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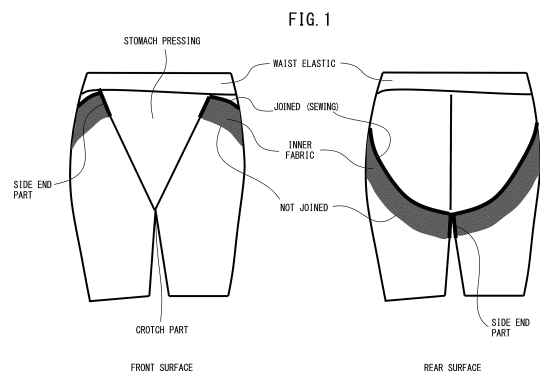
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(54) **BOTTOM GARMENT**

(57) Provided is a bottom garment that does not inhibit ease of movement during action, and has a large pivot effect with respect to the knee. A bottom garment according to the present invention includes elastic yarn and is configured of a body fabric and an inner fabric, wherein the inner fabric is superposed on the inside of the body fabric, the bottom garment having a double structure in which at least a portion of the inner fabric is not joined to the body fabric. The bottom garment is characterized in that $0.1 \leq A/B < 1.0$ is satisfied, where A is the stress upon 80% elongation in the vertical direction of a product of the inner fabric, and B is the stress upon 80% elongation in the horizontal direction of the product of the inner fabric.



Description

FIELD

5 **[0001]** The present invention relates to a bottom garment.

BACKGROUND

10 **[0002]** Conventionally, various types of girdles, briefs, shorts, tights, spats, etc., have been investigated for the purpose of improving the support and shape retention of the buttocks. For example, there has been proposed a girdle in which a member having a stronger tightening force than a main body is partially arranged on the main body of the girdle to enhance the muscle support effect (refer to Patent Literature 1 below). Likewise, many sports tights and compression garments have been proposed.

15 **[0003]** Furthermore, in individuals having an improper ordinary gait, such as bow-legged individuals or individuals having knock-knees, there is excessive strain on the knee joints, leading to muscle weakness and knee pain.

[0004] Significant investigation has been made regarding clothing aimed at correcting such bow-leggedness or knock-knees. For example, a garment which can correct bow-leggedness or knock-knees to reduce knee pain by the provision of a garment body and band-shaped lateral knee support member and construction of the lateral knee support member with a low-stretch material having a lower elongation rate in the height direction than the elastic material constituting the garment body has been proposed (refer to Patent Literature 2 below).

20 **[0005]** However, a bottom garment which does not inhibit ease of movement during action and has a large rotation effect with respect to the knee has not been investigated.

[CITATION LIST]

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[PATENT LITERATURE]

[0006]

30 [PTL 1] Japanese Unexamined Patent Publication (Kokai) No. 2004-300619
[PTL 2] Japanese Unexamined Patent Publication (Kokai) No. 2019-081986

SUMMARY

35 [TECHNICAL PROBLEM]

[0007] In light of the prior art described above, an object of the present invention is to provide a bottom garment which does not inhibit ease of movement during action, and has a large rotation effect with respect to the knee.

40 [SOLUTION TO PROBLEM]

[0008] As a result of rigorous investigation and repeated experimentation in order to achieve the object described above, the present inventors have completed the first present invention.

[0009] Specifically, the first present invention is as described below.

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[1] A bottom garment, which comprises an elastic yarn, which is composed of a body fabric and an inner fabric, and in which there is present a double structure in which the inner fabric overlaps the inside of the body fabric and at least a part of the inner fabric is not joined to the body fabric, wherein when a stress upon 80% elongation in a vertical direction of a product of the inner fabric is defined as A and a stress upon 80% elongation in a horizontal direction of a product of the inner fabric is defined as B, $0.1 \leq A/B < 1.0$.

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[2] The bottom garment according to [1], wherein $0.1 \leq A/B < 0.5$.

[3] The bottom garment according to [1] or [2], wherein when a stress upon 50% elongation in a horizontal direction of a product of the body fabric is defined as C and a stress upon 50% elongation in a horizontal direction of the inner fabric is defined as D, $1.6 < D/C \leq 10$.

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[4] The bottom garment according to [3], wherein $1.6 < D/C \leq 6.0$.

[5] The bottom garment according to [4], wherein $1.6 < D/C \leq 4.0$.

[6] The bottom garment according to any one of [1] to [5], which is a sport garment.

[0010] Furthermore, as a result of rigorous investigation and repeated experimentation in order to achieve the object described above, the present inventors have completed the second present invention.

[0011] Specifically, the second present invention is as described below.

<1> A bottom garment, which comprises an elastic yarn, which is composed of a body fabric and an inner fabric, and in which there is present a double structure in which the inner fabric overlaps the inside of the body fabric and at least a part of the inner fabric is not joined to the body fabric, wherein a vertical direction center line of the inner fabric is located below a part corresponding to the greater trochanter in the vertical direction in a side part of the bottom garment.

<2> The bottom garment according to <1>, wherein an upper end part of the inner fabric is located below the part corresponding to the greater trochanter in the vertical direction in the side part of the bottom garment.

<3> The bottom garment according to <1> or <2>, wherein a shortest distance between an upper end of the inner fabric and the part corresponding to the greater trochanter in the side part of the bottom garment is 0 cm to 10 cm.

<4> The bottom garment according to any one of <1> to <3>, wherein 80% or more of a side end part of the inner fabric in a bottom rear surface is joined with the body fabric at a thigh part.

<5> The bottom garment according to any one of <1> to <4>, wherein when a vertical direction highest point of a side end part of the inner fabric in a front surface of the bottom garment is defined as A, a vertical direction highest point of the inner fabric in a bottom garment side part is defined as B, and a vertical direction highest point of the side end part of the inner fabric in a rear surface of the bottom garment is defined as C, a vertical direction height satisfies $A > B > C$.

<6> The bottom garment according to <5>, wherein the inner fabric is joined to the body fabric on the front surface of the bottom garment above, in the vertical direction, a plane perpendicular to the bottom garment vertical direction including a crotch part.

<7> The bottom garment according to any one of <1> to <4>, wherein when a vertical direction highest point of a side end part of the inner fabric in a front surface of the bottom garment is defined as A, a vertical direction highest point of the inner fabric in a bottom garment side part is defined as B, and a vertical direction highest point of the side end part of the inner fabric in a rear surface of the bottom garment is defined as C, a vertical direction height satisfies $B > A$ and $B > C$.

<8> The bottom garment according to <7>, wherein 80% or more of a side end part of the inner fabric in a bottom front surface is joined with the body fabric at a thigh part.

[ADVANTAGEOUS EFFECTS OF INVENTION]

[0012] The bottom garment of the present invention does not inhibit ease of movement during action, and has an excellent rotation effect with respect to the knee.

BRIEF DESCRIPTION OF DRAWINGS

[0013]

FIG. 1 is a view showing an example of the structure of the bottom garment according to the present embodiment. In FIG. 1, the thick solid line indicates the area joined by sewing (the same applies to FIG. 2 below).

FIG. 2 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 3 is a view showing an example of the structure of the bottom garment according to the present invention. In FIG. 3, the thick solid line indicates the area joined by sewing, and the thick dotted line indicates the area joined by bonding (the same applies to FIGS. 4 to 11 below).

FIG. 4 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 5 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 6 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 7 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 8 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 9 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 10 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 11 is a view showing an example of the structure of the bottom garment according to the present invention.

FIG. 12 is a view showing measurement points when evaluation of the effects of the bottom garment of the present embodiment are performed.

DESCRIPTION OF EMBODIMENTS

<Embodiment of First Invention>

5 **[0014]** The embodiment of the first present invention will be described in detail below.

[0015] The bottom garment of the first present invention comprises an elastic yarn, which is composed of a body fabric and an inner fabric, and in which there is present a double structure in which the inner fabric overlaps the inside of the body fabric and at least a part of the inner fabric is not joined to the body fabric, wherein when a stress upon 80% elongation in a vertical direction of a product of the inner fabric is defined as A and a stress upon 80% elongation in a horizontal direction of a product of the inner fabric is defined as B, $0.1 \leq A/B < 1.0$.

10 **[0016]** In the bottom garment of the first present invention, by overlapping the inner fabric on the inside of the body fabric and setting the ratio (A/B) of the vertical direction and horizontal direction stresses upon 80% elongation of the product of the inner fabric to within a predetermined range, since the inner fabric follows the elongation of the skin during action and does not inhibit the action, movement is facilitated, and an external rotation force or internal rotation force can be efficiently applied to the body, whereby the rotation effect with respect to the knee is large. Thus, a corrective effect on bow-leggedness and knock-knees can be expected, and an excellent walking assist effect can be achieved by wearing the bottom garment of the present invention.

15 **[0017]** Thus, the bottom garment of the present invention can be suitably applied to sports shorts, sports tights, undergarments for middle-aged and elderly people, etc.

20 **[0018]** In particular, the bottom garment of the present invention is preferably a sport garment, i.e., a bottom for sports. The above-mentioned effects can be better realized thereby.

[0019] The body fabric primarily constituting the bottom garment of the present embodiment may comprise an inelastic yarn. The inelastic yarn used for the body fabric primarily constituting the bottom garment of the present embodiment is not particularly limited, and for example, synthetic fibers such as polyamide fibers, polyester fibers, acrylic fibers, polypropylene fibers, vinyl chloride fibers, etc., can be used. The fineness of the synthetic fiber is preferably 20 dtex to 200 dtex.

[0020] Furthermore, the inelastic yarn may be either a filament yarn or a spun yarn.

30 **[0021]** The form of the filament yarn may be any of a raw yarn (unprocessed yarn), a false twisted yarn, a dyed yarn, etc., or a composite yarn thereof. The composite yarn is not particularly limited and may be an air-blended yarn, combined twist, covered yarn, false-twist mixed fiber, etc. The cross-sectional shape of the filament yarn is not particularly limited, and may be a circular, triangular, cross-shaped, W-shaped, M-shaped, C-shaped, I-shaped, dog-bone-shaped, or hollow fiber.

[0022] The form of the spun yarn may be either single or blended. The blended spinning method is not particularly limited, but a spun yarn obtained by the MVS method, in which pilling is less likely to occur, is preferable.

35 **[0023]** In the inelastic yarn, bright yarn, semi-dull yarn, fully-dull yarn, etc., can be arbitrarily selected.

[0024] Cellulose fibers may be used as a part of the inelastic yarn. The cellulose fibers are also not particularly limited, and for example, cupra, rayon, bamboo fibers, cotton, modal, and lyocell can be used.

[0025] The cellulose fibers may be any of a raw yarn (unprocessed yarn), a false twisted yarn, a dyed yarn, etc., in the form of a filament yarn, and may be a composite yarn thereof. Furthermore, the cellulose fibers may be in the form of a spun yarn, either alone or in a blended manner.

40 **[0026]** The cellulose fibers are preferably cupra fibers. The fineness of the cellulose fibers used, in the case of a filament yarn, is preferably 30 dtex to 200 dtex, more preferably 30 dtex to 170 dtex, and further preferably 30 dtex to 120 dtex. Furthermore, in the case of a spun yarn, No. 60 to No. 30 spun yarns are preferable, and No. 50 to No. 40 spun yarns are more preferable. By blending cellulose fibers, it is possible to obtain a bottom garment having excellent wearing feeling, excellent antistatic properties, and excellent bending softness due to the hygroscopicity thereof.

45 **[0027]** In the bottom garment of the present embodiment, an elastic yarn is at least partially arranged in the body fabric constituting the bottom garment.

[0028] The elastic yarn partially arranged in the body fabric of the bottom garment of the present embodiment refers to fibers having a breaking elongation of 100% or more. The polymer of the elastic yarn and the spinning method are not particularly limited, and examples thereof include polyurethane elastic yarns (also referred to as spandex or spandex fibers), polyether ester elastic yarns, polyamide elastic yarns, polyolefin elastic yarns, etc., and for example, as a polyurethane elastic yarn, dry spinning or melt spinning can be used. Furthermore, these elastic yarns may be coated with an inelastic yarn so as to achieve a covered state. Furthermore, so-called rubber yarns, which are in the form of yarns composed of natural rubber, synthetic rubber, or semi-synthetic rubber, can be used, but polyurethane elastic yarn, which has excellent elasticity and is conventionally widely used, is preferable. Thereamong, the diol component constituting the polyurethane polymer preferably has a side chain, more preferably the side chain is a methyl group, and further preferably has two methyl groups on the same carbon.

55 **[0029]** The breaking elongation of the elastic yarn is preferably 400% to 1000% from the viewpoint of imparting the

fabric with suitable elasticity. The breaking elongation is a value measured by the method described in JIS L1013 "8.5.1 Tensile Strength and Elongation."

[0030] It is preferable that the elasticity of the elastic yarn not be impaired at approximately 180°C, which is the normal processing temperature in the presetting process during the dyeing process. Furthermore, elastic yarn having functionality such as high settability, deodorant property, antibacterial property, hygroscopic property, and water absorption property to which a special polymer or powder is added can also be used. Regarding the fineness of elastic yarn, fibers having a fineness of approximately 10 dtex to 700 dtex (decitex, the same symbol is used below) can be used, when looping with the elastic yarn, it is preferable to use elastic yarn having a fineness of approximately 12 dtex to 250 dtex, and when performing insertion knitting of the elastic yarn using a Raschel knitting machine, it is preferable to use elastic yarn having a fineness of 70 dtex to 700 dtex.

