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(54) **SPORTSWEAR**

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(56) References cited:
EP-A1- 1 250 858 JP-A- 2001 262 409
JP-A- 2003 003 306 JP-A- 2003 003 307
JP-A- 2007 107 163 JP-A- 2008 150 767
JP-A- 2008 280 656

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Description

Technical Field

5 **[0001]** The present invention relates to sportswear that is worn with a substantially tight fit to the surface of a wearer.

Background Art

10 **[0002]** Swimsuits with low water resistance are required for competitive swimming. Water resistance can be divided into fluid friction resistance between water flowing along the body surface and the body or swimsuit, and shape resistance that depends on the body shape. Conventional swimsuits have been designed focusing on reducing the friction resistance of the material (see, for example, Patent Documents 1 to 3), but nothing has been done to reduce the shape resistance, which accounts for a high percentage of the water resistance.

15 **[0003]** In order to reduce the shape resistance, it is required to flatten protruding body parts, such as hips and women's breast curves, to the highest degree possible. Also, bending of the lower body with respect to the upper body, which is observed particularly at the time of fatigue, is considered to be a cause of increasing the shape resistance during competitive swimming motions. All of these increase the projected area of the body as viewed from the direction of travel of the body, resulting in an increase in the shape resistance. Accordingly, in order to reduce the shape resistance, it is desirable to flatten body curves and suppress bending of the lower body. In order to suppress the bending of the lower
20 body, a design is needed in which tension is applied primarily in the direction of extension of the hip joints. In order to achieve this, conventionally, a technique has been proposed in which a strong compression material and a weak compression material are used so as to apply tension in the direction of extension of the hip joints. In addition, a pair of leggings for track and field use has been proposed that supports a movement to kick the ground, or in other words, the extension movement of the hip joints by covering the hips with a planar, strong compression material (Patent Document
25 4). However, these conventional techniques are insufficient to suppress the bending of the lower body with respect to the upper body and satisfy both a function of smoothing protruding body parts and a function of high mobility.

Prior Art Documents

30 Patent Documents

[0004]

35 Patent Document 1: Japanese Patent No. 2715088
Patent Document 2: JP 2004-292962A
Patent Document 3: WO 2007/142232
Patent Document 4: JP 2005-146450A
Patent Document 5: JP-2008-150767 & EP-A2-1935 265

40 Disclosure of Invention

Problem to be Solved by the Invention

45 **[0005]** In order to solve the problems encountered with such conventional techniques, the present invention provides sportswear that suppresses the bending of the lower body with respect to the upper body and that has a function of smoothing protruding body parts while satisfying a function of high mobility.

Means for Solving Problem

50 **[0006]** Sportswear of the present invention is sportswear that is worn with a tight fit to the surface of a wearer and that includes a stretch base fabric and partially a non-stretch or low-stretch material, wherein the non-stretch or low-stretch material is separately arranged in a region A that covers at least the back of the waist, a region B that includes rounded portions of the hips, and a region C that includes the back of the thighs, and the non-stretch or low-stretch material reinforces tension in a direction of extension of the hip joints.

55 Effects of the Invention

[0007] Because sportswear of the present invention includes a stretch base fabric and partially a non-stretch or low-

stretch material, wherein the non-stretch or low-stretch material is arranged separately in a region A that covers at least the back of the waist, a region B that includes rounded portions of the hips, and a region C that includes the back of the thighs to reinforce tension in a direction of extension of the hip joints, it is possible to exert a function of lifting up the back of the thighs from the buttocks, suppress the bending of the lower body with respect to the upper body, and provide

a function of smoothing protruding body parts while satisfying a function of high mobility.

[0008] That is to say, by arranging a non-stretch or low-stretch material separately in the regions A to C, the tension in the direction of extension of the hip joints can be reinforced, a function of lifting up the back of the thighs from the buttocks can be exerted, and the bending of the lower body with respect to the upper body can be suppressed. In addition, even when tension is applied to the non-stretch or low-stretch material by a movement, because the material itself stretches little or not at all, the tension applied to the non-stretch or low-stretch material regions acts as a force in the direction of the skin, compressing protruding body parts. The regions A to C are portions where the muscles rise, and by arranging a non-stretch or low-stretch material in these portions, a function of smoothing protruding body parts can be provided. The regions B and C, in particular, are portions in which there are muscles that contribute to the extension of the hip joints such as the gluteus maximus and the hamstring muscles, and by compressing these regions, the intramuscular pressure is increased, effectively causing a muscular force to be exerted in the direction of extension of the hip joints. As a result, it is possible to provide a function of lifting up the back of the thighs from the buttocks, suppress the bending of the lower body with respect to the upper body, and provide a function of smoothing protruding body parts while satisfying a function of high mobility.

Brief Description of Drawings

[0009]

[FIG. 1] FIG. 1A is a front view of a pair of half leggings for swimming according to an embodiment of the present invention. FIG. 1B is a rear view of the half leggings shown in FIG. 1A.

[FIG. 2] FIG. 2A is a front view of a pair of half leggings for swimming according to another embodiment of the present invention. FIG. 2B is a rear view of the half leggings shown in FIG. 2A.

[FIG. 3] FIG. 3A is a front view of a pair of half leggings for swimming according to still another embodiment of the present invention. FIG. 3B is a rear view of the half leggings shown in FIG. 3A.

[FIG. 4] FIG. 4A is a front view of a pair of half leggings for swimming according to still another embodiment of the present invention. FIG. 4B is a rear view of the half leggings shown in FIG. 4A.

[FIG. 5] FIG. 5 is a diagram used to illustrate a direction in which the muscle fibers of the gluteus maximus of a human body run.

[FIG. 6] FIG. 6 is a diagram used to illustrate a direction of stretch of a pair of half leggings for swimming according to an embodiment of the present invention.

[FIG. 7] FIG. 7 is a diagram used to illustrate a direction of stretch of a pair of half leggings for swimming according to a comparative example.

[FIG. 8] FIG. 8A is a front view of a one-piece type swimsuit according to an embodiment of the present invention. FIG. 8B is a rear view of the swimsuit shown in FIG. 8A.

[FIG. 9] FIG. 9A is a front view of a one-piece type swimsuit according to another embodiment of the present invention. FIG. 9B is a rear view of the swimsuit shown in FIG. 9A.

Description of the Invention

[0010] Sportswear of the present invention includes a stretch base fabric and partially a non-stretch or low-stretch material, the non-stretch or low-stretch material is separately arranged in a region A that covers at least the back of the waist, a region B that includes rounded portions of the hips, and a region C that includes the back of the thighs, and the stretch base fabric is arranged in the regions between the regions A and B and between the regions B and C and other regions, whereby tension in the direction of extension of the hip joints is reinforced.

[0011] The non-stretch or low-stretch material can be a woven fabric made using a non-elastic yarn. Examples include fabrics made using a polyester (polyethylene terephthalate, polytrimethylene terephthalate, polybutylene terephthalate, etc.) fiber yarn, a polyamide fiber yarn, an acetate fiber yarn, a cotton fiber yarn, a rayon fiber yarn, an ethylene vinyl alcohol fiber yarn, and so on. Among them, it is preferable to use a polyethylene terephthalate (PET) fiber yarn as it is thermoplastic and hydrophobic and has good heat setting properties. Examples of woven fabrics include a plain weave, a twill weave, a sateen weave, a plain derivative weave, a twill derivative weave, a sateen derivative weave, a derivative weave, a brocade, a half double weave, a double structure, a multi structure, a warp pile weave, a weft pile weave, a leno weave, and so on. Among them, for sports use, a plain weave fabric excels in texture, strength and the like. Usually, a woven fabric is made of warp yarns and weft yarns. Accordingly, when a rigid yarn such as a polyester fiber yarn is

used, the resulting fabric stretches little in both warp and weft directions.

[0012] Another example of the non-stretch or low-stretch material is a knitted fabric made using a non-elastic yarn. Examples of knitted fabrics include a circular knit, a weft knit, a warp knit, a pile knit, and further include a plain knit, a jersey knit, a rib knit, a smooth knit (interlock knit), a rubber knit, a pearl knit, a dembigh stitch structure, a cord structure, an atlas structure, a chain structure, an inlay structure, and so on. Basically, a knitted fabric is formed of loops. Accordingly, when a stress is applied onto a knitted fabric made using a rigid yarn such as a polyester fiber yarn, the loops deform and the fabric stretches out. However, such a change in size is very small, so knitted fabrics as listed above also are included in the non-stretch or low-stretch material.

[0013] Still another example of the non-stretch or low-stretch material is a sheet obtained by impregnating a woven fabric or knitted fabric with an elastomer resin or rubber, or a sheet obtained by attaching an elastomer resin or rubber onto a woven fabric or knitted fabric. It is also possible to impregnate a stretch base fabric with an elastomer resin or rubber, or attach an elastomer resin or rubber onto a stretch base fabric. Examples of elastomer resins include a urethane-based elastomer, a soft vinyl chloride-based elastomer, a styrene-based elastomer, an olefin-based elastomer, an ester-based elastomer, an amide-based elastomer, a chlorinated polyethylene-based elastomer, a Syn-1,2-polybutadiene-based elastomer, a Trans-1,4-polyisoprene-based elastomer, a fluorine-based elastomer, and so on. These resins can be found in "Plastic Data Book" published by Kogyo Chosakai Publishing Co., Ltd, December 1, 1999, pp 854 to 910. Examples of rubbers include a silicone rubber, a fluorine rubber, a urethane rubber, a synthetic rubber, a natural rubber, and so on.

[0014] A non-stretch or low-stretch material may be arranged around the non-stretch or low-stretch material regions stepwise or with a gradient. It is preferable that the non-stretch or low-stretch material arranged stepwise or with a gradient has a circular shape, an elliptical shape, a rounded polygonal shape, or a linear shape.

[0015] The non-stretch or low-stretch material may be sewn to the stretch base fabric. To this end, it is possible to use a cut-and-stitch method, that is, a method in which a hole is made in a fabric, and another fabric is sewn onto the fabric, or a method in which another fabric is sewn onto the stretch base fabric. Alternatively, a sheet impregnated with an elastomer resin or rubber, or a sheet to which an elastomer resin or rubber is attached further may be sewn to the stretch base fabric.

[0016] Still another example of the non-stretch or low-stretch material is embroidery worked on the stretch base fabric using a non-elastic yarn. The non-elastic yarn can be, for example, polyester (polyethylene terephthalate, polytrimethylene terephthalate, polybutylene terephthalate, etc.) fiber yarn, a polyamide fiber yarn, an acetate fiber yarn, a cotton fiber yarn, a rayon fiber yarn, an ethylene vinyl alcohol fiber yarn or the like. Among them, it is preferable to use a polyethylene terephthalate (PET) fiber yarn as it is thermoplastic and hydrophobic and has good heat setting properties.