[0031] As the body fabric primarily constituting the bottom garment of the present embodiment, a woven fabric or a knitted fabric is used, which is appropriately selected in accordance with the item. A knitted fabric is preferable from the viewpoint of elasticity.

[0032] In the case of warp knitting, a structure in which the elastic yarn is inserted or looped by a Raschel knitting machine or a tricot knitting machine is preferably used. In the Raschel structure, a structure in which thick spandex fibers such as 6-course satin, 4-course satin, 6-course tulle, and triconette are inserted is preferably used. A fabric in which two spandex fibers are inserted and the fabric is stretched in the vertical and horizontal is particularly preferable from the viewpoint of wearing comfort. Among tricots, half tricots, double stitches, atlas structures, etc., are preferable because they have good elasticity.

[0033] In the case of a circular knitting, it is preferable that the elastic yarn be looped.

[0034] As the body fabric, a woven fabric woven with elastic fibers is also preferably used.

[0035] As the basis weight of the body fabric, a fabric having a basis weight of 50 to 400 g/m² is preferably used.

[0036] In the body fabric of the present embodiment as a product for general consumers, the stress upon 50% elongation in a horizontal direction is preferably 0.3 N to 3 N, more preferably 0.3 N to 2.5 N, and further preferably 0.5 N to 1.5 N.

The elongation stress is measured using a Tensilon tensile tester to stretch a 2.5 cm wide sample gripped at a grip interval of 10 cm at a tension rate of 300 mm/min to obtain a stress at an elongation ratio of 50%. When the stress upon 50% elongation in a horizontal direction of the body fabric is 3 N or less, there is no excessive tightening at the time of wearing, achieving comfort. Conversely, when the stress upon 50% elongation in a horizontal direction of the body fabric is 0.3 N or more, the wearing feeling is enhanced and it becomes easy to suppress shaking of the body during action. Furthermore, as a product for athletes with a large amount of muscle, it is preferable that the stress upon 50% elongation in a horizontal direction of the body fabric be 0.3 N to 5 N, more preferably 0.3 N to 4.5 N, and further preferably 0.5 N to 4.0 N.

[0037] Furthermore, the stress upon 50% elongation in a vertical direction of the body fabric is preferably 0.3 N to 4 N. When the stress upon 50% elongation in a vertical direction is 4 N or less, the ability to follow action during actions such as sitting and crouching is enhanced. Conversely, when it is 0.3 N or more, the wearing feeling is enhanced and it becomes easy to suppress shaking of the body during action or the like. As used herein, the "horizontal direction" refers to the peripheral direction of the bottom product (the direction around the human body when worn), and the "vertical direction" refers to the vertical direction of the bottom product (the direction in which the bottom garment is put on the human body).

[0038] When used for inners such as girdles and shorts, it is preferable that the hem on the leg side have a hem structure formed by pulling out threads and a free-cut structure that can be used without fraying or curling of threads on the cut surface. By using these, since it is not necessary to sew the end portions, it is possible to prevent the end portions from becoming thick and to prevent the end portions from contacting the skin and leaving marks on the skin. Furthermore, lines are not visible on the outside, which is excellent in aesthetics. As the free-cut material, for example, a blended material of polyurethane and an inelastic fiber, which is easily heat-sealed, is preferably used, and nylon or polyester is preferably used as the inelastic yarn.

[0039] The bottom garment of the present embodiment is characterized by having a double structure in which the inner fabric overlaps the inside (the human body side when worn) of the body fabric.

[0040] As the inner fabric, a woven fabric or knitted fabric is used, which is appropriately selected depending on the product, but a knitted fabric is preferable from the viewpoint of elasticity. In the case of warp knitting, a structure in which the elastic yarn is inserted or looped by a Raschel knitting machine or a tricot knitting machine is preferably used. In the Raschel structure, a structure in which thick spandex fibers such as 6-course satin, 4-course satin, 6-course tulle, and triconette are inserted is preferably used. A fabric in which two spandex fibers are inserted and the fabric is stretched in the warp and weft is particularly preferable from the viewpoint of wearing comfort. In Jacquard Raschel, there may be a difference in fabric stretch stress within the inner fabric panel. Among tricots, half tricots, double stitches, atlas structures, etc., are preferable because they have good elasticity. In the case of a circular knitting, it is preferable that the elastic yarn be looped. As the woven fabric, a woven fabric woven with elastic fibers is preferably used. As the basis weight of the inner fabric, a fabric having a basis weight of 50 to 400 g/m² is preferably used.

[0041] In the inner fabric of the present embodiment, the area covered by the inner fabric is preferably 60% or less of the area of the buttocks from the viewpoint of efficiently exerting the external rotation force or the internal rotation force. As used herein, the term "buttocks" refers to the region from the left and right sides of the human body and the supracristal plane (waist) to the gluteal sulcus. If the inner fabric covers 60% or less of the area of the buttocks, the stretch balance of the inner fabric is likely to change when worn, and the force for pulling the thighs outward or inward becomes strong and effective, and thus, the area covered is more preferably 50% or less. Furthermore, if the area covering the buttocks is more than a predetermined area, the inner fabric does not bite into the body when stretched, and the pressure applied during stretching is low, whereby wearing comfort is achieved. Thus, the inner fabric preferably covers at least 10% or more of the buttocks. When covering the upper part of the thighs, it is preferable to cover a portion within 10 cm from the gluteal sulcus toward the lower leg.

[0042] The vertical direction width of the product of the inner fabric is preferably 5 cm to 20 cm, and more preferably 5 cm to 18 cm. When the vertical direction width of the inner fabric is 5 cm or more, there is a sufficient body-covering area and an elongation force upon the elongation of the fabric is likely to be applied to the body, whereby the external rotation effect or the internal rotation effect can easily be exerted. Conversely, when the vertical direction width of the inner fabric is 20 cm or less, the stretch balance of the inner fabric is likely to change when worn, and the force pulling the thighs outward or inward becomes stronger, whereby the external rotation effect or internal rotation effect can easily be exhibited.

[0043] The inner fabric of the bottom garment of the present invention is characterized in that it is arranged on the inside of the body fabric and at least a part thereof is not joined with the body fabric. As used herein, "not joined" means the fabrics are not always in close contact and affixed by means such as sewing or bonding, and the fabrics are floating.

[0044] By overlapping at least a part of the inner fabric whose stress upon elongation is more than 1.6 times and 10 times or less that of the body fabric on the body fabric without joining it to the body fabric, and not joining at least a part of the inner fabric, when worn or stationary, the stretch balance of the inner fabric changes from the front side to the buttocks side, so that a force pulling the thighs outward or inward is generated.

[0045] During walking, the inner fabric shifts according to the movement, and the stretching balance of the inner fabric changes from the front side to the buttocks side more than when stationary, whereby the force pulling the thighs further outward or inward is generated. Due to the effect of pulling the thighs, an external or internal rotational force is generated on the lower leg, and a force for opening or closing the legs is generated. It is believed that this action leads to an increase in stride length and walking speed. Furthermore, by applying an external rotation force to knock-knees and an internal rotation force bow-leggedness, it is believed that the position of the femur is corrected in the normal direction, and the legs are more likely to rotate outwards when standing, such as when walking, which further increases stride length and walking speed.

[0046] In particular, since at least part of the inner fabric is not joined to the body fabric, the effect of turning the leg outward can be obtained by always pulling the leg surface with the inner fabric independently of (not following) the body fabric.

[0047] Further, in the bottom garment of the present embodiment, when the stress upon 80% elongation in the vertical direction of the product of the inner fabric is defined as A and the stress upon 80% elongation in a horizontal direction of the product of the inner fabric is defined as B, $0.1 \leq A/B < 1.0$, preferably $0.1 \leq A/B < 0.7$, more preferably $0.1 \leq A/B < 0.5$, and further preferably $0.1 A/B < 0.3$.

[0048] By overlapping the inner fabric on the inside of the body fabric and setting the ratio of the vertical direction and horizontal direction stresses upon 80% elongation of the inner fabric to within a predetermined range, and specifically, making the vertical direction more likely to stretch than the horizontal direction in the inner fabric, during action, the inner fabric follows the extension of the skin and does not inhibit the action, whereby movement is facilitated, and the external rotation force or the internal rotation force can be efficiently applied to the body, whereby the rotation effect with respect to the knee is large.

[0049] Therefore, a corrective effect on knock-knees and bow-leggedness can be expected, and an excellent walking assistance effect can be achieved by wearing the bottom garment of the present invention.

[0050] In the bottom garment of the present embodiment, when the stress upon 50% elongation in a horizontal direction of the product of the body fabric is defined as C and the stress upon 50% elongation in a horizontal direction of the inner fabric is defined as D, $1.6 < D/C \leq 10$ is preferable, $1.6 < D/C \leq 8.0$ is more preferable, $1.6 < D/C \leq 6.0$ is further preferable, $1.6 < D/C \leq 4.0$ is even further preferable, and $1.6 < D/C \leq 3.0$ is particularly preferable.

[0051] By setting the ratio of the stress C upon 50% elongation in a horizontal direction of the body fabric and the stress D upon 50% elongation in a horizontal direction of the inner fabric to within a predetermined range, and specifically, making the inner fabric less stretchable than the body fabric in the horizontal direction, the rotation effect with respect to the knee is greater because the inner fabric can efficiently apply external or internal rotation to the body by pulling the legs during action.

[0052] However, if the horizontal direction elongation stress of the inner fabric is excessively large, the tightening feeling when worn will be strong, whereby comfort will be reduced.

[0053] In this manner, in the bottom garment of the present embodiment, in the inner fabric, by increasing the horizontal direction elongation stress, i.e., making it unlikely to elongate, and making the vertical direction elongation stress small, i.e., making it more likely to elongate, it is possible to achieve both the effect of pulling the legs to rotate them externally or internally and the ease of movement during action.

[0054] The relationship between the horizontal direction elongation stress and the vertical direction elongation stress of such a body fabric and inner fabric can be realized by, for example, in the body fabric, using the warp direction of a warp knitted fabric in the horizontal direction (reverse use), and in inner fabric, using the warp direction of a warp knitted fabric in the vertical direction.

[0055] Examples of the arrangement of the preferred members of the bottom garment of the present embodiment are shown in FIGS. 1 and 2.

[0056] In FIG. 1, the inner fabric is arranged so as to cover from the waist to the lower part of the buttocks. In the arrangement of this fabric, since the amount of elongation from the waist to the buttocks of the inner fabric when worn is larger than the amount of elongation of the fabric corresponding to the lower part of the buttocks, when the inner fabric is pulled toward the lower part of the buttocks, a force pulling the thighs outward (external rotation force) is generated, whereby the effect of externally rotating the legs can be obtained.

[0057] In FIG. 2, the inner fabric is arranged from the base of the thigh or the groin to the upper part of the buttocks or from the gluteal sulcus to the upper part of the thighs. In the arrangement of this fabric, since the amount of elongation when worn of the inner fabric corresponding to the front part is larger than the amount of elongation of the inner fabric corresponding to the back part, when the inner fabric is pulled toward the front side, a force pulling the thighs inward (internal rotation force) is generated, whereby the effect of inwardly rotating the legs can be obtained.

[0058] In the bottom garment of the present embodiment, the area ratio of the portion in which the inner fabric is not joined with the body fabric, relative to the total area of the inner fabric, is preferably 70% or more, more preferably 80% or more, and further preferably 90% or more. If the area ratio is 70% or more, the body fabric and inner fabric tend to move differently, and it is easy to obtain the leg correction effect.

[0059] Joining is preferably performed at ends of the inner fabric, for example, the upper end, lower end, and side end parts (the left and right ends of the inner fabric, the joint portions with the crotch part, and the joint portions with the front panel (also called the stomach pressing panel or panel) are collectively referred to as side end parts; refer to FIG. 1). It is preferable that 20% to 70% of the end portions of the inner fabric not be joined, and the unjoined portions are preferably the lower end portions of the inner fabric. Further, when the ratio of the end portion of the inner fabric that is not joined to the body fabric of the inner fabric is 20% to 100% with respect to the total length of the lower end portion of the inner fabric, the stretch balance of the inner fabric tends to change from the front side to the buttocks side or the back part, and the force for pulling the thigh parts to the outside or the inside becomes strong, which is preferable. Note that the joined portions and the non-joined portions may be continuous or discontinuous. A waist elastic may be installed on the waist portion.

[0060] When a stomach pressing panel is installed on the front surface by means of a girdle or the like, it is preferable that the side edges of the inner fabric be joined to the left and right parts of the panel. The vertical direction width of the product of the panel is preferably 5 cm to 20 cm, and it is preferable that the inner fabric be joined to one side of the front panel, pass through the back center, and be joined to the front panel on the other side.

[0061] In order to generate the above external rotation force, in a front surface of the bottom garment when laid flat, it is preferable that 70% or more of the joint portion of the side end part of the inner fabric be located above the horizontal line passing through a point 5 cm above the crotch part. The crotch part means the bifurcated apex at the lower part of the bottom shown in FIG. 1. As shown in FIG. 1, the portion indicated by the thick solid line at both ends of the inner fabric is the joint portion of the side end part. If 70% of this thick solid line is located above the horizontal line passing through the point 5 cm above the crotch part, the external rotational force is likely to be generated.

[0062] Furthermore, in order to generate the internal rotation force, in a front surface of the bottom garment when laid flat, it is preferable that 70% or more of the joint portion of the side end part of the inner fabric be joined below the horizontal line passing through the point 5 cm above the crotch part. As shown in FIG. 2, the part represented by the thick solid line at both ends of the inner fabric is the joint portion of the side end part, and if 70% of this thick solid line is located below the horizontal line passing through the point 5 cm above the crotch part, the internal rotational force is likely to be generated.

[0063] When the end of the inner fabric is above the region 5 cm above the crotch part, the elongation of the inner fabric on the front is less than that on the back, and when it is below, the elongation of the inner fabric on the front surface is greater than that on the back surface, whereby external rotation force and internal rotation force are generated when worn.

[0064] Though the joining can be performed by sewing, bonding, etc., a method which does not impair the elongation of the fabric is preferable, and two-needle stitching or staggered stitching is preferable for sewing, and joining with a width of 0.5 cm to 1.5 cm is preferable for bonding. Joining by bonding is more preferable because a difference in height of the joint portion is eliminated as compared with the case of sewing. It is also preferable to use a free-cut material for

the inner fabric because a difference in height at the ends thereof is eliminated.

[0065] The pressure of the bottom garment of the present embodiment applied to the buttocks is preferably 5 hPa to 20 hPa, and more preferably 8 hPa to 18 hPa. The pressure on the buttocks is the average of the pressure on the left and right at the tops of the left and right hips (hip tops) at the position where the circumference of the buttocks is the largest, and in medium-sized bottom garments, it is attached to an M size standard body type mannequin and measured with an air pack type pressure gauge. Furthermore, in large-sized bottom garments, it is attached to a large size standard body type mannequin and measured. When the pressure on the buttocks is 5 hPa or more, the pressure is sufficiently large and the effect of suppressing shaking during action is high, which is preferable. Conversely, if the pressure on the buttocks is 20 hPa or less, the feeling of constriction can be reduced and wearing comfort is enhanced.

[0066] For bottom garments for athletes, it is preferable to use a slightly stronger pressure from the viewpoint of supporting exercise performance, and the pressure on the buttocks is preferably 10 hPa to 20 hPa. In the case of bottom garments for athletes, polyester fibers are desirable as the inelastic yarn used for the body fabric or inner fabric from the viewpoint of sweat treatment.

[0067] For bottom garments for the elderly, it is preferable to increase the ease of wearing with a slightly weaker pressure, and the pressure on the buttocks is preferably 5 hPa to 15 hPa. When the pressure on the buttocks is within the above range, the ease of wearing is also improved.

[0068] The inner fabric can be layered on the legs of shorts and compression wear, and can suppress shaking of the thighs and calves.

<Embodiment of Second Invention>

[0069] The embodiment for carrying out the second present invention will be described in detail below.

[0070] The bottom garment of the second present invention is composed of a body fabric and an inner fabric which comprise an elastic yarn, and in which there is present a double structure in which the inner fabric overlaps the inside of the body fabric and at least a part of the inner fabric is not joined to the body fabric, wherein a vertical direction center line of the inner fabric is located below a part corresponding to the greater trochanter in the vertical direction in a side part of the bottom garment.

[0071] In the bottom garment of the second present invention, by overlapping the inner fabric on the inside of the body fabric and arranging the inner fabric so that the vertical direction center line is located below the greater trochanter, tightening forces can be applied to positions closer to the greater trochanter in the femur, whereby an external rotation force or internal rotation force can be efficiently applied to the body, and thus, the rotation effect with respect to the knee is large. Thus, a corrective effect on bow-leggedness and knock-knees can be expected, the effect of stabilizing the position of the pelvis in the correct position due to proper rotation of the lower limbs can be expected. An excellent walking assist effect can be achieved by wearing the bottom garment of the present invention.

[0072] Thus, the bottom garment of the present invention can be suitably applied to sports shorts, sports tights, undergarments for middle-aged and elderly people, children's uniforms or pants, compression bottoms for pregnant women, etc.

[0073] In particular, the bottom garment of the present invention is preferably a sport garment, i.e., a bottom for sports. The above-mentioned effects can be better realized.

[0074] The body fabric primarily constituting the bottom garment of the present embodiment may comprise an inelastic yarn. The inelastic yarn used for the body fabric primarily constituting the bottom garment of the present embodiment is not particularly limited, and for example, synthetic fibers such as polyamide fibers, polyester fibers, acrylic fibers, polypropylene fibers, vinyl chloride fibers, etc., can be used. The fineness of the synthetic fiber is preferably 20 dtex to 200 dtex.

[0075] Furthermore, the inelastic yarn may be either a filament yarn or a spun yarn.

[0076] The form of the filament yarn may be any of a raw yarn (unprocessed yarn), a false twisted yarn, a dyed yarn, etc., or a composite yarn thereof. The composite yarn is not particularly limited and may be an air-blended yarn, combined twist, covering, false-twist mixed fiber, etc. The cross-sectional shape of the filament yarn is not particularly limited, and may be a circular, triangular, cross-shaped, W-shaped, M-shaped, C-shaped, I-shaped, dog-bones-shaped, or hollow fiber.

[0077] The form of the spun yarn may be either single or mixed. The blended spinning method is not particularly limited, but a spun yarn obtained by the MVS method, in which pilling is less likely to occur, is preferable.

[0078] In the inelastic yarn, bright yarn, semi-dull yarn, fully-dull yarn, etc., can be arbitrarily selected.

[0079] Cellulose fibers may be used as a part of the inelastic yarn. The cellulose fibers are also not particularly limited, and for example, cupra, rayon, bamboo fibers, cotton, modal, and lyocell can be used.

[0080] The cellulose fibers may be any of a raw yarn (unprocessed yarn), a false twisted yarn, a dyed yarn, etc., in the form of a filament yarn, and may be a composite yarn thereof. Furthermore, the cellulose fibers may be in the form of a spun yarn, either alone or in a blended manner.

[0081] The cellulose fibers are preferably cupra fibers. The fineness of the cellulose fibers used, in the case of a filament yarn, is preferably 30 dtex to 200 dtex, more preferably 30 dtex to 170 dtex, and further preferably 30 dtex to 120 dtex. Furthermore, in the case of a spun yarn, No. 60 to No. 30 spun yarns are preferable, and No. 50 to No. 40 spun yarns are more preferable. By mixing cellulose fibers, it is possible to obtain a bottom garment having excellent wearing feeling, excellent antistatic properties, and excellent bending softness due to the hygroscopicity thereof.

[0082] In the bottom garment of the present embodiment, an elastic yarn is at least partially arranged in the body fabric constituting the bottom garment.

[0083] The elastic yarn partially arranged in the body fabric of the bottom garment of the present embodiment refers to fibers having a breaking elongation of 100% or more. The polymer of the elastic yarn and the spinning method are not particularly limited, and examples thereof include polyurethane elastic yarns (also referred to as spandex or spandex fibers), polyether ester elastic yarns, polyamide elastic yarns, polyolefin elastic yarns, etc., and for example, as a polyurethane elastic yarn, dry spinning or melt spinning can be used. Furthermore, these elastic yarns may be coated with an inelastic yarn so as to achieve a covered state. Furthermore, so-called rubber yarns, which are in the form of yarns composed of natural rubber, synthetic rubber, or semi-synthetic rubber, can be used, but polyurethane elastic yarn, which has excellent elasticity and is generally widely used, is preferable. Thereamong, the diol component constituting the polyurethane polymer preferably has a side chain, more preferably the side chain is a methyl group, and further preferably has two methyl groups on the same carbon.

[0084] The breaking elongation of the elastic yarn is preferably 400% to 1000% from the viewpoint of imparting the fabric with suitable elasticity. The breaking elongation is a value measured by the method described in JIS L1013 "8.5.1 Tensile Strength and Elongation."

[0085] It is preferable that the elasticity of the elastic yarn not be impaired at approximately 180°C, which is the normal processing temperature in the presetting process during the dyeing process. Furthermore, elastic yarn having functionality such as high settability, deodorant property, antibacterial property, hygroscopic property, and water absorption property to which a special polymer or powder is added can also be used. Regarding the fineness of elastic yarn, fibers having a fineness of approximately 10 dtex to 700 dtex (decitex, the same symbol is used below) can be used, and when looping with the elastic yarn, it is preferable to use elastic yarn having a fineness of approximately 12 dtex to 250 dtex, and when performing insertion knitting of elastic yarn using a Raschel knitting machine, it is preferable to use elastic yarn having a fineness of 70 dtex to 700 dtex.

[0086] As the body fabric primarily constituting the bottom garment of the present embodiment, a woven fabric or a knitted fabric is used, which is appropriately selected in accordance with the item. A knitted fabric is preferable from the viewpoint of elasticity.

[0087] In the case of warp knitting, a structure in which the elastic yarn is inserted or looped by a Raschel knitting machine or a tricot knitting machine is preferably used. In the Raschel structure, a structure in which thick spandex fibers such as 6-course satin, 4-course satin, 6-course tulle, and triconette are inserted is preferably used. A fabric in which two spandex fibers are inserted and the fabric is stretched in the warp and weft directions is particularly preferable from the viewpoint of wearing comfort. In tricots, half tricots, double stitches, atlas structures, etc., are preferable because they have good elasticity.

[0088] In the case of a circular knitting, it is preferable that the elastic yarn be looped.

[0089] As the body fabric, a woven fabric woven with elastic fibers is also preferably used, and in particular, a woven fabric in which elastic fibers are woven in both the warp and weft is preferable.

[0090] In the body fabric of the present embodiment as a product for general consumers, the stress upon 50% elongation in a horizontal direction is preferably 0.3 N to 3 N, more preferably 0.3 N to 2.5 N, and further preferably 0.5 N to 1.5 N. The elongation stress is measured using a Tensilon tensile tester to stretch a 2.5 cm wide sample gripped at a grip interval of 10 cm at a tension rate of 300 mm/min, and to obtain a stress at an elongation ratio of 50%. When the stress upon 50% elongation in a horizontal direction of the body fabric is 3 N or less, there is no excessive tightening at the time of wearing, achieving comfort. Conversely, when the stress upon 50% elongation in a horizontal direction of the body fabric is 0.3 N or more, the compensation effect is high. Furthermore, as a product for athletes with a large amount of muscle, it is preferable that the stress upon 50% elongation in a horizontal direction of the body fabric be 0.3 N to 5 N, more preferably 0.3 N to 4.5 N, and further preferably 0.5 N to 4.0 N.

[0091] Furthermore, the stress upon 50% elongation in a vertical direction of the body fabric is preferably 0.3 N to 4 N. When the stress upon 50% elongation in a vertical direction is 4 N or less, the ability to follow action during actions such as sitting and crouching is enhanced. Conversely, when it is 0.3 N or more, the compensation effect is high. As used herein, the "horizontal direction" refers to the peripheral direction of the bottom product (the direction around the human body when worn), and the "vertical direction" refers to the vertical direction of the bottom product (the direction in which it is worn on the human body).

[0092] When used for inners such as girdles and shorts, it is preferable that the hem on the leg side have a hem structure formed by pulling out threads and a free-cut structure that can be used without fraying or curling of threads on the cut surface. By using these, since it is not necessary to sew the end portions, it is possible to prevent the end portion

from becoming thick and to prevent the end portion from contacting the skin and leaving a mark on the skin. Furthermore, the line is not visible on the outer and is excellent in aesthetics. As the free-cut material, for example, a mixed material of polyurethane and an inelastic fiber, which is easily heat-sealed, is preferably used, and nylon or polyester is preferably used as the inelastic yarn.

[0093] The bottom garment of the present embodiment is characterized by having a double structure in which the inner fabric overlaps the inside (the human body side when worn) of the body fabric.

[0094] As the inner fabric, a woven fabric or knitted fabric is used, which is appropriately selected depending on the product, but a knitted fabric is preferable from the viewpoint of elasticity. In the case of warp knitting, a structure in which the elastic yarn is inserted or looped by a Raschel knitting machine or a tricot knitting machine is preferably used. In the Raschel structure, a structure in which thick spandex fibers such as 6-course satin, 4-course satin, 6-course tulle, and triconette are inserted is preferably used. A fabric in which two spandex fibers are inserted and the fabric is stretched in the warp and weft directions is particularly preferable from the viewpoint of wearing comfort. In Jacquard Raschel, there may be a difference in fabric stretch stress within the inner fabric panel. In tricot, half tricot, double stitches, atlas structures, etc., are preferable because they have good elasticity. In the case of a circular knitting, it is preferable that the elastic yarn be looped. As the inner fabric, a woven fabric woven with elastic fibers is preferably used, and in particular, a woven fabric in which elastic fibers are woven in both the warp and weft is preferable.

[0095] The stress upon 50% elongation in a horizontal direction of the inner fabric of the present embodiment is 0.3 times to 1.6 times the stress upon 50% elongation in a horizontal direction of the body fabric, preferably 0.3 times to 1.3 times, more preferably 0.3 times to 1.1 times, further preferably 0.3 times to 0.9 times, and most preferably 0.5 times to 0.9 times. When the stress upon 50% elongation in a horizontal direction of the inner fabric is less than 0.3 times the horizontal direction stress of the body fabric, the support effect is inferior, and conversely, when the stress upon 50% elongation in a horizontal direction of the inner fabric exceeds 1.6 times the horizontal direction stress of the body fabric, the stress of the inner fabric is excessively strong, bringing about inferior comfort.