[0017] It is preferable that the non-stretch or low-stretch material has an elongation factor under a load of 4.9 N (500 gf) measured in accordance with Japanese Industrial Standards (JIS) 1096 of 0% or more and less than 10% in the longitudinal direction of the body, whereby the effect of reinforcing the back of the thighs from the buttocks of the human body can be further enhanced.

[0018] The non-stretch or low-stretch material preferably has a weight per unit area of 100 to 400 g/m². As long as the weight per unit area falls within this range, a suitable appearance and high wearability can be obtained without a heavy feeling and the problem of being see-through.

[0019] In addition, in the present invention, it is also preferable to arrange the non-stretch or low-stretch material in a continuous region C' that covers the inner thighs in addition to the back of the thighs, whereby the function of lifting up the back of the thighs from the buttocks can be further enhanced. Furthermore, by covering the hip adductor muscles, it is possible to suppress the increase of the shape resistance caused by abducting the hip joints.

[0020] Furthermore, in the present invention, it is also preferable to arrange the non-stretch or low-stretch material in a continuous region C'' that covers the back of the thighs and also encircles the thighs, whereby the function of lifting up the back of the thighs from the buttocks can be enhanced, and the curves of the thighs can be reduced as well, thereby reducing water resistance.

[0021] In the present invention, it is also preferable to arrange the non-stretch or low-stretch material separately in a region D that covers the quadriceps femoris muscles, whereby the curves of the thighs can be reduced, thereby reducing water resistance.

[0022] It is preferable that a dividing portion between the region A and the region B has a truncated V shape as viewed vertically from the back side, whereby the function of lifting up the back of the thighs from the buttocks can be further enhanced, and a function of not impeding the movement of the human body can be obtained.

[0023] It is preferable that a dividing portion between the region B and the region C has an inverted truncated V shape or a shape with a recess in the center thereof as viewed vertically from the back side. As described above, the function of lifting up the back of the thighs from the buttocks can be further enhanced.

[0024] The stretch base fabric used in the present invention is preferably a one-way or two-way woven or knitted fabric that is formed of a yarn that includes an elastic yarn. The elastic yarn is preferably at least one selected from a polyurethane-based elastic yarn and a polyester-based elastic yarn as they are highly stretchable and suitable for sports

garments. The elastic yarn may be a bare yarn (uncovered yarn) which may be paralleled with a non-elastic yarn (rigid yarn) when used, or a covered yarn whose surface is covered with a polyester fiber or a nylon fiber.

[0025] It is preferable that the stretch base fabric is a fabric (woven or knitted fabric) that has an elongation factor under a load of 4.9 N (500 gf) measured in accordance with JIS 1096 of 10% or more in the longitudinal direction of the body. As long as the elongation factor falls within this range, a fabric that is capable of following the movements of the body and that has high wearability is obtained. Particularly, it is preferable that the stretch material arranged in the dividing portions between the regions A and B, between the regions B and C and between regions C and D is an easy-to-stretch material. This is to keep balance because the regions A to D are made of a difficult-to-stretch material. It is preferable that the stretch base fabric has a weight per unit area of 100 to 400g/m². As long as the weight per unit area falls within this range, a suitable appearance and high wearability can be obtained without a heavy feeling and the problem of being see-through.

[0026] In the present invention, in order to achieve a "substantially tight fit", sportswear in which the circumference direction has 50% or more and 110% or less with respect to the size of a naked human body, more preferably 70% or more and 95% or less, and the length has 75% or more and 100% or less with respect to the same, more preferably 85% or more and 100% or less is formed. Needless to say, these ratios are merely a rough guide because the human body size differs from person to person. More specifically, the size is determined in accordance with the standard defined by Association of Japan Sporting Goods Industries (JASPO).

[0027] The sportswear is suitable as leggings for sports use, specifically, as half leggings and long leggings. The sportswear may be of one-piece type that covers the upper body such as a half suit, a long suit or a full suit.

[0028] In the present invention, a V-shaped or U-shaped non-stretch or low-stretch material further may be arranged in a shin portion for reinforcement, whereby it is possible to prevent the knees from bending while swimming and maintain a flat streamline.

[0029] In the one-piece type swimsuit, the non-stretch or low-stretch material may be arranged in right and left breast portions and an abdominal portion for reinforcement, whereby it is possible to prevent the portion extending from the abdominal portion to the breast portion from bending and to maintain a flat streamline. In the abdominal portion, the non-stretch or low-stretch material may be arranged in a single position or may be arranged separately in a plurality of positions.

[0030] The non-stretch or low-stretch material may be provided with a slit, whereby because the slit stretches, advantages can be obtained such as providing good wearability and wear comfort, ease of breathing, and maintaining the effect of lifting up the body.

[0031] The sportswear described above is suitable as a swimsuit as well as athletic wear for sporting events including ball games, track and field events such as running, jumping and throwing, and the like, and particularly suitable as a swimsuit for competitive swimming use. That is to say, improved performance is expected to be achieved with the above-described sportswear of the present invention in the sporting events in which extension movement of the hip joints affects the performance. In track and field, for example, the sportswear of the present invention is effective in short-distance running, jumping and throwing events in which explosive power is important.

[0032] The hip joint extends, such as when kicking the ground in a short-distance running event, when jumping in a jump event, and when throwing an object in a throw event. In any of these situations, the foot contacts the ground, and the contraction of the gluteus maximus and the like exerts a large force in the direction of extension of the hip joint. Accordingly, the sportswear of the present invention that reinforces tension in the direction of extension of the hip joints can improve performance.

[0033] The present invention is also effective in ball games that require constant jumping movement such as basketball and volleyball. In such sporting events, the same effects can be expected when jumping for the same reason described above.

[0034] The effects also can be expected when landing. That is to say, in landing movement, the hip joint temporarily bends, at which time the muscles such as the gluteus maximus exert a force in the direction of extension of the hip joint while being pulled and stretched, and this action serves as a factor that absorbs the impact of landing. The tension in the direction of extension of the hip joints created by the above-described sportswear of the present invention helps this action, so the burden imposed on the muscles when landing can be reduced.

[0035] Furthermore, the sportswear of the present invention is also effective as athletic wear for sporting events performed in a crouching posture in which the hip joint is bent such as speed skating and skiing. In such sporting events, it is necessary constantly to maintain a posture in which the hip joints are bent. At this time, the muscles such as the gluteus maximus continuously exert muscular force in the direction of extension of the hip joint. The tension in the direction of extension of the hip joints created by the present invention helps such an action as well, so the burden imposed on the muscles used to maintain the posture can be reduced.

[0036] In speed skating in particular, the same effects as those obtained in a short-distance running event can be expected when kicking the ice.

[0037] Hereinafter, the present invention will be described with reference to the accompanying drawings. FIG. 1A is

a front view of a pair of half leggings 10 for swimming according to an embodiment of the present invention. FIG. 1B is a rear view of the half leggings shown in FIG. 1A.. In FIGS. 1A and 1B, a stretch base fabric (1) constitutes the primary portion. A non-stretch or low-stretch material is arranged separately in a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes the rounded portions of both hips, and a region C (4a, 4b) that includes the back of the thighs. This configuration reinforces tension in the direction of extension of the hip joints, exerts a function of lifting up the back of the thighs from the buttocks, suppresses the bending of the lower body with respect to the upper body, and provides a function of smoothing protruding body parts while satisfying a function of high mobility.

[0038] The stretch base fabric (1) and the regions A to C can be formed by placing a non-stretch or low-stretch sheet onto the stretch base fabric (1) and fixing it by sewing or by means of an adhesive. Alternatively, a method may be used in which a non-stretch or low-stretch sheet that is thermoplastic is thermally pressed and fixed on the stretch base fabric (1). Alternatively, a method may be used in which the positions that correspond to the regions A to C of the stretch base fabric (1) are cut out and a non-stretch or low-stretch sheet is placed on the cut-out positions and sewed on. Alternatively, a method may be used in which an elastomer resin or rubber is impregnated into or attached to the stretch base fabric (1). Still alternatively, a method may be used in which embroidery is worked on the positions that correspond to the regions A to C of the stretch base fabric (1) to reduce the stretchability

[0039] FIG. 2A is a front view of a pair of half leggings 11 for swimming according to another embodiment of the present invention. FIG. 2B is a rear view of the half leggings shown in FIG. 2A. In FIGS. 2A and 2B, a stretch base fabric (1) constitutes the primary portion. A non-stretch or low-stretch material is arranged separately in a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes the rounded portions of both hips, a region C' (5a, 5b) that continuously includes the back of the thighs and the inner thighs, and a region D (7a, 7b) that covers the quadriceps femoris muscles. With this configuration, it is possible further to enhance the effect of lifting up the legs. In addition, because the hip adductor muscles are covered, it is possible to suppress the increase of shape resistance caused by abducting the hip joints. Furthermore, because the curves of the thighs are reduced, water resistance can be reduced.

[0040] FIG. 3A is a front view of a pair of half leggings 12 for swimming according to still another embodiment of the present invention. FIG. 3B is a rear view of the half leggings shown in FIG. 3A. FIGS. 3A and 3B are different from FIGS. 1A and 1B in that the non-stretch or low-stretch material is arranged in a region C" (6a, 6b) that encircles the thighs, whereas the remaining configuration is the same. In this example as well, the effect of lifting up the legs can be further enhanced. In addition, because the hip adductor muscles are covered, it is possible to suppress the increase of shape resistance caused by abducting the hip joints. Furthermore, the curves of the thighs are reduced, which reduces water resistance.

[0041] FIG. 4A is a front view of a pair of half leggings 13 for swimming according to still another embodiment of the present invention. FIG. 4B is a rear view of the half leggings shown in FIG. 4A. FIGS. 4A and 4B are different from FIGS. 2A and 2B in that the region D (7a, 7b) that covers the quadriceps femoris muscles is not provided.

[0042] Next, the muscles of the lower human body will be described with reference to FIG. 5. A hip includes a gluteus maximus 20, a gluteus medius 21 located above the gluteus maximus and an upper iliotibial tract 22 located on the side. Reference numeral 23 indicates an upper adductor magnus. Reference numeral 24 indicates a direction of contraction of the gluteus maximus 20.