[0096] In the inner fabric of the present embodiment, the area covered by the inner fabric is preferably 60% or less of the area of the buttocks from the viewpoint of efficiently exerting the external rotation force or the internal rotation force. As used herein, the term "buttocks" refers to the region from the left and right sides of the human body and the supracristal plane (waist) to the gluteal sulcus. If the inner fabric covers 60% or less of the area of the buttocks, the elongation balance of the inner fabric is likely to change when worn, the force for pulling the thighs outward or inward becomes strong and effective, and the area covered is more preferably 50% or less.

[0097] The vertical direction width of the product of the inner fabric is preferably 5 cm to 20 cm, and more preferably 5 cm to 18 cm. When the vertical direction width of the inner fabric is 5 cm or more, there is a sufficient body-covering area and an elongation force upon the elongation of the fabric is likely to be applied to the body, whereby the external rotation effect or the internal rotation effect can easily be exerted. Conversely, if the vertical direction width of the inner fabric is 20 cm or less, the stretch balance of the inner fabric is likely to change when worn, and the force pulling the thighs outward or inward becomes stronger, whereby the external rotation effect or internal rotation effect can easily be exhibited.

[0098] The inner fabric of the bottom garment of the present invention is characterized in that it is arranged on the inside of the body fabric and at least a part thereof is not joined with the body fabric. As used herein, "not joined" means the fabrics are not always in close contact and fixed by means such as sewing or bonding, and the fabrics are floating.

[0099] By overlapping at least a part of the inner fabric whose stress upon elongation is 0.3 times to 1.6 times that of the body fabric on the body fabric without jointing it to the body fabric, the effect of rotating the legs is exhibited. Furthermore, by not jointing at least a part of the inner fabric, when worn or stationary, the stretch balance of the inner fabric changes from the front side to the buttocks side, so that a force pulling the thighs outward or inward is generated.

[0100] During walking, the inner fabric shifts according to the movement, and the stretching balance of the inner fabric changes from the front side to the buttocks side more than when stationary, whereby the force pulling the thighs further outward or inward is generated. Due to the effect of pulling the thighs, an external or internal rotational force is generated on the lower leg, and a force for opening or closing the legs is generated. It is believed that this action leads to an increase in stride length and walking speed. Furthermore, by applying an external rotation force to knock-knees and an internal rotation force bow-leggedness, it is believed that the position of the femur is corrected in the normal direction, and the legs are more likely to rotate outwards when standing, such as when walking, which further increases stride length and walking speed.

[0101] In particular, since at least part of the inner fabric is not joined to the body fabric, the effect of turning the legs outward can be obtained by always pulling with the inner fabric independently of (not following) the body fabric.

[0102] Further, in the bottom garment of the present embodiment, as shown in FIG. 3, the vertical direction center line of the inner fabric is located below a part corresponding to the greater trochanter in the vertical direction in the side part of the bottom garment.

[0103] The vertical direction center line is a line connecting the central part of the inner fabric in the vertical direction, and is indicated by the fine dotted line in the drawing.

[0104] By arranging the inner fabric so that the vertical direction center line is located under the greater trochanter of the wearer, a tightening force can be applied to positions closer to the greater trochanter in the femur, and the femur can be efficiently rotated by the forces from the side (outside) to the inside or forces from the inside to the side. As a result, a corrective effect on bow-leggedness and knock-knees can be expected, and the lower limbs can be properly rotated so that the position of the pelvis can be maintained in the correct position.

[0105] It is preferable that the upper end portion of the inner fabric be located below a part corresponding to the greater trochanter in the vertical direction in the side part of the bottom garment.

[0106] By arranging the inner fabric in the side part so that the upper end is located lower than the part corresponding to the greater trochanter in the vertical direction, a corrective effect can be obtained without applying a tightening force to the greater trochanter, whereby movement is unlikely to be inhibited during action, and the bottom can easily move.

[0107] Further, it is preferable that the shortest distance between the upper end portion of the inner fabric and the part corresponding to the greater trochanter in the side part be 0 to 10 cm.

[0108] By applying a tightening force to the femur closer to the greater trochanter, the corrective effect can be obtained efficiently.

[0109] FIGS. 3 to 11 show examples of preferable arrangement of each member in the bottom garment of the present embodiment.

[0110] In FIGS. 3 to 6, the inner fabric is arranged so as to cover the lower part of the buttocks or the thighs from the waist or the groin. In the arrangement of this fabric, the inner fabric is pulled from the waist or groin toward the lower buttocks or thighs when worn, whereby the effect of externally rotating the legs can be obtained by generating a force (external rotation force) pulling the thighs outward.

[0111] When the arrangement of the inner fabric is as shown in FIG. 3, $A > B > C$, and when the distance between the greater trochanter and the upper end of the inner fabric is short, the external rotation force is effectively generated.

[0112] When the arrangement of the inner fabric is as shown in FIG. 4, $A = B > C$, and a lesser external rotation force than in FIG. 3 is generated.

[0113] When the arrangement of the inner fabric is as shown in FIG. 5, $A > B > C$, but the inclination of the inner fabric is smaller than in FIG. 3, and a lesser external rotation force than in FIG. 3 is generated.

[0114] When the arrangement of the inner fabric is as shown in FIG. 6, $A > B > C$, but since the upper end of the inner fabric or the vertical direction center line of the inner fabric is above the part corresponding to the greater trochanter, there is a greater feeling of movement restriction than in the case of the arrangement of FIG. 3. When the upper end of the inner fabric is above the part corresponding to the greater trochanter, an external rotation force less than that of the case of the arrangement of FIG. 3 is generated, and when the upper end of the inner fabric and the vertical direction center line of the inner fabric are above the part corresponding to the greater trochanter, the external rotation force is less likely to be generated.

[0115] In FIGS. 7 to 11, the inner fabric is arranged so as to cover the lower part of the buttocks or the rear part of the thighs from the front part or groin of the thighs. In the arrangement of this fabric, the effect of inwardly rotating the legs can be obtained by generating a force (internal rotation force) pulling the inner fabric from the lower part of the buttocks or the rear part of the thighs to the front part of the thighs or the groin when worn.

[0116] When the arrangement of the inner fabric is as shown in FIG. 7, $B > A$ and $B > C$, and when the distance between the greater trochanter and the upper end of the inner fabric is short, the internal rotational force is effectively generated.

[0117] When the arrangement of the inner fabric is as shown in FIG. 8, $A = B = C$, and a lesser internal rotational force than in FIG. 7 is generated.

[0118] When the arrangement of the inner fabric is as shown in FIG. 9, $B < A$ and $B < C$, and a lesser internal rotational force than in FIG. 8 is generated.

[0119] When the arrangement of the inner fabric is as shown in FIG. 10, $B > A$ and $B > C$, but the inclination of the inner fabric in the front portion is smaller than in FIG. 7, and a lesser internal rotational force than in FIG. 7 is generated.

[0120] When the arrangement of the inner fabric is as shown in FIG. 11, $B > A$ and $B > C$, but the inclination of the inner fabric on the back surface is smaller than in FIG. 7, and a lesser internal rotational force is generated than in FIG. 7.

[0121] In the bottom garment of the present embodiment, the area ratio of the portion in which the inner fabric is not joined with the body fabric, relative to the total area of the inner fabric, is preferably 70% or more, more preferably 80% or more, and further preferably 90% or more. It is preferable that the area ratio be 70% or more because the effect of rotating the legs can be obtained, and the bottom can easily move.

[0122] Joining is preferably performed at ends of the inner fabric, for example, the upper end, lower end, and side end parts (the left and right ends of the inner fabric, the joint portions with the crotch part, and the joint portions with the front panel (also called the stomach pressing panel or panel) are collectively referred to as side end parts; refer to FIG. 3).

[0123] It is preferable that 20% to 70% of the end portions of the inner fabric not be joined, and the unjoined portions are preferably the lower end portions of the inner fabric. Further, when the ratio of the end portion of the inner fabric that is not joined to the body fabric of the inner fabric is 20% to 100% with respect to the total length of the lower end portion

of the inner fabric, the stretch balance of the inner fabric tends to change from the front side to the buttocks side or the back part, and the force for pulling the thigh parts to the outside or the inside becomes strong, which is preferable. Note that the joined portions and the non-joined portions may be continuous or discontinuous.

[0124] In particular, in the bottom garment of the present embodiment, it is preferable that 80% or more of the side end part of the inner fabric a bottom rear surface be joined to the body fabric at the thigh part.

[0125] By arranging the inner fabric so that the inclination from the side part to the thigh part becomes large, the effect of rotating the legs can be obtained.

[0126] When a stomach pressing panel is installed on the front surface by means of a girdle or the like, it is preferable that the side edges of the inner fabric be joined to the left and right parts of the panel. The vertical direction width of the product of the panel is preferably 5 cm to 20 cm, and it is preferable that the inner fabric be joined to one side of the front panel, pass through the back center, and be joined to the front panel on the other side. When the stomach pressing panel is not installed on the front surface of a sports bottom or the like, it is preferable that the upper ends and the side ends of the inner fabric be joined to the waist portion or arbitrary parts of the body fabric. The left and right sides of the inner fabric may overlap.

[0127] In order to generate the above external rotation force, in a front surface of the bottom garment when laid flat, it is preferable that 70% or more of the joint portion of the side end part of the inner fabric be located above the horizontal line passing through a point 5 cm above the crotch part. The crotch part means the bifurcated apex at the lower part of the bottom shown in FIG. 3. As shown in FIG. 3, the portion indicated by the thick solid line at both ends of the inner fabric is the joint portion of the side end part. If 70% of this thick solid line is located above the horizontal line passing through the point 5 cm above the crotch part, the external rotational force is likely to be generated.

[0128] When the end of the inner fabric is above the region 5 cm above the crotch part, the stretching of the inner fabric on the front surface is less than on the back surface, whereby the external rotation force is generated when worn.

[0129] In particular, in the bottom garment of the present embodiment, as shown in FIG. 3, when the vertical direction highest point of a side end part of the inner fabric in a front surface of the bottom garment is defined as A, a vertical direction highest point of the inner fabric in a bottom garment side part is defined as B, and a vertical direction highest point of the side end part of the inner fabric in a rear surface of the bottom garment is defined as C, it is preferable that the vertical direction height satisfy $A > B > C$.

[0130] The presence of the inner fabric in a spiral shape from the upper part of the front surface to the side parts to the back surface allows the thighs to be pulled outward when worn to effectively generate the external rotational force.

[0131] Furthermore, it is preferable that the inner fabric be joined with the body fabric in the front surface of the bottom garment in the vertical direction above the plane perpendicular to the vertical direction of the bottom garment including the crotch part.

[0132] In the arrangement of this fabric, since the amount of elongation of the inner fabric corresponding to the lower part of the buttocks when worn is greater than the amount of extension from the waist to the buttocks, when the inner fabric is pulled toward the lower part of the buttocks, a force pulling the thighs outward (external rotation force) is generated, whereby the effect of externally rotating the legs can be obtained.

[0133] Furthermore, in order to generate the internal rotation force, in a front surface of the bottom garment when laid flat, it is preferable that 70% or more of the joint portion of the side end part of the inner fabric be joined below the horizontal line passing through the point 5 cm above the crotch part. As shown in FIG. 5, the part represented by the thick solid line at both ends of the inner fabric is the joint portion of the side end part, and if 70% of this thick solid line is located below the horizontal line passing through the point 5 cm above the crotch part, the internal rotational force is likely to be generated.

[0134] When the end of the inner fabric is below the region 5 cm above the crotch part, the elongation of the inner fabric on the front is less than that on the back, the elongation of the inner fabric on the front surface is greater than that on the back surface, whereby internal rotation force is generated when worn.

[0135] In particular, in the bottom garment of the present embodiment, as shown in FIG. 7, when the vertical direction highest point of a side end part of the inner fabric in a front surface of the bottom garment is defined as A, a vertical direction highest point of the inner fabric in a bottom garment side part is defined as B, and a vertical direction highest point of the side end part of the inner fabric in a rear surface of the bottom garment is defined as C, it is preferable that the vertical direction height satisfy $B > A$ and $B > C$.

[0136] Since the inner fabric arrangement from the front side to the side part is $B > A$, B becomes a position closer to the greater trochanter, and the thighs can be pulled inward when worn to effectively generate the internal rotational force. In addition, by setting $B > C$ on the back surface, movement is not inhibited during action, and the bottom can easily move.

[0137] Furthermore, it is preferable that 80% or more of the side end parts of the inner fabric in the bottom front surface be joined to the body fabric at the thighs.

[0138] The inclination of the inner fabric increases from the front side to the side part, whereby the correction effect can be enhanced.

[0139] Though the joining can be performed by sewing, bonding, etc., a method which does not impair the elongation of the fabric is preferable, and two-needle stitching or staggered stitching is preferable for sewing, and joining with a width of 0.5 cm to 1.5 cm is preferable for bonding. Joining by bonding is more preferable because a difference in height of the joint portion is eliminated as compared with the case of sewing. It is also preferable to use a free-cut material for the inner fabric because a difference in height at the ends thereof is eliminated.

[0140] The pressure of the bottom garment of the present embodiment applied to the buttocks is preferably 5 hPa to 20 hPa, and more preferably 8 hPa to 18 hPa. The pressure on the buttocks is the average of the pressure on the left and right at the tops of the left and right hips (hip tops) at the position where the circumference of the buttocks is the largest, and in medium-sized bottom garments, it is attached to an M size standard body type mannequin and measured with an air pack type pressure gauge. Furthermore, in large-sized bottom garments, it is attached to a large size standard body type mannequin and measured. When the pressure on the buttocks is 5 hPa or more, the pressure is sufficiently large and the effect of rotating the legs is high, which is preferable. Conversely, if the pressure on the buttocks is 20 hPa or less, action is not inhibited during exercise, which is preferable.

[0141] For bottom garments for athletes, it is preferable to use a slightly stronger pressure from the viewpoint of supporting exercise performance, and the pressure on the buttocks is preferably 10 hPa to 20 hPa. In the case of bottom garments for athletes, polyester fibers are desirable as the inelastic yarn used for the body fabric or inner fabric from the viewpoint of sweat treatment.

[0142] For bottom garments for the elderly, it is preferable to increase the ease of wearing with a slightly weaker pressure, and the pressure on the buttocks is preferably 5 hPa to 15 hPa. When the pressure on the buttocks is within the above range, the ease of wearing is also improved.

EXAMPLES

«First Examples»

[0143] The first present invention will be specifically described below by way of Examples and Comparative Examples. Note that the measurement, etc., of the elongation stress in the Examples and Comparative Examples is performed as described below.

(1) Vertical Direction and Horizontal Direction 50% and 80% Elongation Stresses, Elongation Recovery Rates

[0144] Using a Tensilon tensile tester, a 2.5 cm wide sample gripped at a gripping interval of 10 cm is repeatedly subjected to an elongation rate of 0% to 80% and a recovery rate of 80% to 0% at a tensile speed of 300 mm/min three times, and the elongation load and recovery load for each of the vertical direction and horizontal direction are measured, and an elongation recovery curve is drawn. The stresses of the elongation rates of 50% and 80% in the first elongation are read and set as vertical direction and horizontal direction 50% and 80% elongation loads. If it is not possible to secure a gripping length of 10 cm due to circumstances of the production shape, elongation is performed at the possible gripping interval. If the width cannot be secured at 2.5 cm, a value is calculated by converting the measured width to 2.5 cm using the following formula.

$$\text{Elongation load at 2.5 cm width [cN]} = \{2.5 \text{ cm} / (\text{measured fabric width [cm]})\} \times \text{measured elongation load [cN]}$$

[0145] Regarding the elongation recovery rate, the third residual elongation (%) in the above-mentioned elongation stress measurement is read from the elongation recovery curve for each of the vertical direction and the horizontal direction, and the elongation recovery rate (%) in the vertical direction and the horizontal direction are calculated from the following formula:

$$\text{Elongation recovery rate (\%)} = \{[80 - (\text{residual elongation})] \div 80\} \times 100$$

[0146] Note that the fabric used for measurement is sampled from the bottom garment so as not to partially include a portion having a high elongation stress, such as a joint portion or an embroidered portion.

(2) Ratio of Region of Inner Fabric that is not Joined to Body Fabric

[0147] When the area of the inner fabric overlapping the body fabric is defined as S (cm²) and the area of the joint

portion is defined as S' (cm^2), the ratio of the region of the inner fabric that is not joined to the body fabric can be calculated by the following formula:

$$\text{Ratio of region of inner fabric that is not joined to body fabric} = (S - S') / S \times 100 (\%)$$

[0148] Note that when the areas S and S' cannot be obtained, the above ratio is calculated by obtaining the weight of a paper pattern or cloth corresponding to the area of the paper pattern or the area of the cloth, respectively, and replacing the area of the above formula with the weight.

(3) Ratio of Lower Ends of Inner Fabric not Joined to Body Fabric

[0149] When the end arranged downward when the inner fabric is worn (excluding the side end parts) is defined as P (cm), and the ends arranged downward when worn and joined to the body fabric are defined as P' (cm), the ratio of the lower ends of the inner fabric not joined to the body fabric can be calculated from the following formula:

$$\text{Ratio of lower ends of inner fabric not joined to body fabric} = (P - P') / P \times 100 (\%)$$

(4) Area Ratio where Inner Fabric Covers Buttocks

[0150] In the bottom garment, when the area of the buttock region surrounded by the waist, left and right side lines, and gluteal sulcus is defined as K (cm^2), and the area within this area where the inner fabric is present is defined as K' (cm^2), the area ratio where the inner fabric covers the buttocks can be calculated from the following formula:

$$\text{Area ratio where inner fabric covers buttocks} = K' / K \times 100 (\%)$$

[0151] Note that when calculating this area, the bottom garment is placed on a medium-sized mannequin, and the K of the bottom garment with respect to the buttock region K' of the mannequin is measured.

(5) Pressure

[0152] An air pack connected to an AMI-3037-10 pressure measuring device manufactured by AMI Techno Co., Ltd. is attached to the left and right hip top (top of buttock protrusion) parts and abdomen (3 cm below the navel) of a standard medium-sized mannequin, and the pressure (kPa) when the medium-sized bottom garment of the present embodiment is worn is measured repeatedly by performing desorption three times, and the average thereof is calculated.

(6) Hip Torque

[0153] Five subjects aged 20 to 40 were made to wear the bottom garment, and using a HUMAC NORM (manufactured by CSMi), the angle between the hip joint and the thigh in the supine position is set to neutral 0° , and when the thigh is raised and bent until the angle between the hip joint and the thigh becomes 120° , the force applied when raising the leg in the center of the thigh part was used as the torque for measurement.

(7) Knee Angle Θ

[0154] Five subjects aged 20 to 40 were made to wear the bottom garment, and in the static standing position, as shown in FIG. 12, reflex markers were attached at the iliac point, the center of the patella, and the lateral malleolus point, and an action analysis system (VENUS 3D: manufactured by Nobby-Tech. Ltd.) was used to measure the knee angle from the iliac point, the center of the patella, and the lateral malleolus point (Θ shown in FIG. 12: representing the internal angle of the knee as seen from the front). The degree of effect was calculated by the following formula.

$$\text{Knee angle } \Theta [^\circ] = (\text{angle between iliac point, center of patella, and lateral malleolus when wearing bottom garment}) - (\text{angle between iliac point, center of patella, and lateral malleolus when not worn})$$

[0155] When the external rotation force is exerted and the knee is externally rotated, Θ becomes a negative value, and when the internal rotation force is exerted and the knee is internally rotated, Θ becomes a positive value. Furthermore, the larger the absolute value of Θ , the greater the action of internal rotation or external rotation.

5 (8) Wearing Feeling

[0156] Five subjects evaluated the overall tightening feeling, ease of movement, and leg correction according to the following criteria, and the average thereof is calculated.

10 <Tightening feeling>

[0157]

15 5: Very comfortable
4: Somewhat comfortable
3: Unclear
2: Somewhat uncomfortable
1: Very uncomfortable

20 <Ease of movement>

[0158]

25 5: Very easy to move
4: Easy to move
3: Unclear
2: Slightly difficult to move
1: Very difficult to move

30 <Correction feeling>

[0159]

35 5: Strong corrective power
4: Some corrective power
3: Unclear
2: Little corrective power
1: Substantially no corrective power

40 [Example 1]

[0160] Regarding the fabric for the body fabric and inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 56 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0, and finishing was performed by a conventional method.

[0161] The warp direction of the fabric as a knitted fabric was arranged in the horizontal direction of the product, and a body fabric and an inner fabric were produced in a JASPO (Japan Sporting Goods Industry Association) unisex medium size unisex with the pattern of FIG. 1. Furthermore, in the inner fabric, the warp direction of the fabric as a knitted fabric was arranged in the vertical direction of the product. Sewing was performed using a seamer sewing machine. The upper side and side end parts of the inner fabric were sewn with the body fabric using the seaming sewing machine to produce a bottom garment.

[0162] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

55 [Example 2]

[0163] A bottom garment was produced in the same manner as Example 1, except that the inner fabric was finished in a state in which little tension was applied to the fabric in the horizontal direction during processing.

[0164] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 3]

[0165] A bottom garment was produced in the same manner as Example 1, except that regarding the inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 56 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 2-0/1-3.

[0166] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 4]

[0167] A bottom garment was produced in the same manner as Example 3, except that regarding the body fabric, using a single tricot machine, a full set of 44 dtex 24 polyester filament was threaded onto the front loom and 44 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0.

[0168] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 5]

[0169] A bottom garment was produced in the same manner as Example 4, except that regarding the inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 56 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/1-2 and the back structure was organized in 2-0/1-3.

[0170] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 6]

[0171] A bottom garment was produced in the same manner as Example 5, except that regarding the inner fabric, using a single tricot machine, a full set of 44 dtex 24 polyester filament was threaded onto the front loom and 44 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0.

[0172] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 7]

[0173] A bottom garment was produced in the same manner as Example 5, except that regarding the inner fabric, using a single tricot machine, a full set of 44 dtex 24 polyester filament was threaded onto the front loom and 33 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/4-5, the middle structure was organized in 2-3/1-0, and the back structure was organized in 1-0/1-2.

[0174] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 8]

[0175] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0176] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 9]

[0177] A bottom garment was produced in the same manner as Example 3 except that the body fabric and inner fabric

were produced with the pattern of FIG. 2.

[0178] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

5 [Example 10]

[0179] A bottom garment was produced in the same manner as Example 4 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

10 **[0180]** The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 11]

15 **[0181]** A bottom garment was produced in the same manner as Example 5 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0182] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

[Example 12]

20 **[0183]** A bottom garment was produced in the same manner as Example 7 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0184] The results of wearing evaluations are shown in Table 1 below along with the characteristics of the fabrics and garment.

25 [Comparative Example 1]

[0185] A bottom garment was produced in the same manner as Example 1, except that regarding the body fabric, the warp direction as a knitted fabric was arranged in the horizontal direction of the product.

30 **[0186]** The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Comparative Example 2]

35 **[0187]** A bottom garment was produced in the same manner as Comparative Example 1, except that regarding the inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 56 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/1-2 and the back structure was organized in 1-2/1-0.

40 **[0188]** The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Comparative Example 3]

45 **[0189]** A bottom garment was produced in the same manner as Comparative Example 1, except that regarding the inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 78 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 2-0/1-3.

[0190] The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

50 [Comparative Example 4]

[0191] Regarding the fabric for the inner fabric, A 240 dtex composite yarn in which a 165 dtex polyester two-heater processed yarn was wound on a 78 dtex polyurethane fiber that has been elongated three times under the condition of 800T/m was wound on a beam as a warp and set on a loom, two beams per loom were placed in a 45-tooth/inch loom, and a CSY 340 dtex composite yarn was used in the weft to produce a woven fabric having a taffeta structure at 54 lines/inch. The obtained woven fabric was relaxed and scoured with a continuous scouring machine, then preset at 185 °C for 1 minute, and then dyed with polyester with a liquid flow dyeing machine, after dyeing, a soft finishing agent was

padded, and a bottom garment was produced in the same manner as Comparative Example 1 except that the stretchable woven fabric obtained by performing the finishing set at 160° C for 1 minute was used by arranging the warp direction as the woven fabric in the horizontal direction of the product.

[0192] The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Comparative Example 5]

[0193] A bottom garment was produced in the same manner as Comparative Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0194] The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Comparative Example 6]

[0195] A bottom garment was produced in the same manner as Comparative Example 3 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0196] The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Comparative Example 7]

[0197] A bottom garment was produced in the same manner as Comparative Example 4 except that the body fabric and inner fabric were produced with the pattern of FIG. 2.

[0198] The results of wearing evaluations are shown in Table 2 below along with the characteristics of the fabrics and garment.