[0043] FIG. 6 is a diagram illustrating the direction of stretch of each region when the half leggings 10 for swimming shown in FIG. 1 are secured to the hips of a human body as shown in FIG. 5. In FIG. 6, reference numeral 31 indicates a direction in which a tension applied to the stretch base fabric (1) located between the region A (2a, 2b) and the region B (3a, 3b) occurs, 32 indicates a direction of contraction of the gluteus maximus, and 30 indicates a direction of the combined force of a force in the tension direction 31 and a force in the gluteus maximus contraction direction 32. Reference numeral 33 indicates a direction of extension of the skin located between the region B (3a, 3b) and the region C (4a, 4b). It can be seen that because the dividing portion between the region A (2a, 2b) and the region B (3a, 3b) has a truncated V shape (shape of the inverted Japanese letter ヌ), the direction of tension generated by the fabric approximates the muscle contraction direction, as a result of which the buttocks can be easily lifted up and the rounded portions can be easily pressed down. It also can be seen that because the dividing portion between the region B (3a, 3b) and the region C (4a, 4b) has an inverted truncated V shape (shape of the Japanese letter ヌ), the stretch base fabric (1) has a significant stretch allowance.

[0044] FIG. 7 is a diagram illustrating a direction of stretch of a pair of half leggings for swimming according to a comparative example. In FIG. 7, reference numeral 41 indicates a direction in which a tension applied to the stretch base fabric (1) located between the region A (2a, 2b) and the region B (3a, 3b) occurs, 44 indicates an extension line of that direction, 42 indicates a direction of contraction of the gluteus maximus, and 40 indicates an extension line of that direction. Reference numeral 43 indicates a direction of extension of the skin located between the region B (3a, 3b) and the region C (4a, 4b). Because the dividing portion between the region A (2a, 2b) and the region B (3a, 3b) has an inverted truncated V shape, the direction of tension generated by the fabric does not approximate the muscle contraction direction, as a result of which the buttocks cannot be lifted up easily and the rounded portions cannot be pressed down

easily. In addition, because the dividing portion between the region B (3a, 3b) and the region C (4a, 4b) form a truncated V shape, the stretch base fabric (1) has a small stretch allowance (the arrows 43).

[0045] The muscle fiber running direction of the gluteus maximus, which primarily is involved in extension of the hip joints, extends from the center in the width direction toward the outer side at an angle of 30 to 70 degrees as viewed vertically from a back side of the body (see FIG. 5). That is to say, they form an inverted truncated V shape as viewed vertically from the back side. The direction matches the approximate direction in which the tension generated by contraction of the gluteus maximus is exerted. In a preferred example of the present invention, the dividing portion between the region A and the region B has a truncated V shape as viewed vertically from the back side. That is to say, they have an angle approximately orthogonal to the contraction direction of the gluteus maximus. Accordingly, the tension generated by extension of the fabric caused by extension of the hip joint is more likely to occur in a direction extending from the upper end of the region B to the lower end of the region A, which approximates the contraction direction of the gluteus maximus. Consequently, the buttocks can be lifted up more easily and the rounded portions of the hips can be pressed down more easily (see FIG. 6). If, on the other hand, the dividing portion between the region A and the region B has a shape that has an angle extending downward from the center in the width direction toward the outer side as viewed vertically from the back side of the body, that is, an inverted truncated V shape, the stretch base fabric will stretch easily in the contraction direction of the muscles, as a result of which the buttocks cannot be lifted up easily and the rounded portions cannot be pressed down easily. (see FIG. 7).

[0046] Furthermore, by arranging a stretch base fabric in the dividing portions between the regions A and B and between the regions B and C and other regions, it is possible to satisfy a function of high mobility. That is to say, if the regions A to C are continuously covered with a strong compression material, these regions will undergo a very large change in tension when stretched by a movement. If, on the other hand, a non-stretch or low-stretch sheet is arranged separately in the regions A to C, when stretched by a movement, the regions A to C will stretch little or not at all and only the stretch base fabric that changes little in tension by stretch will stretch, as a result of which mobility is secured.

[0047] The gluteal sulcus is a part whose skin stretches the most when the hip joint is bent. The direction in which the skin of the gluteal sulcus stretches extends downward from the center in the width direction toward the outer side at an angle of 15 to 85 degrees as viewed vertically from the back side. That is to say, they form an inverted truncated V shape as viewed vertically from the back side. On the other hand, in the present invention, the dividing portion between the region B and the region C has an inverted truncated V shape as viewed vertically from the back side. That is to say, it has an angle that approximates the direction of contraction of the gluteal sulcus skin. Accordingly, the stretch allowance of the stretch base fabric becomes large with respect to the extension of the gluteal sulcus skin, providing more mobility (see FIG. 6). If, on the other hand, the dividing portion between the region B and the region C has an angle that extends upward from the center in the width direction toward the outer side as viewed vertically from the back side, that is to say, a truncated V shape, the stretch allowance of the stretch base fabric will be smaller, resulting in poor mobility (see FIG. 7).

[0048] FIG. 8A is a front view of a one-piece type swimsuit according to an embodiment of the present invention. FIG. 8B is a rear view of the swimsuit shown in FIG. 8A. In FIGS. 8A and 8B, a stretch base fabric (1) constitutes the primary portion. A non-stretch or low-stretch material is arranged separately in a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes the rounded portions of both hips, a region C' (5a, 5b) that continuously includes the back of the thighs and the inner thighs, and a region D (7a, 7b) that covers the quadriceps femoris muscles, whereby the effect of lifting up the legs can be enhanced. In addition, because the hip adductor muscles are covered, it is possible to suppress the increase of shape resistance caused by abducting the hip joints. Furthermore, because the curves of the thighs are reduced, water resistance can be reduced. Also, the non-stretch or low-stretch material is arranged in right and left breast portions 28a and 28b and an abdominal portion 29 for reinforcement. The non-stretch or low-stretch material of the right and left breast portions 28a and 28b can prevent the pectoralis major and the breasts from protruding, so water resistance can be reduced. Likewise, the non-stretch or low-stretch material of the abdominal portion 29 increases the internal pressure of the abdominal portion, so the lumbar portion is not easily bent, maintaining a flat streamline.

[0049] FIG. 9A is a front view of a one-piece type swimsuit according to another embodiment of the present invention. FIG. 9B is a rear view of the swimsuit shown in FIG. 9A. As shown in the rear view of FIG. 9B, FIG. 9B is the same as FIG. 8B in that the non-stretch or low-stretch material is arranged separately in a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes the rounded portions of both hips, a region C' (5a, 5b) that continuously includes the back of the thighs and the inner thighs, and a region D (7a, 7b) that covers the quadriceps femoris muscles. FIG. 9A and 9B are different from FIGS. 8A and 8B in that the region A (2a, 2b) has a larger area, and that the dividing portion between the region B (3a, 3b) and the region C' (5a, 5b) has a shape with a recess in the center thereof. As with the example of FIGS. 8A and 8B, the effect of lifting up the legs can be enhanced further, the increase of shape resistance caused by abducting the hip joints can be suppressed by covering the hip adductor muscles, and water resistance can be reduced by reducing the curves of the thighs. This swimsuit can be put on and off by opening and closing a zip fastener 9. As shown in FIG. 9A, the non-stretch or low-stretch material is arranged in right and left breast portions 25a and 25b and abdominal portions 26a to 26c and 27a to 27c for reinforcement. The non-stretch or

low-stretch material of the right and left breast portions 25a and 25b prevent the pectoralis major and the breasts from protruding, so water resistance can be reduced. Likewise, the non-stretch or low-stretch material of the abdominal portions 26a to 26c and 27a to 27c increase the internal pressure of the abdominal portions, so the lumbar portion is not easily bent, maintaining a flat streamline. Furthermore, a V-shaped or U-shaped non-stretch or low-stretch material may be arranged in shin portions 8a and 8b for reinforcement, whereby it is possible to prevent the knees from bending while swimming and to maintain a flat streamline. The non-stretch or low-stretch material of the region A (2a, 2b), the region C' (5a, 5b), the region D (7a, 7b), the right and left breast portions 25a and 25b and the abdominal portions 26a to 26c and 27a to 27c may be provided with 1 mm wide slits that appear to be linear, whereby it is possible to provide a swimsuit that stretches, provides good comfort when worn and is easy to put on and off.

[0050] In FIG. 9B, the dividing portion between the region B (3a, 3b) and the region C (5a, 5b) includes an inverted truncated V-shaped inner portion in the width direction and a truncated V-shaped outer portion in the width direction as viewed vertically from the back side of the body. As already stated above, because a truncated V-shaped dividing portion impairs mobility, slits are provided in the region C (5a, 5b) to secure mobility.

Examples

[0051] Hereinafter, examples of the present invention will be described, but it should be understood that the present invention is not limited thereto.

(Example 1)

[0052] As shown in FIGS. 1A and 1B, a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes the rounded portions of the hips, and a region C (4a, 4b) that includes the back of the thighs were separately arranged on the surface of a stretch base fabric 1 by providing a non-stretch or low-stretch sheet by attaching a transfer sheet by thermal pressing so as to reinforce tension in the direction of extension of the hip joints.

[0053] As the stretch base fabric, a fabric woven in a plain weave with a weight per unit area of 110g/m² was used. For the warp yarn, a yarn made by covering 44 dtex (decitex) polyurethane (Pu) filaments with 33 dtex (decitex) nylon filaments with a filament number of ten was used, and for the weft yarn, a yarn made by covering 44 dtex (decitex) polyurethane (Pu) filaments with 33 dtex (decitex) nylon filaments with a filament number of ten was used. The number of warp yarns per inch was 161, and the number of weft yarns per inch was 204. This woven fabric was dyed and then treated for water repellency. As the water repellent treatment, 10 wt% of a fluorine resin-based water repellent agent, namely, DP-10 (trade name) available from Shichifuku Chemical Co., Ltd. and 1 wt% of a urethane-based resin, namely, EVAFANOLAP12 available from Nicca Chemical Co., Ltd. as a binder resin were collected and dispersed in 10 liters of water to obtain a water repellent treatment solution. The obtained water repellent treatment solution was applied in an amount of 7.2 wt% to the stretch fabric through immersion, and the fabric was sewn into a pair of half leggings.

[0054] The transfer sheet used to form the non-stretch or low-stretch material portions by thermal pressing was Polytough 3 (product name) available from Japan Polymark Co., Ltd. The transfer sheet was composed primarily of urethane, and had a thickness of 100 μm and a weight per unit area of 121 g/m².

(Comparative Example 1)

[0055] A swimsuit was produced using only the stretch base fabric used in Example 1.

(Example 2)

[0056] A pair of half leggings was produced in the same manner as in Example 1 except that the half leggings were configured as shown in FIGS. 2A and 2B.

[0057] Five male competitive swimmers were instructed to wear the half leggings of Comparative Example 1 and Examples 1 and 2, and to respond to the items shown in Tables 1 to 3. Each item was rated on a scale of 1 to 5, with 5 being strongly agreed, 4 being mostly agreed, 3 being somewhat agreed, 2 being somewhat disagreed, and 1 being disagreed.