[Table 1]

	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8	Ex 9	Ex 10	Ex 11	Ex 12
Pattern	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 2	FIG. 2	FIG. 2	FIG. 2	FIG. 2
Body fabric												
	Basis weight	[g/m ²]	243	243	243	174	174	174	243	174	174	174
	Thickness	[mm]	0.61	0.61	0.61	0.426	0.426	0.61	0.61	0.426	0.426	0.426
	Horizontal 50% stress C	[N]	2.3	2.3	2.3	1.9	1.8	1.8	1.8	1.8	1.8	1.8
Inner fabric	Elongation recovery rate	[%]	84	84	84	95	95	84	84	95	95	95
	Basis weight	[g/m ²]	243	94	230	230	202	243	230	230	140	281
	Thickness	[mm]	0.61	0.271	0.68	0.68	0.52	1.12	0.68	0.68	0.32	1.12
	Horizontal 50% stress D	[N]	4.5	5.0	12.1	12.1	6.0	4.5	12.1	12.1	20.9	3.4
	Horizontal 50% stress B	[N]	6.9	7.1	15.1	15.1	7.2	6.9	15.1	15.1	22.1	4.3
	Vertical 80% stress A	[N]	2.9	2.3	4.2	4.2	3.2	2.9	4.2	4.2	4.8	3.4
	Elongation recovery rate	[%]	88	89	87	87	88	88	87	87	85	85
Stress ratio, inner fabric horizontal/body fabric horizontal = D/C		[-]	1.95	2.16	5.25	6.36	11.60	2.49	6.71	6.71	11.60	1.91
Stress ratio, inner fabric vertical /inner fabric horizontal = A/B		[-]	0.42	0.32	0.28	0.28	0.44	0.42	0.28	0.28	0.22	0.79
Area ratio where inner fabric is not joined with body fabric		[%]	97	97	97	97	97	93	93	93	93	93
Ratio of lower ends of inner fabric not joined to body fabric		[%]	92	92	92	92	92	93	93	93	93	93
Area ratio where inner fabric covers buttocks		[%]	48	48	48	48	48	9	9	9	9	9
Pressure	Hip tops	[hPa]	14	18	20	22	17	18	12	15	14	16
	Stomach	[hPa]	10	12	15	18	12	15	11	10	12	12
Hip torque		[Nm]	20	22	28	37	23	25	16	20	24	18
Knee angle		[deg.]	-7.2	-7	-8	-8.5	-6.8	-6.8	7.4	8.4	9.3	6.4
Wearing feeling	Tightening feeling	[-]	4.8	4.8	4.6	4.2	4.6	4.6	4.4	4	3.8	4.6
	Ease of movement	[-]	4.8	4.6	4.4	4.4	4.6	4.4	4.6	4.4	4.2	4.2
	Correction feeling	[-]	4.6	4.6	4.6	4.8	4.6	4.4	4.6	4.6	4.8	4.2

[Table 2]

			Comp Ex 1	Comp Ex 2	Comp Ex 3	Comp Ex 4	Comp Ex 5	Comp Ex 6	Comp Ex 7
Pattern			FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 2	FIG. 2	FIG. 2
Body fabric	Basis weight	[g/m ²]	243	243	174	174	243	174	174
	Thickness	[mm]	0.61	0.61	0.426	0.426	0.61	0.426	0.426
	Horizontal 50% stress C	[N]	2.3	2.3	1.8	1.8	2.3	1.8	1.8
	Elongation recovery rate	[%]	84	84	84	84	84	84	84
Inner fabric	Basis weight	[g/m ²]	243	223	201	195	243	201	195
	Thickness	[mm]	0.61	0.72	0.59	0.32	0.61	0.59	0.32
	Horizontal 50% stress D	[N]	1.4	6.3	8.8	19.9	1.4	8.8	19.9
	Horizontal 50% stress B	[N]	2.9	9	11	22.1	2.9	11	22.1
	Vertical 80% stress A	[N]	6.9	11.5	30.2	30.2	6.9	30.2	30.2
	Elongation recovery rate	[%]	88	86	83	75	88	83	75
Stress ratio, inner fabric horizontal/ body fabric horizontal = D/C		[-]	0.60	2.74	4.89	11.05	0.60	4.89	11.05
Stress ratio, inner fabric vertical /inner fabric horizontal = A/B		[-]	2.38	1.28	2.75	1.37	2.38	2.75	1.37
Area ratio where inner fabric is not joined with body fabric		[%]	97	97	97	97	93	93	93
Ratio of lower ends of inner fabric not joined to body fabric		[%]	92	92	92	92	93	93	93
Area ratio where inner fabric covers buttocks		[%]	48	48	48	48	9	9	9
Pressure	Hip tops	[hPa]	18	22	24	20	18	22	20
	Stomach	[hPa]	14	18	20	22	16	18	20
Hip torque		[Nm]	47	52	57	60	35	39	46
Knee angle		[deg.]	-2.1	-3.5	-5.4	-6.2	2.4	3.2	4.1
Wearing feeling	Tightening feeling	[-]	4	3.8	3.6	3.6	3.2	3	2.8
	Ease of movement	[-]	2.8	3	2.6	2	2.6	3.6	3.2
	Correction feeling	[-]	3.2	3.4	4	4.2	2.8	3	3.4

[0199] From Tables 1 and 2, since the ratio of the stress A upon 80% elongation in the vertical direction of the product of the inner fabric to the stress B upon 80% elongation in a horizontal direction of the product of the inner fabric satisfied $0.1 \leq A/B < 1.0$, the effect of internal or external rotation on the knee was suitably obtained. Further, appropriate tightening

feeling, ease of movement, and correction feeling could be simultaneously achieved.

[0200] Thus, the bottom garment of the present invention does not inhibit the ease of movement during action and has an excellent rotation effect with respect to the knee.

«Second Examples»

[0201] Next, Regarding the second present invention, the present embodiments will be specifically described below by way of Examples and Comparative Examples. However, the second present invention is not limited to the following Examples as long as there is no deviation from the spirit thereof. The physical properties in the Examples were measured by the following methods.

(1) Horizontal Direction 50% Elongation Stress, Elongation Recovery Rate

[0202] Using a Tensilon tensile tester, a 2.5 cm wide sample gripped at a gripping interval of 10 cm is repeatedly subjected to an elongation rate of 0% to 80% and a recovery rate of 80% to 0% at a tensile speed of 300 mm/min three times, and the stress upon elongation and stress upon recovery are measured for the horizontal direction, and an elongation recovery curve is drawn. The stress of the elongation rate of 50% in the first elongation is read and set as the stress upon 50% elongation in a horizontal direction. If it is not possible to secure a gripping length of 10 cm due to circumstances of the production shape, elongation is performed at the possible gripping interval, such as 5 cm.

[0203] Regarding the elongation recovery rate, the third residual elongation (%) in the above-mentioned elongation stress measurement is read from the elongation recovery curve for the horizontal direction, and the elongation recovery rate (%) in the vertical direction and the horizontal direction are calculated from the following formula:

$$\text{Elongation recovery rate (\%)} = \{[80 - (\text{residual elongation})] \div 80\} \times 100$$

[0204] Note that the fabric used for measurement is sampled so as not to partially include a portion having a high elongation stress, such as a joint portion or an embroidered portion.

(2) Distance Between Vertical Direction Center Line of Inner Fabric and Upper End of Inner Fabric and Part Corresponding to Greater Trochanter

[0205] In the side part (the stitching line on the side of the leg of the torso) of a C70 torso manufactured by Kiiya Co., Ltd., a point 10 cm above the crotch part at a horizontal distance is defined as the part corresponding to the greater trochanter. In a state in which the bottom garment is applied to the torso, the vertical direction distance between the vertical direction center line of the inner fabric and the upper end of the inner fabric and the part corresponding to the greater trochanter is measured.

(3) Height of Vertical Direction Highest Point

[0206] In a state in which the bottom garment is turned over and placed on a desk, the vertical direction distance from the hem on the bottom garment side part to the joint portion between the body fabric and the inner fabric is measured. The bottom garment side part indicates the part that appears as a side line when the bottom garment is placed on the desk with the front center and the back center of the bottom garment overlapped.

(4) Pressure

[0207] An air pack connected to an AMI-3037-10 pressure measuring device manufactured by AMI Techno Co., Ltd. is attached to the left and right hip top (top of buttock protrusion) parts and abdomen (3 cm below the navel) of a C70-sized lower body torso manufactured by Kiiya Co., Ltd., and the pressure (kPa) when the medium-sized bottom garment of the present embodiment is worn is measured repeatedly by performing desorption three times, and the average thereof is calculated.

(5) Stride Length Difference, Walking Time Difference

[0208] Five subjects aged 20 to 60 years old were made to wear bottom garment, and the time T and stride length Q were measured during walking on an 800 m course, and the difference between the time T1 and the stride length Q1 when wearing only shorts was determined. Note that in each case, each subject wore the same untightened long pants,

T-shirt, and athletic shoes as outerwear.

$$\text{Stride length difference} = Q - Q1 \text{ (cm)}$$

$$\text{Walking time difference} = T1 - T \text{ (sec)}$$

(6) Knee Angle Θ

[0209] Five subjects aged 20 to 60 were made to wear the bottom garment, and in the static standing position, as shown in FIG. 12, reflex markers were attached at the iliac point, the center of the patella, and the lateral malleolus point, and an action analysis system (VENUS 3D: manufactured by Nobby-Tech. Ltd.) was used to measure the knee angle from the iliac point, the center of the patella, and the lateral malleolus point (Θ shown in FIG. 12: representing the internal angle of the knee as seen from the front). The degree of effect was calculated by the following formula.

$$\text{Knee angle } \Theta [^\circ] = (\text{angle between iliac point, center of patella, and lateral malleolus when wearing bottom garment}) - (\text{angle between iliac point, center of patella, and lateral malleolus when not worn})$$

[0210] When the external rotation force is exerted and the knee is externally rotated, Θ becomes a negative value, and when the internal rotation force is exerted and the knee is internally rotated, Θ becomes a positive value. Furthermore, the larger the absolute value of Θ , the greater the action of internal rotation or external rotation.

(7) Average Muscle Activity

[0211] The muscle activity E of the rectus femoris, gluteus maximus, and biceps femoris, when a subject in their twenties wears the bottom garment and runs on a treadmill at a speed of 12 km/hr is measured using a myoelectric evaluation device (Personal-EMG plus: manufactured by Oisaka Electronic Equipment Ltd.), and the degree of change from the muscle activity amount E1 when wearing only shorts is calculated from the following equation.

$$\text{Average muscle activity } [\%CTRL] = (E / E1) \times 100$$

[0212] Note that in order to distinguish between the stance phase and the swing phase, the state of treadmill running is photographed with a high-speed camera, and the value of each muscle activity is obtained by integrating only the stance phase in the running cycle. E is defined as the average value of the amount of muscle activity in the three running cycles. The rectus femoris, gluteus maximus, and biceps femoris are muscle groups involved in flexion and extension of the lower limbs, and when the average muscle activity is significant, energy consumption is significant in running, and conversely, when the average muscle activity is small, energy consumption is small in running, and it is deemed that efficient running is possible.

(8) Wearing Feeling

[0213] Five subjects evaluated the tightening feeling, ease of movement, and fatigue of the buttocks according to the following criteria, and the average thereof is calculated.

<Tightening feeling>

[0214]

5: Very comfortable

4: Somewhat comfortable

- 3: Unclear
- 2: Somewhat uncomfortable
- 1: Very uncomfortable

5 <Ease of movement>

[0215]

- 5: Very easy to move
- 4: Easy to move
- 3: Unclear
- 2: Slightly difficult to move
- 1: Very difficult to move

15 <Fatigue>

[0216]

- 5: Very little fatigue
- 4: Some fatigue
- 3: Unclear
- 2: Somewhat significant fatigue
- 1: Significant fatigue

25 [Example 1]

[0217] Regarding the fabric for the body fabric and inner fabric, using a single tricot machine, a full set of 56 dtex 36 polyester filament was threaded onto the front loom and 56 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0, and finishing was performed by a conventional method.

[0218] The warp direction of the fabric as a knitted fabric was arranged in the horizontal direction of the product, and a body fabric and an inner fabric were produced in a JASPO (Japan Sporting Goods Industry Association) unisex medium size unisex with the pattern of FIG. 3. Furthermore, in the inner fabric, the warp direction of the fabric as a knitted fabric was arranged in the vertical direction of the product. Sewing was performed using a seamer sewing machine. The upper side and side end parts of the inner fabric were sewn with the body fabric using the seaming sewing machine to produce a bottom garment for athletes.

[Example 2]

[0219] A bottom garment for the elderly was produced in the same manner as Example 1, except that regarding the fabric for the body fabric, using a single tricot machine, a full set of 44 dtex 24 polyester filament was threaded onto the front loom and 33 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0, and regarding the fabric for the inner fabric, using a single tricot machine, a full set of 44 dtex 24 polyester filament was threaded onto the front loom and 33 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 1-2/1-0.

[Example 3]

[0220] A bottom garment was produced in the same manner as Example 1, except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was reduced.

[Example 4]

[0221] A bottom garment was produced in the same manner as Example 1, except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was reduced more than Example 3.

[Example 5]

[0222] A bottom garment was produced in the same manner as Example 1, except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was increased.

[Example 6]

[0223] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 4.

[Example 7]

[0224] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 5.

[Example 8]

[0225] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 6.

[Example 9]

[0226] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with a long length.

[Example 10]

[0227] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 7.

[Example 11]

[0228] A bottom garment was produced in the same manner as Example 2 except that the body fabric and inner fabric were produced with the pattern of FIG. 7.

[Example 12]

[0229] A bottom garment was produced in the same manner as Example 10 except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was reduced.

[Example 13]

[0230] A bottom garment was produced in the same manner as Example 10 except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was reduced more than Example 12.

[Example 14]

[0231] A bottom garment was produced in the same manner as Example 10 except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was increased.

[Example 15]

[0232] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 8.

[Example 16]

[0233] A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric

were produced with the pattern of FIG. 9.

[Example 17]

- 5 **[0234]** A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 10.

[Example 18]

- 10 **[0235]** A bottom garment was produced in the same manner as Example 1 except that the body fabric and inner fabric were produced with the pattern of FIG. 11.

[Example 19]

- 15 **[0236]** A bottom garment was produced in the same manner as Example 10 except that the body fabric and inner fabric were produced with a long length.

[Comparative Example 1]

- 20 **[0237]** A bottom garment was produced in the same manner as Example 1 except that the height B of the highest part of the joining point between the body fabric and the inner fabric of the side part was high.

[Comparative Example 2]

- 25 **[0238]** A bottom garment was produced in the same manner as Example 1 except that the inner fabric was entirely joined to the body fabric.

[Comparative Example 3]

- 30 **[0239]** A bottom garment was produced as described below with reference to Example 1 of WO 2019/124525.