[0058]

[TABLE 1]

Comparative Example 1	Subject A	Subject B	Subject C	Subject D	Subject E
When worn: the buttocks are pressed down	2	1	2	1	2

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(continued)

Comparative Example 1	Subject A	Subject B	Subject C	Subject D	Subject E
When worn: the legs are pulled backward	2	2	1	1	1
During swimming: the lower body can float	2	1	1	2	1
During swimming: the legs can be moved easily	5	4	4	5	4
Total	11	8	8	9	8
Average	2.75	2	2	2.25	2

[0059]

[TABLE 2]

Example 1	Subject A	Subject B	Subject C	Subject D	Subject E
When worn: the buttocks are pressed down	4	5	4	3	4
When worn: the legs are pulled backward	5	4	3	3	4
During swimming: the lower body can float	5	4	4	4	5
During swimming: the legs can be moved easily	4	4	4	5	4
Total	18	17	15	15	17
Average	4.5	4.25	3.75	3.75	4.25

[0060]

[TABLE 3]

Example 2	Subject A	Subject B	Subject C	Subject D	Subject E
When worn: the buttocks are pressed down	5	5	4	3	4
When worn: the legs are pulled backward	5	4	4	4	5
During swimming: the lower body can float	5	5	4	4	5
During swimming: the legs can be moved easily	4	4	4	5	4
Total	19	18	16	16	18
Average	4.75	4.5	4	4	4.5

[0061] As can be clearly seen from the results of Tables 1 to 3, in Comparative Example 1, all subjects gave low ratings to all items except for the item "During swimming: the legs can be moved easily", with the average score of 2 to 2.75. On the other hand, in Examples 1 and 2, all subjects gave ratings of 3 or higher, with the average score of 3.75 or higher. When Examples 1 and 2 were compared, although there was not a large difference between them, slightly better results were obtained in Example 2 with the average score of 4 to 4.75 whereas the average scores of Example 1 were 3.75 to 4.75.

[0062] From the above results, it was found that the region A, the region B and the region C or the region C' of Examples 1 and 2 can reduce the curves of the hips and thighs, suppressing the bending of the lower body with respect to the upper body. It was also found that the swimsuits of Examples 1 and 2 have a small shape resistance and can provide high performance. Furthermore, all subjects felt that the back of the thighs was lifted up or the lower body floated when they wore the swimsuits of Examples 1 and 2, and judged the swimsuits of Examples 1 and 2 as having good wear comfort and high mobility.

(Comparative Example 2)

[0063] A one-piece type swimsuit was produced using only the stretch base fabric used in Example 1. As in Examples 1 to 2, five female competitive swimmers were instructed to wear the swimsuit and to respond to the items shown in

Table 4. Each item was rated on a scale of 1 to 5, with 5 being strongly agreed, 4 being mostly agreed, 3 being somewhat agreed, 2 being somewhat disagreed, and 1 being disagreed.

[0064]

[TABLE 4]					
Comparative Example 2	Subject F	Subject G	Subject H	Subject I	Subject J
When worn: the buttocks are pressed down	2	3	2	1	1
When worn: the legs are pulled backward	1	2	2	2	1
During swimming the lower body can float	1	2	2	2	1
During swimming: the legs can be moved easily	4	4	5	4	5
Total	8	11	11	9	8
Average	2	2.75	2.75	2.25	2

(Example 3)

[0065] A one-piece type swimsuit was produced in the same manner as in Example 1 except that the swimsuit was configured as shown in FIGS. 9A and 9B. As in Examples 1 to 2, five female competitive swimmers were instructed to wear the swimsuit and to respond to the items shown in Table 5. Each item was rated on a scale of 1 to 5, with 5 being strongly agreed, 4 being mostly agreed, 3 being somewhat agreed, 2 being somewhat disagreed, and 1 being disagreed.

[0066]

[TABLE 5]					
Example 3	Subject F	Subject G	Subject H	Subject I	Subject J
When worn: the buttocks are pressed down	4	5	4	4	4
When worn: the legs are pulled backward	4	5	5	5	4
During swimming: the lower body can float	4	5	5	5	5
During swimming: the legs can be moved easily	5	3	5	4	5
Total	17	18	19	18	18
Average	4.25	4.5	4.75	4.5	4.5

[0067] As can be seen clearly from the results of Tables 4 and 5, in Comparative Example 2, all subjects gave low ratings to all items except for the item "During swimming: the legs can be moved easily", with the average score of 2 to 2.75. On the other hand, in Example 3, all subjects gave ratings of 3 or higher, with the average score of 4.25 or higher.

[0068] From the above results, the swimsuit of Example 3 received higher evaluation ratings and better records were achieved, as compared to those of Examples 1 and 2. With respect to the mobility of the legs, almost the same answers as those of Comparative Example 2 were obtained in Example 3, from which it was found that the slits provided in the region C facilitate the mobility of the legs.

Industrial Applicability

[0069] Other than swimsuits, the sportswear of the present invention is also useful as athletic wear for sporting events including ball games such as basket ball and volley ball, and track and field events such as running, jumping and throwing, and also as athletic wear for sporting events carried out in a crouching posture in which the hip joint is bent, such as speed skating and skiing.

Description of Reference Numerals

[0070]

1 Stretch base fabric

	2a, 2b	Region A
	3a, 3b	Region B
	4a, 4b	Region C
	5a, 5b	Region C'
5	6a, 6b	Region C''
	7a, 7b	Region D
	8a, 8b	Shin portion
	9	Zip fastener
	10, 11, 12, 13, 14	Pair of half leggings for swimming
10	15, 16	One-piece type swimsuit
	20	Gluteus maximus
	21	Gluteus medius
	22	Upper iliotibial tract
	23	Upper adductor magnus
15	24	Direction of contraction of the gluteus maximus
	25a, 25b, 28a, 28b	Breast portion
	26a-26c, 27a-27c, 29	Abdominal portion
	30, 31, 40, 41, 44	Direction in which a tension is applied
	32, 42	Direction of contraction of the gluteus maximus
20	33, 43	Direction of extension of the skin

Claims

- 25 1. Sportswear (10) that is worn with a tight fit to the surface of a wearer and that comprises a stretch base fabric (11) and partially a non-stretch or low-stretch material (2ab, 3ab, 4ab), **characterised in that** the non-stretch or low-stretch material (2, 3, 4) is separately arranged in a region A (2a, 2b) that covers at least the back of the waist, a region B (3a, 3b) that includes rounded portions of the hips, and a region C (4a, 4b) that includes the back of the thighs, and
- 30 the non-stretch or low-stretch material (2, 3, 4) reinforces tension in direction of extension of the hip joints.
2. The sportswear according to claim 1, wherein the non-stretch or low-stretch region C (4a, 4b) is a region C (5a, 5b) that continuously includes the inner thighs.
- 35 3. The sportswear according to claim 1, wherein the non-stretch or low-stretch region C is a region C (6a, 6b) that encircles the thighs.
4. The sportswear according to any one of claims 1 to 3, wherein a region D (7a, 7b) that covers the quadriceps femoris muscles further is separately arranged as a non-stretch or low-stretch region.
- 40 5. The sportswear according to any one of claims 1 to 4, wherein a dividing portion between the region A (4a, 4b) and the region B (3a, 3b) has truncated V shape as viewed vertically from a back side.
6. The sportswear according to any one of claims 1 to 4, wherein a dividing portion between the region B and the region C, the region C' (5a, 5b) or the region C' (6a, 6b) has an inverted truncated V shape or a shape with a recess in the center thereof as viewed vertically from a back side.
- 45 7. The sportswear according to any one of claims 1 to 6, wherein the non-stretch or low-stretch material (2, 3, 4) is formed of a woven fabric or knitted fabric.
- 50 8. The sportswear according to any one of claims 1 to 7, wherein the non-stretch or low-stretch material (2, 3, 4) is formed of a sheet obtained by impregnating a woven fabric or knitted fabric with an elastomer resin or rubber, or a sheet obtained by attaching an elastomer resin or rubber onto a woven fabric or knitted fabric.
- 55 9. The sportswear according to any one of claims 1 to 8, wherein the non-stretch or low-stretch material (2, 3, 4) is formed by being sewn or embroidered into the stretch base fabric (1).
10. The sportswear according to any one of claims 1 to 9, wherein the non-stretch or low-stretch material (2, 3, 4) has

an elongation factor under a load of 4.9 N (500 gf) measured in accordance with Japanese Industrial Standards (JIS) 1096 of 0% or more and less than 10% in a longitudinal direction of a body.

- 5 11. The sportswear according to claim 1, wherein the stretch base fabric (1) is a one-way or two-way woven or knitted fabric that is formed of a yarn that includes an elastic yarn.
12. The sportswear according to claim 1 or 11, wherein the stretch base fabric (1) is a fabric that has an elongation factor under a load of 4.9 N (500 gf) measured in accordance with JIS 1096 of 10% or more in a longitudinal direction of a body.
- 10 13. The sportswear according to any one of claims 1 to 12, wherein a V-shaped or U-shaped non-stretch or low-stretch material (2, 3, 4) is provided in a shin portion for reinforcement.
14. The sportswear according to any one of claims 1 to 13, wherein the sportswear is a leggings type swimsuit (10-13) or a one-piece type swimsuit (15-16).
- 15 15. The sportswear according to claim 14, wherein in the one-piece type swimsuit (15-16), the non-stretch or low-stretch material (2-4) is arranged in right and left breast portions and an abdominal portion for reinforcement.
- 20 16. The sportswear according to any one of claims 1 to 15, wherein the non-stretch or low-stretch material is provided with a slit (9).

Patentansprüche

- 25 1. Sportbekleidung (10), die eng anliegend an die Oberfläche eines Trägers getragen wird und die ein Stretchgrundgewebe (1) und teilweise ein Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2ab, 3ab, 4ab) umfasst, **dadurch gekennzeichnet, dass** das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) separat in einem Bereich A (2a, 2b), der zumindest die Rückseite der Taille bedeckt, einem Bereich B (3a, 3b), der gerundete Bereiche der Hüften beinhaltet, und einem Bereich C (4a, 4b), der die Rückseite der Oberschenkel beinhaltet, angeordnet ist und das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) die Spannkraft in einer Richtung einer Verlängerung der Hüftgelenke verstärkt.
- 30 2. Die Sportbekleidung nach Anspruch 1, wobei der Nicht-Stretchbereich oder Bereich mit geringem Stretchanteil C (4a, 4b) ein Bereich C' (5a, 5b) ist, der die inneren Oberschenkelpartien durchgehend beinhaltet.
3. Die Sportbekleidung nach Anspruch 1, wobei der Nicht-Stretchbereich oder Bereich mit geringem Stretchanteil C ein Bereich C'' (6a, 6b) ist, der die Oberschenkel umgibt.
- 40 4. Die Sportbekleidung nach einem der Ansprüche 1 bis 3, wobei ein Bereich D (7a, 7b), der die Quadriceps femoris-Muskeln bedeckt, weiter separat als ein Nicht-Stretchbereich oder Bereich mit geringem Stretchanteil angeordnet ist.
5. Die Sportbekleidung nach einem der Ansprüche 1 bis 4, wobei ein unterteilender Bereich zwischen dem Bereich A (4a, 4b) und dem Bereich B (3a, 3b) bei vertikaler rückwärtiger Ansicht eine abgestumpfte V-Form aufweist.
- 45 6. Die Sportbekleidung nach einem der Ansprüche 1 bis 4, wobei ein unterteilender Bereich zwischen dem Bereich B und dem Bereich C, dem Bereich C' (5a, 5b) oder dem Bereich C'' (6a, 6b) eine umgekehrte abgestumpfte V-Form oder eine Form mit einer Vertiefung in deren Mitte bei vertikaler rückwärtiger Ansicht aufweist.
- 50 7. Die Sportbekleidung nach einem der Ansprüche 1 bis 6, wobei das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) aus einem Gewebe oder Gestrick hergestellt wird.
- 55 8. Die Sportbekleidung nach einem der Ansprüche 1 bis 7, wobei das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) aus einer Bahn, die durch Imprägnieren eines Gewebes oder Gestricks mit einem Elastomerharz oder -kautschuk erhalten wird, oder einer Bahn, die durch Anhaften eines Elastomerharzes oder -kautschuks auf einem Gewebe oder Gestrick erhalten wird, hergestellt wird.

9. Die Sportbekleidung nach einem der Ansprüche 1 bis 8, wobei das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) dadurch hergestellt wird, dass es in das Stretchgrundgewebe (1) eingenäht oder -gestickt wird.
10. Die Sportbekleidung nach einem der Ansprüche 1 bis 9, wobei das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) einen Dehnungsfaktor unter einer Last von 4,9 N (500 gf), gemessen gemäß Japanischer Industrienorm (JIS) 1096, von 0% oder mehr und weniger als 10% in einer Längsrichtung eines Körpers aufweist.
11. Die Sportbekleidung nach Anspruch 1, wobei das Stretchgrundgewebe (1) ein einseitiges oder beidseitiges Gewebe oder Gestrick ist, das aus einem Garn hergestellt ist, das ein elastisches Garn beinhaltet.
12. Die Sportbekleidung nach Anspruch 1 oder 11, wobei das Stretchgrundgewebe (1) ein Gewebe ist, das einen Dehnungsfaktor unter einer Last von 4,9 N (500 gf), gemessen gemäß JIS 1096, von 10% oder mehr in einer Längsrichtung eines Körpers aufweist.
13. Die Sportbekleidung nach einem der Ansprüche 1 bis 12, wobei ein V-förmiges oder U-förmiges Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2, 3, 4) in einem Schienbeinbereich zur Verstärkung bereitgestellt ist.
14. Die Sportbekleidung nach einem der Ansprüche 1 bis 13, wobei die Sportbekleidung ein Schwimmanzug vom Legging-Typ (10-13) oder ein einteiliger Schwimmanzug (15-16) ist.
15. Die Sportbekleidung nach Anspruch 14, wobei bei dem einteiligen Schwimmanzug (15-16) das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil (2-4) in rechten und linken Brustbereichen und einem Bauchbereich zur Verstärkung angeordnet ist.
16. Die Sportbekleidung nach einem der Ansprüche 1 bis 15, wobei das Nicht-Stretchmaterial oder Material mit geringem Stretchanteil mit einem Schlitz (9) versehen ist.

Revendications

1. Vêtement de sport (10) qui est porté avec un ajustement près du corps par rapport à la surface d'un utilisateur et qui comprend un tissu de base extensible (1) et partiellement un matériau non extensible ou faiblement extensible (2ab, 3ab, 4ab), **caractérisé par** :
 - le matériau non extensible ou faiblement extensible (2, 3, 4) est agencé séparément dans une région A (2a, 2b) qui recouvre au moins l'arrière de la taille, une région B (3a, 3b) qui comprend des parties arrondies des hanches, et une région C (4a, 4b) qui comprend l'arrière des cuisses, et
 - le matériau non extensible ou faiblement extensible (2, 3, 4) renforce la tension dans une direction d'extension des articulations des hanches.
2. Vêtement de sport selon la revendication 1, dans lequel la région C non extensible ou faiblement extensible (4a, 4b) est une région C' (5a, 5b) qui comprend de manière continue l'intérieur des cuisses.
3. Vêtement de sport selon la revendication 1, dans lequel la région C non extensible ou faiblement extensible est une région C" (6a, 6b) qui encercle les cuisses.
4. Vêtement de sport selon l'une quelconque des revendications 1 à 3, dans lequel une région D (7a, 7b) qui couvre les muscles quadriceps cruraux est en outre agencée séparément en tant que région non extensible ou faiblement extensible.
5. Vêtement de sport selon l'une quelconque des revendications 1 à 4, dans lequel une partie de division entre la région A (4a, 4b) et la région B (3a, 3b) a une forme de V tronquée, lorsqu'elle est observée verticalement depuis un côté arrière.
6. Vêtement de sport selon l'une quelconque des revendications 1 à 4, dans lequel une partie de division entre la région B et la région C, la région C' (5a, 5b) ou la région C" (6a, 6b) a une forme de V inversé tronquée ou une forme avec un évidement dans son centre, comme observé verticalement depuis un côté arrière.

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7. Vêtement de sport selon l'une quelconque des revendications 1 à 6, dans lequel le matériau non extensible ou faiblement extensible (2, 3, 4) est formé avec un tissu tissé ou un tissu tricoté.
- 5 8. Vêtement de sport selon l'une quelconque des revendications 1 à 7, dans lequel le matériau non extensible ou faiblement extensible (2, 3, 4) est formé à partir d'une feuille obtenue en imprégnant un tissu tissé ou un tissu tricoté avec une résine élastomère ou du caoutchouc, ou une feuille obtenue en fixant une résine élastomère ou du caoutchouc sur un tissu tissé ou un tissu tricoté.
- 10 9. Vêtement de sport selon l'une quelconque des revendications 1 à 8, dans lequel le matériau non extensible ou faiblement extensible (2, 3, 4) est formé en étant cousu ou brodé dans le tissu de base extensible (1).
- 15 10. Vêtement de sport selon l'une quelconque des revendications 1 à 9, dans lequel le matériau non extensible ou faiblement extensible (2, 3, 4) a un facteur d'allongement sous une charge de 4,9 N (500 gf) mesurée selon les normes industrielles japonaises (JIS) 1096 de 0% ou plus et inférieures à 10% dans une direction longitudinale d'un corps.
- 20 11. Vêtement de sport selon la revendication 1, dans lequel le tissu de base extensible (1) est un tissu tissé ou tricoté unidirectionnel ou bidirectionnel qui est formé avec un fil qui comprend un fil élastique.
- 25 12. Vêtement de sport selon la revendication 1 ou 11, dans lequel le tissu de base extensible (1) est un tissu qui a un facteur d'allongement sous une charge de 4,9 N (500 gf) mesurée selon les JIS 1096 de 10% ou plus dans une direction longitudinale d'un corps.
- 30 13. Vêtement de sport selon l'une quelconque des revendications 1 à 12, dans lequel un matériau non extensible ou faiblement extensible (2, 3, 4) en forme de V ou en forme de U est prévu dans une partie de tibia pour le renforcement.
- 35 14. Vêtement de sport selon l'une quelconque des revendications 1 à 13, dans lequel le vêtement de sport est un maillot de bain de type à jambes longues (10 - 13) ou un maillot de bain de type une pièce (15 - 16).
- 40 15. Vêtement de sport selon la revendication 14, dans lequel dans le maillot de bain de type une pièce (15 - 16), le matériau non extensible ou faiblement extensible (2 - 4) est agencé dans les parties thoraciques droite et gauche et une partie abdominale pour le renforcement.
- 45 16. Vêtement de sport selon l'une quelconque des revendications 1 à 15, dans lequel le matériau non extensible ou faiblement extensible est prévu avec une fermeture éclair (9).
- 50
- 55