- [0240]** Regarding the fabric for the body fabric, a full set of nylon 44 dtex 34 filament nylon was threaded onto the front loom, 155 dtex spandex fibers were threaded onto the middle loom, and 33 dtex spandex fibers were threaded on the rear loom, the front structure was organized in 1-0/2-1/2-3/1-2, the middle structure was organized in 0-0/1-1, and the back structure was organized in 0-0/3-3/2-2/3-3, a gray fabric was produced such that the part corresponding to the hem had a hem structure, and finishing was performed by a conventional method.

- 35 **[0241]** Regarding the fabric for the inner fabric, using a single tricot machine, a full set of 33 dtex 34 nylon filament was threaded onto the front loom and 15 dtex polyurethane fibers were threaded on the rear loom, the front structure was organized in 1-0/2-3 and the back structure was organized in 2-0/1-3, and finishing was performed by a conventional method.

- 40 **[0242]** The warp direction of the fabric as a knitted fabric was arranged in the horizontal direction of the product, the inner fabric was overlapped and joined from the vicinity of the center of the buttocks in the vertical direction to the vicinity of the base of the legs in the pattern of FIG. 6 to produce a women's medium-sized (height 155 to 165 cm) bottom garment. An adhesive manufactured by BEMIS was used for the joining, and the joining was carried out at a pressure of 3 BAR and a temperature of 160 °C for 30 seconds using a bonding machine. The joint width was 1 cm, the lower end of the inner fabric was free-cut and sewn, and joining with the body fabric was not performed except for the crotch part.

[Comparative Example 4]

- [0243]** A bottom garment was produced as described below with reference to Example 9 of WO 2019/124525.

- 50 **[0244]** A women's medium-sized bottom garment was produced in the same manner as Example 3 except that the body fabric and inner fabric were produced with the pattern of FIG. 10.

- [0245]** The results of the wearing evaluations of the bottom garments of the above Examples and Comparative Examples are shown in Tables 3 to 5 below together with the characteristics of the fabrics and garments.

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[Table 3]

	Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8
	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 2	FIG. 3	FIG. 4
Pattern								
Body fabric	Basis weight	[g/m ²]	243	174	243	243	243	243
	Thickness	[mm]	0.61	0.43	0.61	0.61	0.61	0.61
	Stress upon 50% elongation in horizontal direction	[N]	2.2	1.3	2.2	2.2	2.2	2.2
	Elongation recovery rate	[%]	84	95	84	84	84	84
Inner fabric	Basis weight	[g/m ²]	243	166	243	243	243	243
	Thickness	[mm]	0.61	0.53	0.61	0.61	0.61	0.61
	Stress upon 50% elongation in horizontal direction	[N]	2.4	0.47	2.4	2.4	2.4	2.4
	Elongation recovery rate	[%]	89	85	89	89	89	89
Ratio of inner fabric horizontal stress/body fabric horizontal stress		[-]	1.09	0.36	1.09	1.09	1.09	1.09
Position of 70% or more of joint portion of side end part with respect to horizontal line passing through point 5 cm above crotch part			Above	Above	Above	Above	Above	Above
Position of vertical direction center line of inner fabric with respect to part corresponding to greater trochanter			Below	Below	Below	Below	Below	Below
Position of upper end of inner fabric with respect to part corresponding to greater trochanter			Below	Below	Above	Above	Above	Above
Shortest distance between upper end of inner fabric and part corresponding to greater trochanter			0.5	0.5	7.5	9.5	0.1	0.3
Ratio of joining between side end part of inner fabric and thigh part on back surface		[%]	100	100	100	100	100	50
Ratio of joining between side end part of inner fabric and thigh part on front surface		[%]	0	0	0	0	0	0
Height of vertical direction highest point A of side end part of inner fabric on front surface		[cm]	31.0	40.0	31.0	31.0	22.0	30.5
Height of vertical direction highest point B of inner fabric in side part		[cm]	19.5	35.0	12.5	31.0	20.0	20.2

(continued)

		Ex 1	Ex 2	Ex 3	Ex 4	Ex 5	Ex 6	Ex 7	Ex 8
	Pattern	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 1	FIG. 2	FIG. 3	FIG. 4
Height of vertical direction highest point C of side end part of inner fabric on back surface	[cm]	12.0	14.0	12.0	12.0	12.0	12.0	15.0	22.0
	Hip top	15	9	15	15	15	15	15	15
Pressure	Stomach	11	6	11	11	11	11	11	11
Stride length difference	[cm]	4.1	3.8	2.8	2.5	3.5	3.2	3.4	3.2
Walking time difference	[sec]	57	53	47	41	49	44	45	44
Knee angle $\ominus$	[deg.]	-7.6	-6.8	-6.1	-5.6	-6.2	-6.3	-6.5	-6.3
Average Muscle Activity	Rectus femoris	94	95	96	98	96	97	95	98
	Gluteus maximus	93	96	97	97	97	96	97	97
	Biceps femoris	95	94	96	97	97	98	98	96
Wearing Feeling	Tightening feeling	4.4	4.6	4.6	4.6	3.8	3.7	4.4	4.5
	Ease of movement	4.6	4.8	4.8	4.8	3.9	3.8	4.6	4.9
	Fatigue	4.8	4.6	4.6	4.6	3.7	3.7	4.6	4.8

[Table 4]

Pattern		Ex9	Ex10	Ex11	Ex12	Ex13	Ex14	Ex15	Ex16
Body fabric	Basis weight	FIG. 1	FIG. 5	FIG. 5	FIG. 5	FIG. 5	FIG. 5	FIG. 6	FIG. 7
	Thickness	243	243	174	243	243	243	243	243
	Stress upon 50% elongation in horizontal direction	0.61	0.61	0.43	0.61	0.61	0.61	0.61	0.61
	Elongation recovery rate	2.2	2.2	1.3	2.2	2.2	2.2	2.2	2.2
Inner fabric Ratio of inner fabric	Basis weight	84	84	95	84	84	84	84	84
	Thickness	243	243	166	243	243	243	243	243
	Stress upon 50% elongation in horizontal direction	0.61	0.61	0.53	0.61	0.61	0.61	0.61	0.61
	Elongation recovery rate	2.4	2.4	0.47	2.4	2.4	2.4	2.4	2.4
Ratio of inner fabric horizontal stress/body fabric horizontal stress		89	89	85	89	89	89	89	89
Position of 70% or more of joint portion of side end part with respect to horizontal line passing through point cm above crotch part		1.09	1.09	0.36	1.09	1.09	1.09	1.09	1.09
Position of vertical direction center line of inner fabric with respect to part corresponding to greater trochanter		Above	Below	Below	Below	Below	Below	Below	Below
Position of upper end of inner fabric with respect to part corresponding to greater trochanter		Below	Below	Below	Below	Below	Below	Below	Below
Shortest distance between upper end of inner fabric and part corresponding to greater trochanter		Below	Below	Below	Below	Below	Average	Below	Below
Ratio of joining between side end part of inner fabric and thigh part on back surface		0.5	2.0	0.9	7.1	12.5	1.2	6.0	6.0
Ratio of joining between side end part of inner fabric and thigh part on front surface		100	100	85	100	100	100	100	100
Height of vertical direction highest point A of side end part of inner fabric on front surface		0	100	80	100	100	100	100	100
Height of vertical direction highest point B of inner fabric in side part		80.0	12.0	16.0	10.0	10.0	12.0	14.0	16.0
		68.5	18.0	27.0	12.9	7.5	21.2	14.0	14.0

(continued)

Pattern		Ex9	Ex10	Ex11	Ex12	Ex13	Ex14	Ex15	Ex16
Height of vertical direction highest point C of side end part of inner fabric on back surface		FIG. 1	FIG. 5	FIG. 5	FIG. 5	FIG. 5	FIG. 5	FIG. 6	FIG. 7
Pressure	Hip top	[cm]	61.0	12.0	19.0	10.0	12.0	14.0	16.0
	Stomach	[hPa]	15	15	9	15	15	15	15
Stride length difference		[hPa]	11	11	6	11	11	11	11
Walking time difference		[cm]	2.5	4.3	3.7	2.8	3.3	3.1	2.6
Knee angle $\ominus$		[sec]	41	60	51	39	46	43	41
Average Muscle Activity		[deg.]	-5.5	7.3	6.7	5.6	6.5	6.1	5.6
	Rectus femoris	[%CTRL]	97	92	93	96	95	96	97
	Gluteus maximus	[%CTRL]	96	94	95	97	94	95	98
	Biceps femoris	[%CTRL]	97	91	90	95	96	95	98
Wearing Feeling	Tightenin feeling	[-]	4.6	4.1	4.4	4.4	3.9	4.5	4.3
	Ease of movement	[-]	3.9	4.6	4.6	4.6	3.8	4.6	4.5
	Fatigue	[-]	4.0	4.9	4.6	4.6	3.5	4.6	4.6

[Table 5]

			Ex 17	Ex 18	Ex 19	Comp Ex 1	Comp Ex 2	Comp Ex 3	Comp Ex 4
	Pattern		FIG. 8	FIG. 9	FIG. 5	FIG. 1	FIG. 1	FIG. 4	FIG. 8
	Body fabric	Basis weight	[g/m ²]	243	243	243	243	172	172
		Thickness	[mm]	0.61	0.61	0.61	0.61	0.45	0.45
		Stress upon 50% elongation in horizontal direction	[N]	2.2	2.2	2.2	2.2	1.5	1.5
		Elongation recovery rate	[%]	84	84	84	84	96	96
	Inner fabric	Basis weight	[g/m ²]	243	243	243	243	135	135
		Thickness	[mm]	0.61	0.61	0.61	0.61	0.41	0.41
		Stress upon 50% elongation in horizontal direction	[N]	2.4	2.4	2.4	2.4	0.56	0.56
		Elongation recovery rate	[%]	89	89	89	89	92	92
	Ratio of inner fabric horizontal stress/body fabric horizontal stress		[-]	1.09	1.09	1.09	1.09	0.37	0.37
	Position of 70% or more of joint portion of side end part with respect to horizontal line passing through point 5 cm above crotch part		Below	Below	Below	Above	Above	Above	Below
	Position of vertical direction center line of inner fabric with respect to part corresponding to greater trochanter		Below	Below	Below	Above	Below	Above	Above
	Position of upper end of inner fabric with respect to part corresponding to greater trochanter		Above	Below	Below	Above	Below	Above	Above
	Shortest distance between upper end of inner fabric and part corresponding to greater trochanter		7.0	4.0	2.0	9.5	0.5	11	6.2
	Ratio of joining between side end part of inner fabric and thigh part on back surface		[%]	100	50	100	100	40	100
	Ratio of joining between side end part of inner fabric and thigh part on front surface		[%]	30	100	100	0	0	30
	Height of vertical direction highest point A of side end part of inner fabric on front surface		[cm]	26.0	17.0	60.0	31.0	31.0	16.0

(continued)

			Ex 17	Ex 18	Ex 19	Comp Ex 1	Comp Ex 2	Comp Ex 3	Comp Ex 4
5	Pattern		FIG. 8	FIG. 9	FIG. 5	FIG. 1	FIG. 1	FIG. 4	FIG. 8
	Height of vertical direction highest point B of inner fabric in side part	[cm]	27.0	24.0	66.0	29.5	19.5	33.0	23.0
10	Height of vertical direction highest point C of side end part of inner fabric on back surface	[cm]	14.0	22.0	60.0	12.0	12.0	22.0	20.0
15	Pressure	Hip top	[hPa]	15	15	15	15	14	12
		Stomach	[hPa]	11	11	11	11	10	9
	Stride length difference	[cm]	2.9	3.5	2.4	1.8	0.6	1.9	2.1
	Walking time difference	[sec]	40	49	39	31	10	33	36
20	Knee angle Θ	[deg.]	5.8	6.3	5.5	-4.7	0.1	-5.1	4.8
25	Average Muscle Activity	Rectus femoris	[%CTRL]	95	94	97	105	120	102
		Gluteus maximus	[%CTRL]	93	94	96	109	117	105
		Biceps femoris	[%CTRL]	97	95	97	104	118	104
30	Wearing Feeling	Tightening feeling	[-]	3.8	4.3	4.4	3.1	2.3	3.6
		Ease of movement	[-]	3.7	4.9	4.1	3.3	2.4	3.7
		Fatigue	[-]	3.9	4.9	3.8	3.2	2.5	3.6

[0246] From Tables 3 to 5, since the vertical direction center line of the inner fabric was located below a part corresponding to the greater trochanter in the vertical direction in the side part of the bottom garment, the effect of internal or external rotation on the knee is suitably obtained. Furthermore, excellent tightening feeling, ease of movement, and feeling of correction could be simultaneously achieved.

[0247] Thus, the bottom garment of the present invention does not inhibit the ease of movement during action and has an excellent rotation effect with respect to the knee.

INDUSTRIAL APPLICABILITY

[0248] In the bottom garment of the first present invention, since the inner fabric overlaps the inside of the body fabric and the ratio of the vertical direction and horizontal direction stresses upon 80% elongation of the inner fabric is in a predetermined range, since the inner fabric follows the extension of the skin during action and does not inhibit the action, movement is facilitated, and the external rotation force or the internal rotation force can be efficiently applied to the body, whereby the rotation effect with respect to the knee is large. Thus, a corrective effect on bow-leggedness and knock-knees can be expected, and an excellent walking assist effect can be achieved by wearing the bottom garment of the present invention. Therefore, the bottom garment of the present invention can be suitably used for sports bottoms and the like.