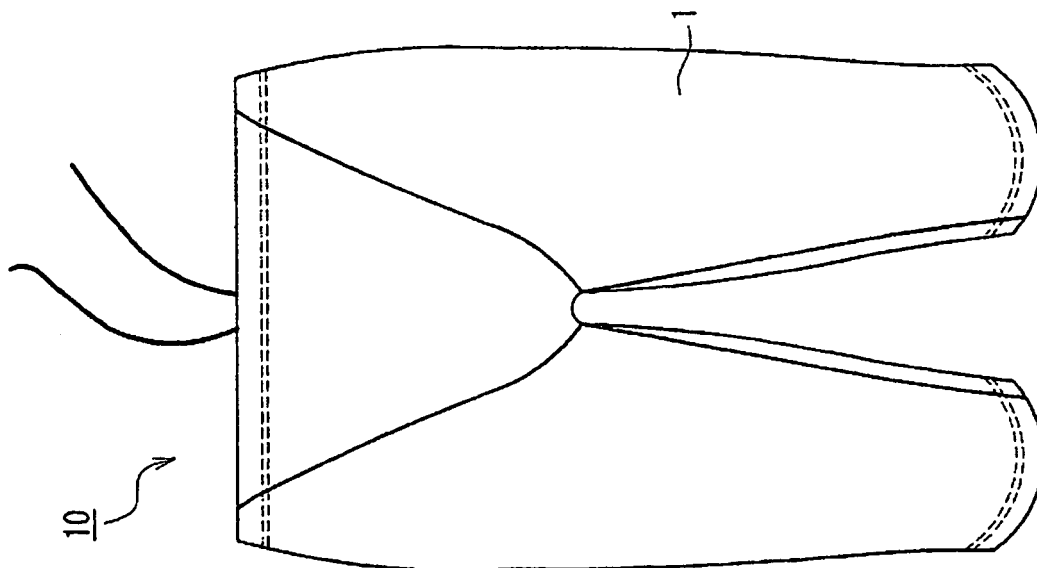


FIG. 1A

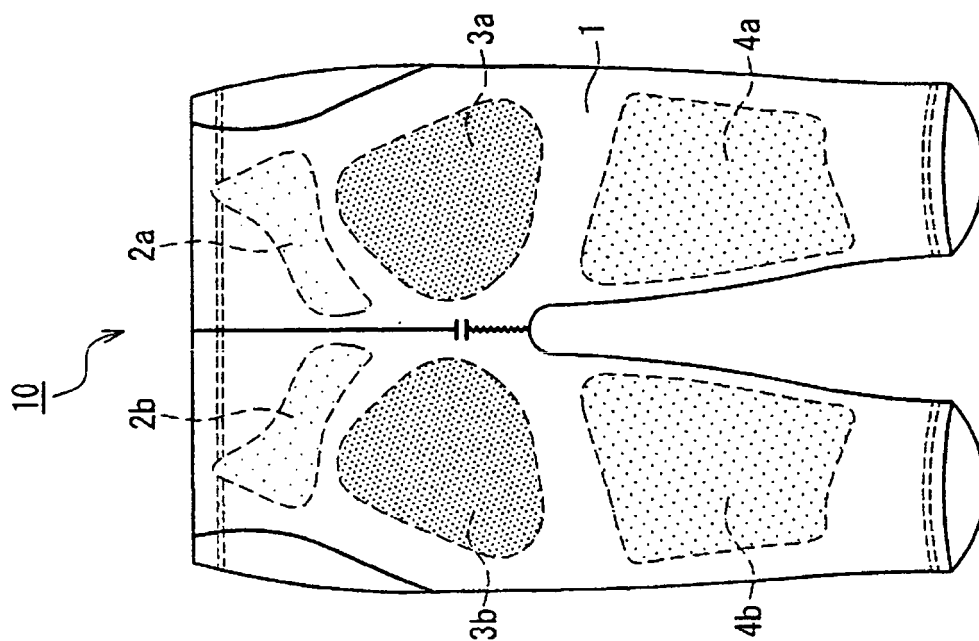


FIG. 1B

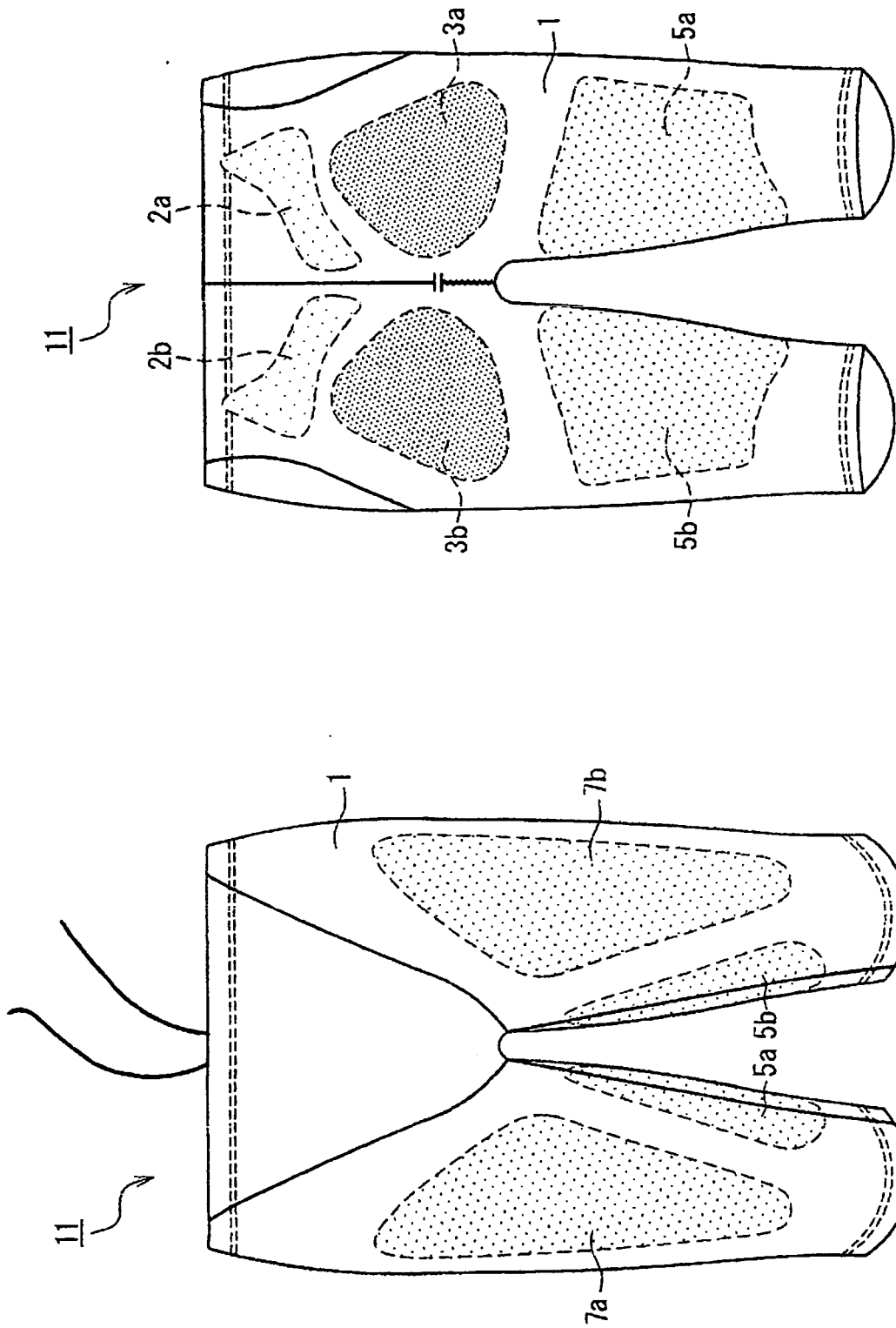


FIG. 2B

FIG. 2A

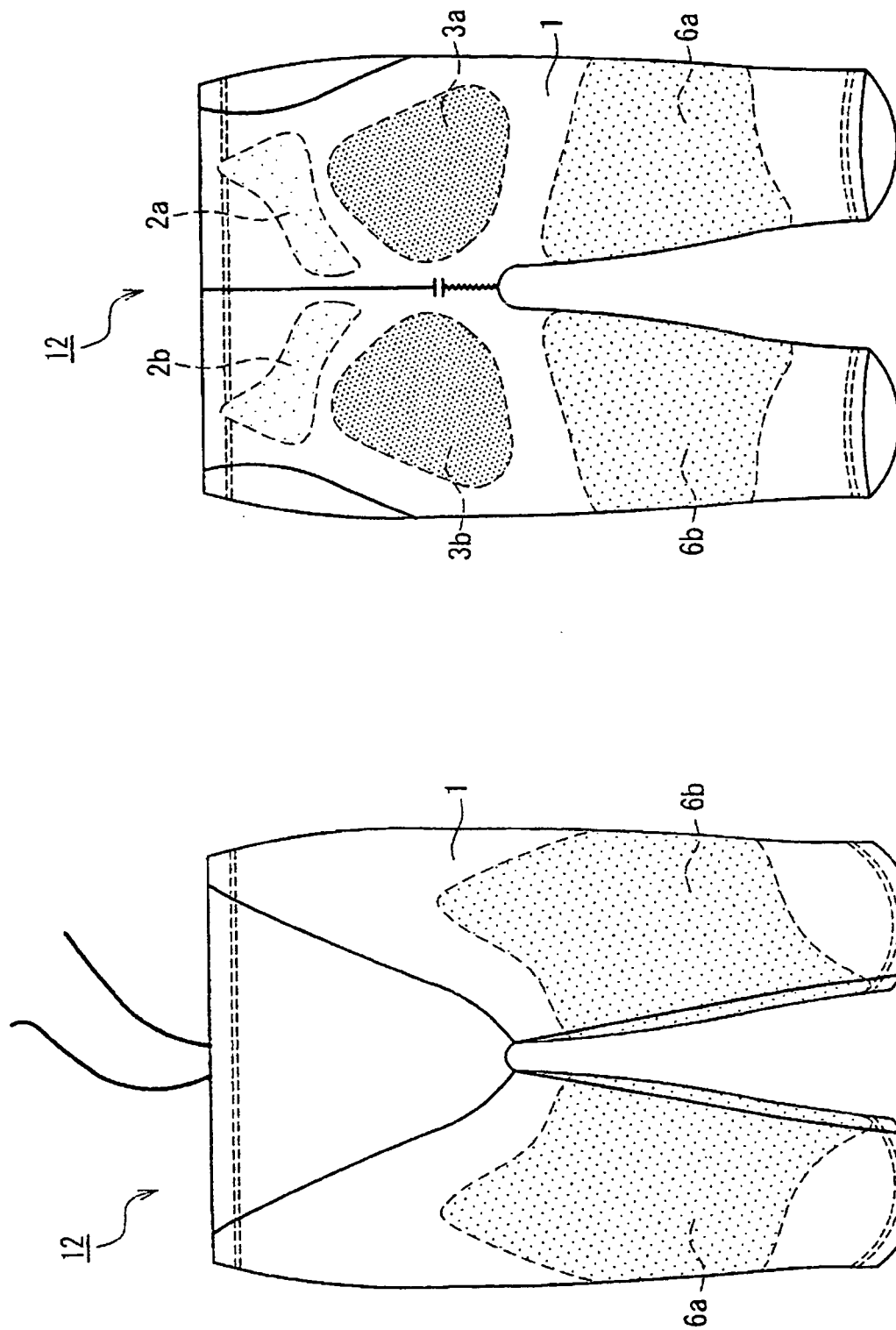


FIG. 3B

FIG. 3A

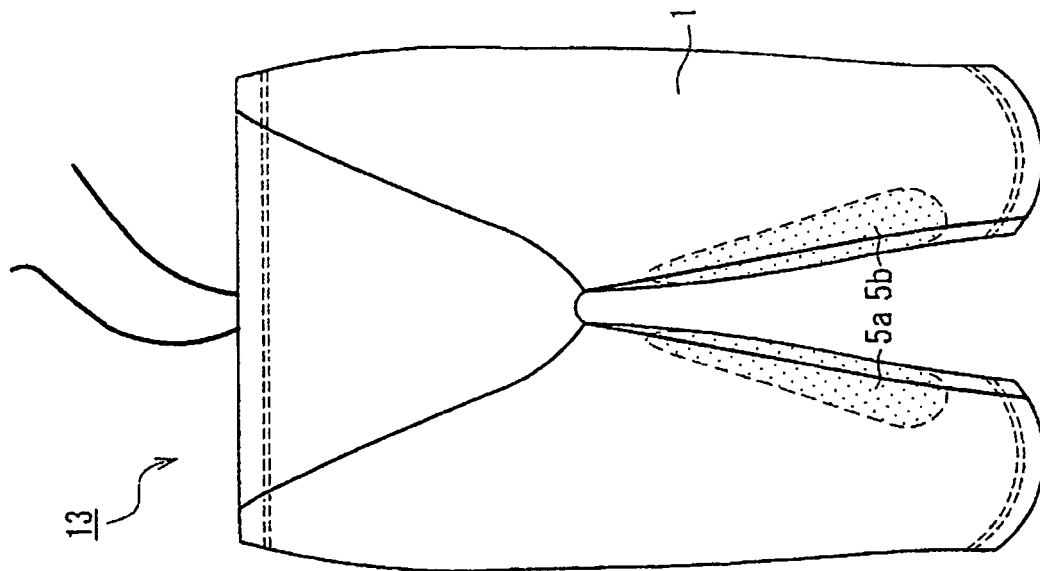


FIG. 4A

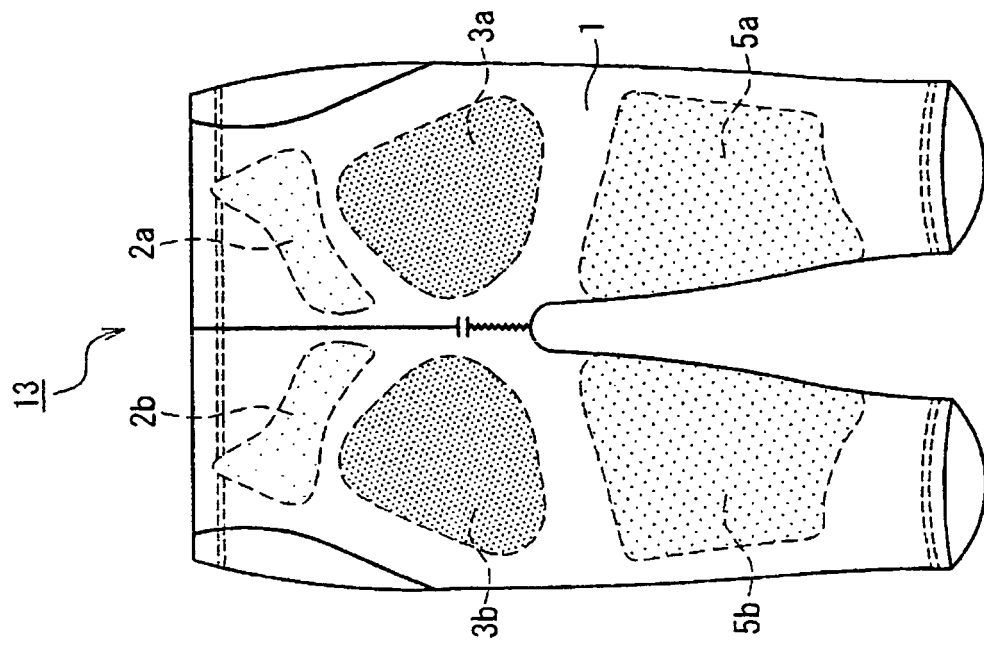


FIG. 4B

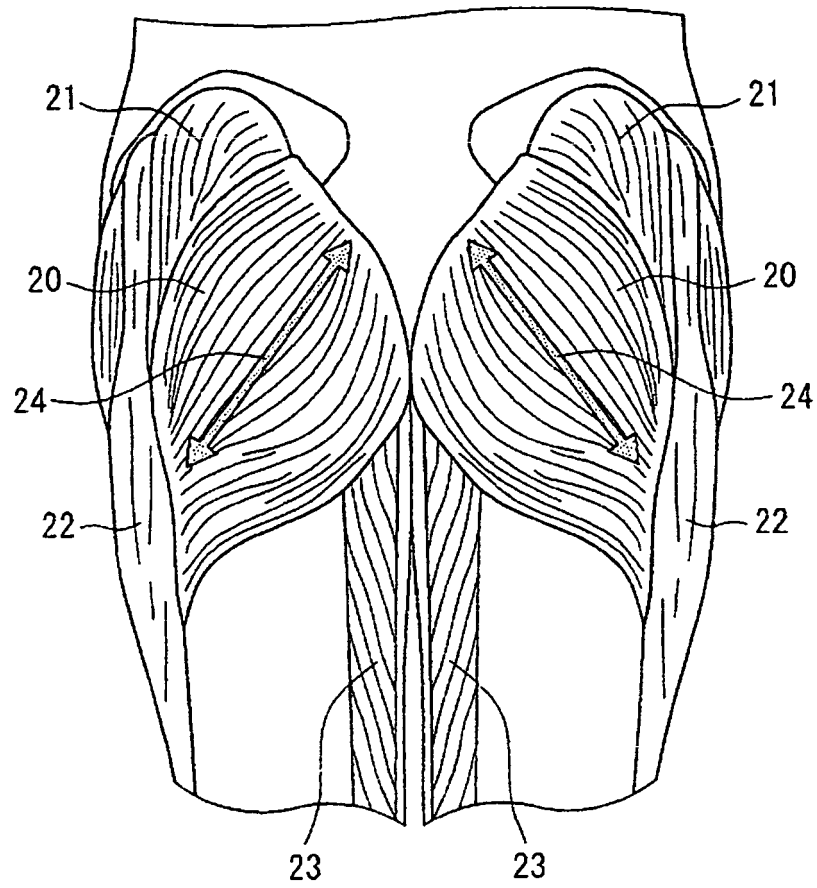


FIG. 5

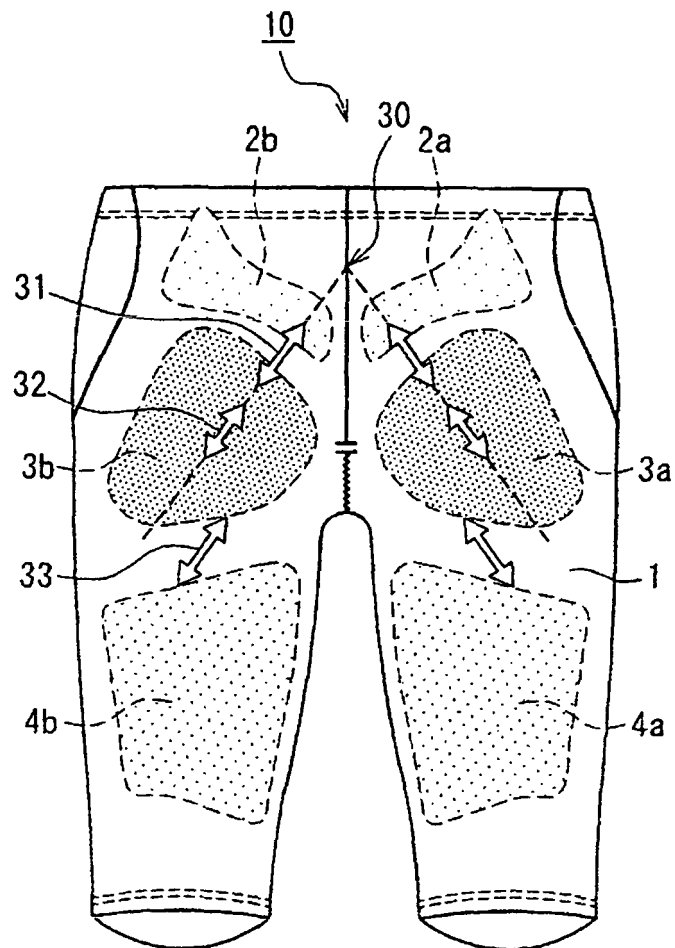


FIG. 6

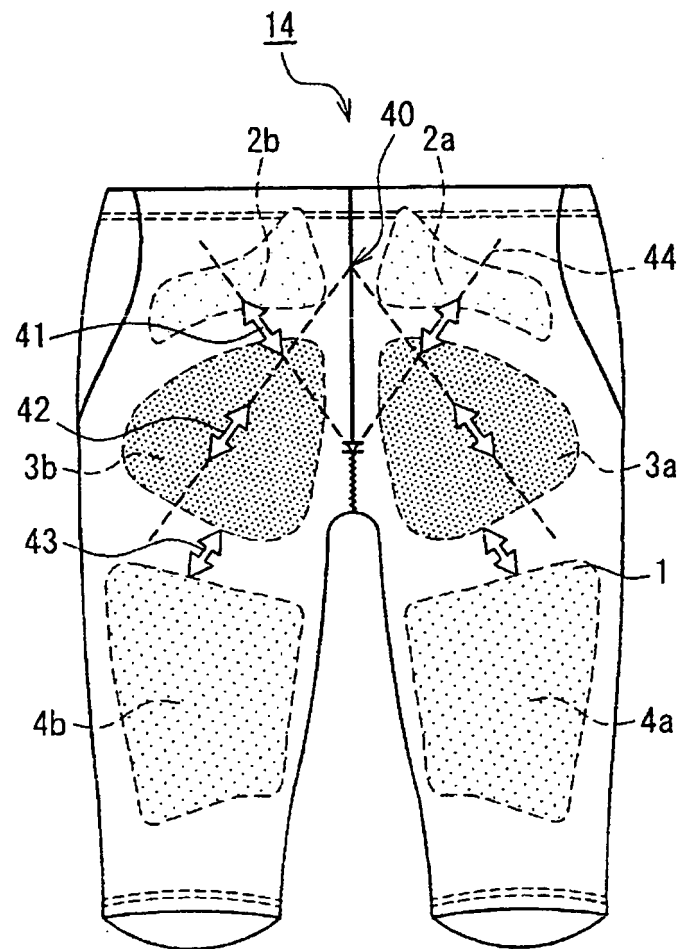


FIG. 7

FIG. 8A

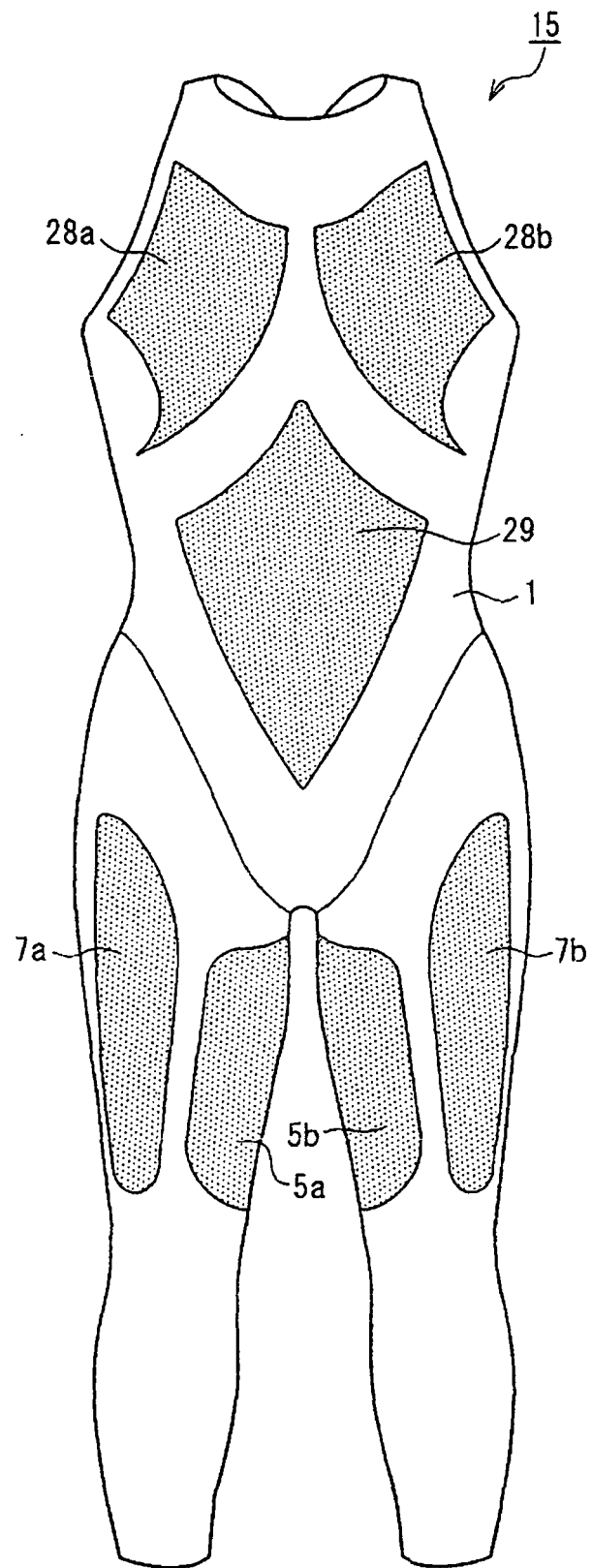


FIG. 8B

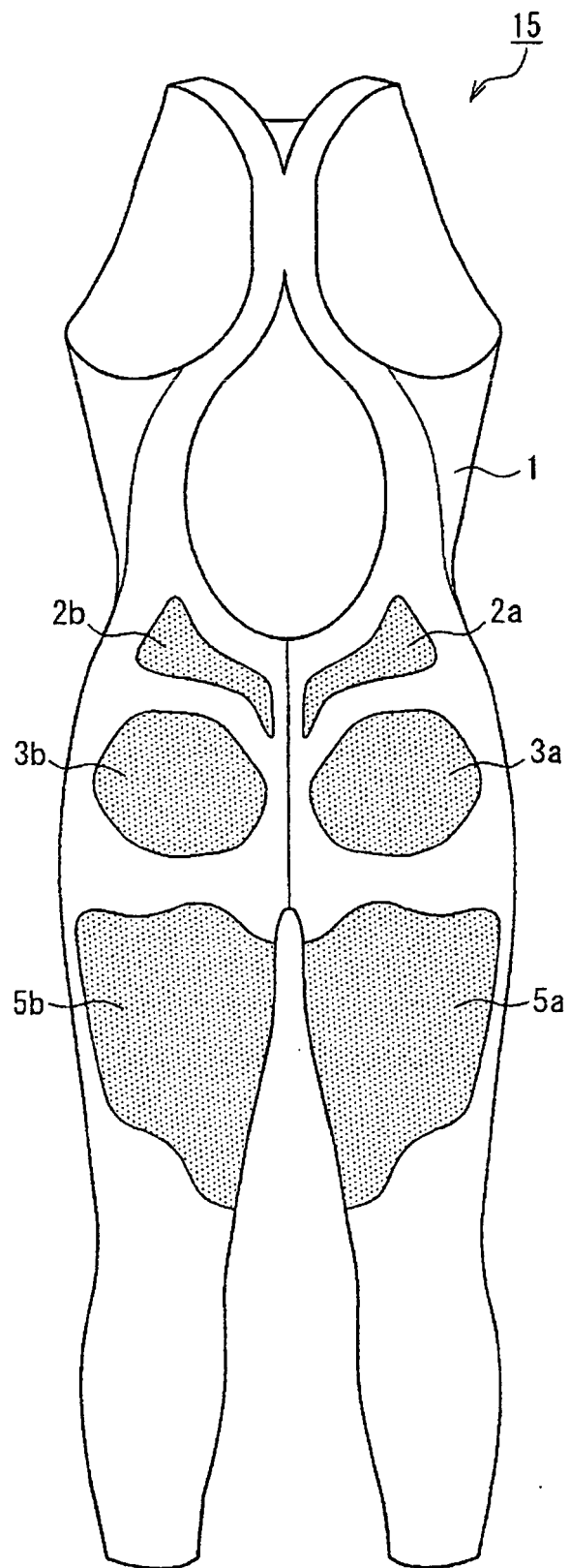


FIG. 9A

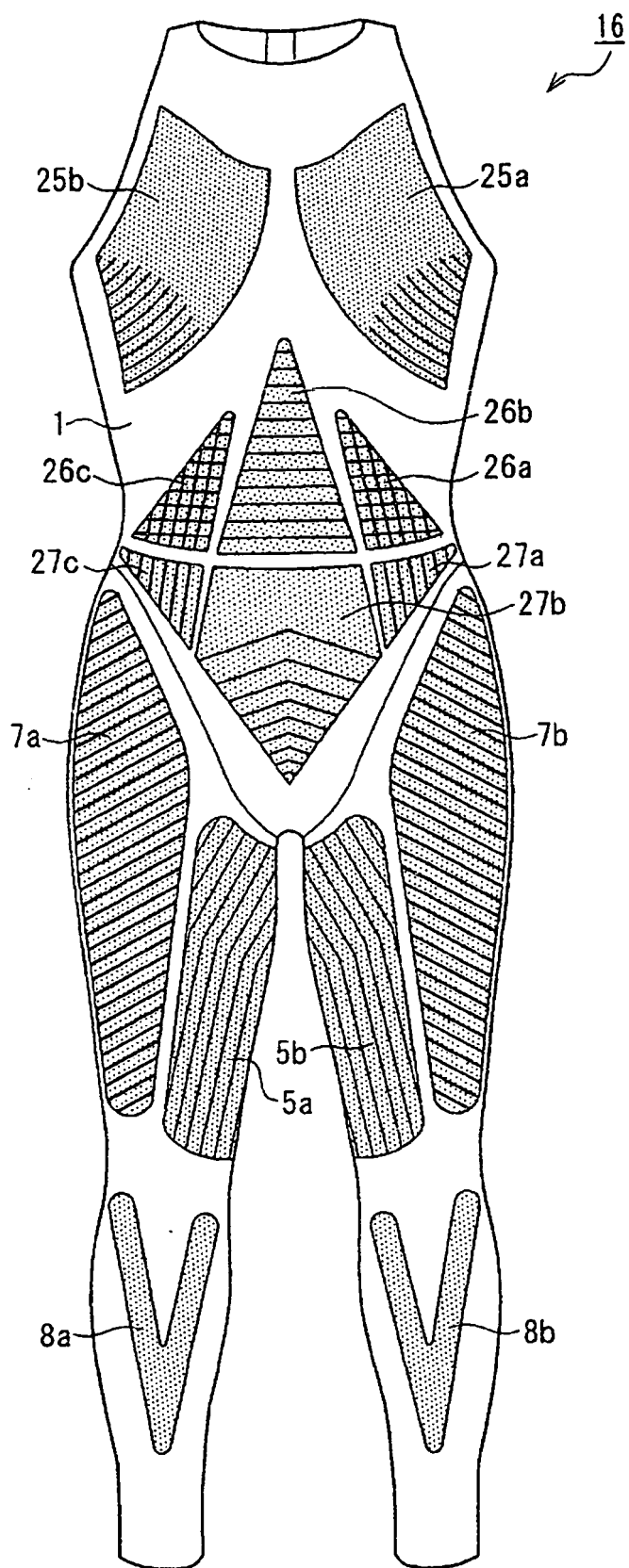
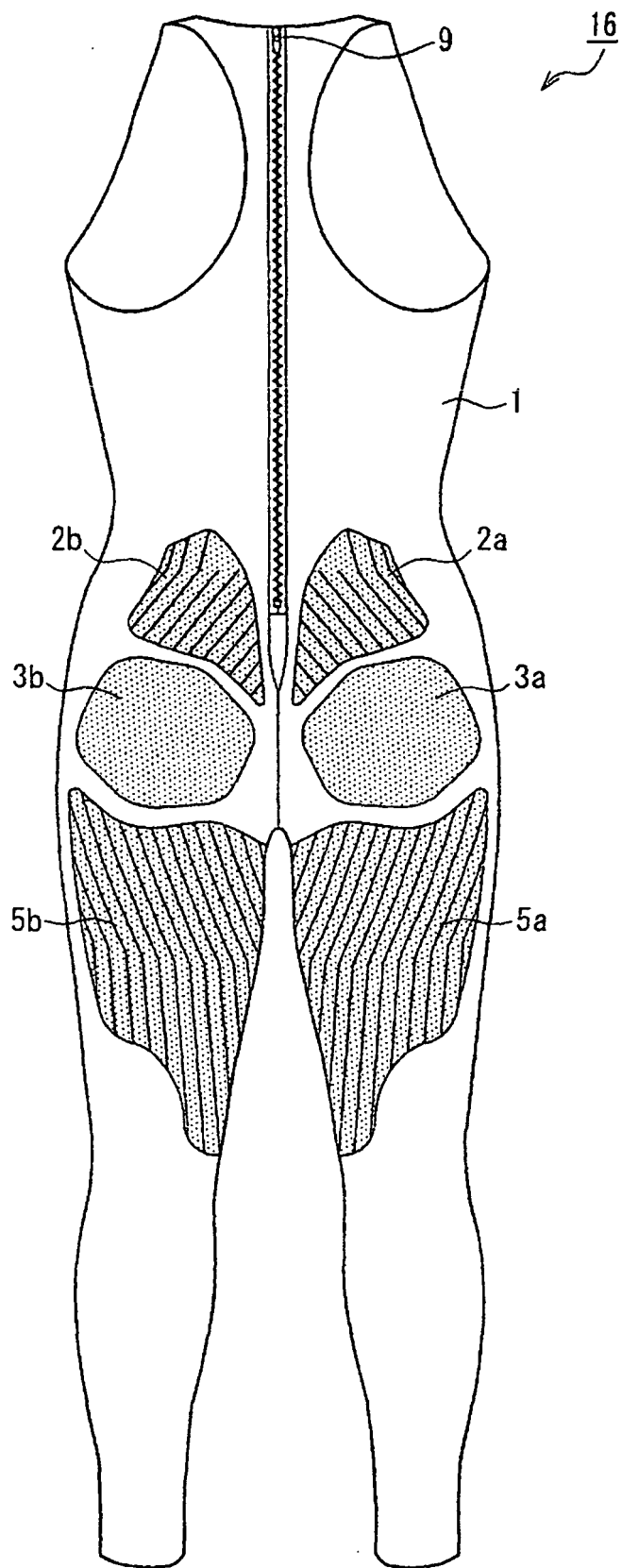


FIG. 9B



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2715088 B [0004]
- JP 2004292962 A [0004]
- WO 2007142232 A [0004]
- JP 2005146450 A [0004]
- JP 2008150767 A [0004]
- EP 1935265 A2 [0004]

Non-patent literature cited in the description

- Plastic Data Book. Kogyo Chosakai Publishing Co., Ltd, 01 December 1999, 854-910 [0013]