[0249] In the bottom garment of the second present invention, since the vertical direction center line of the inner fabric is located below a part corresponding to the greater trochanter in the vertical direction in the side part of the bottom garment, since the inner fabric follows the extension of the skin during action and does not inhibit the action, movement is facilitated, and the external rotation force or the internal rotation force can be efficiently applied to the body, whereby the rotation effect with respect to the knee is large. Thus, a corrective effect on bow-leggedness and knock-knees can be expected, and an excellent walking assist effect can be achieved by wearing the bottom garment of the present

invention. Therefore, the bottom garment of the present invention can be suitably used for sports bottoms and the like.

Claims

1. A bottom garment, which comprises an elastic yarn, which is composed of a body fabric and an inner fabric, and in which there is present a double structure in which the inner fabric overlaps the inside of the body fabric and at least a part of the inner fabric is not joined to the body fabric, wherein when a stress upon 80% elongation in a vertical direction of a product of the inner fabric is defined as A and a stress upon 80% elongation in a horizontal direction of a product of the inner fabric is defined as B, $0.1 \leq A/B < 1.0$.
2. The bottom garment according to claim 1, wherein $0.1 \leq A/B < 0.5$.
3. The bottom garment according to claim 1 or 2, wherein when a stress upon 50% elongation in a horizontal direction of a product of the body fabric is defined as C and a stress upon 50% elongation in a horizontal direction of the inner fabric is defined as D, $1.6 < D/C \leq 10$.
4. The bottom garment according to claim 3, wherein $1.6 < D/C \leq 6.0$.
5. The bottom garment according to claim 4, wherein $1.6 < D/C \leq 4.0$.
6. The bottom garment according to any one of claims 1 to 5, which is a sport garment.

FIG. 1

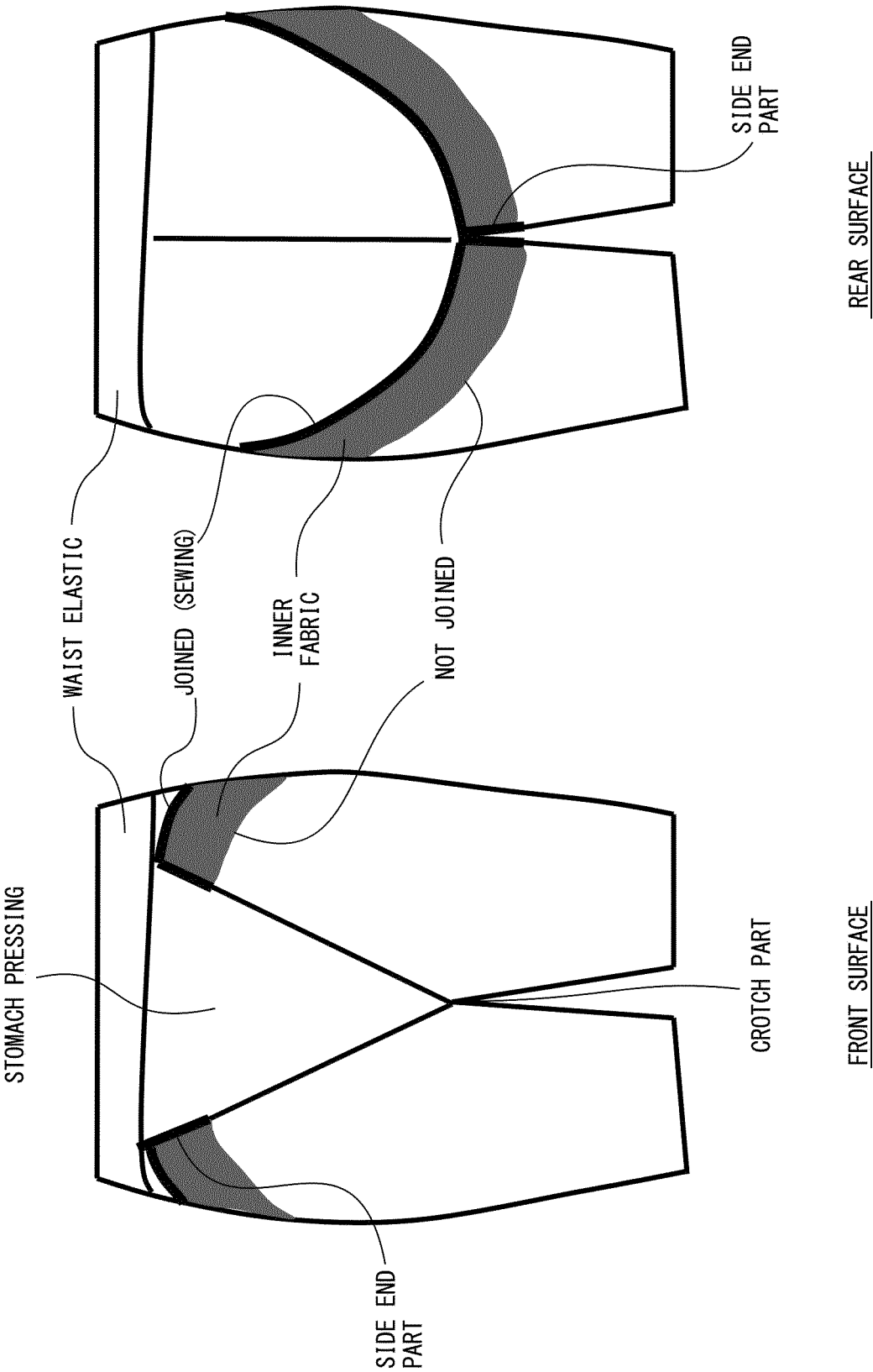


FIG. 2

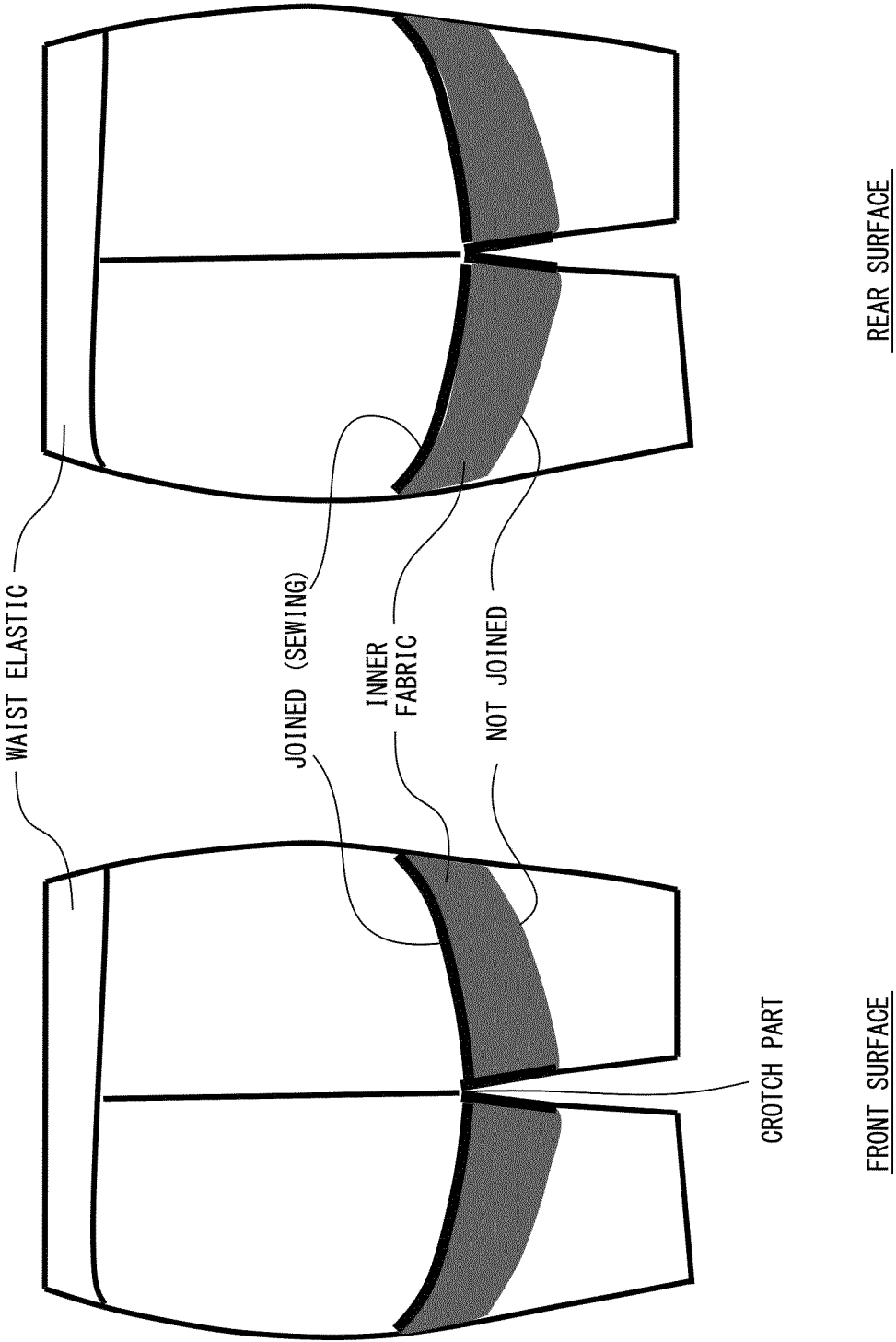


FIG. 3

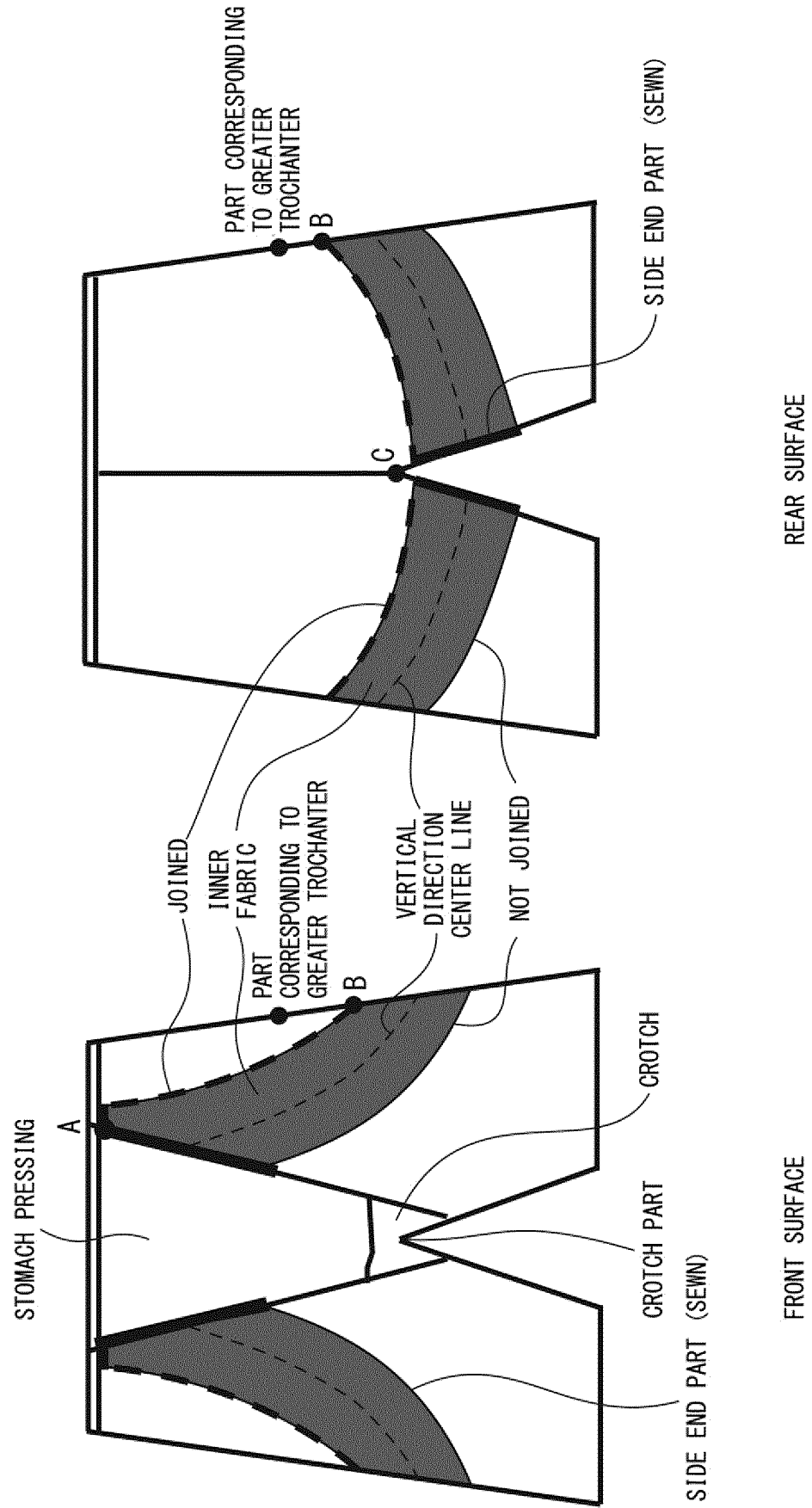


FIG. 4

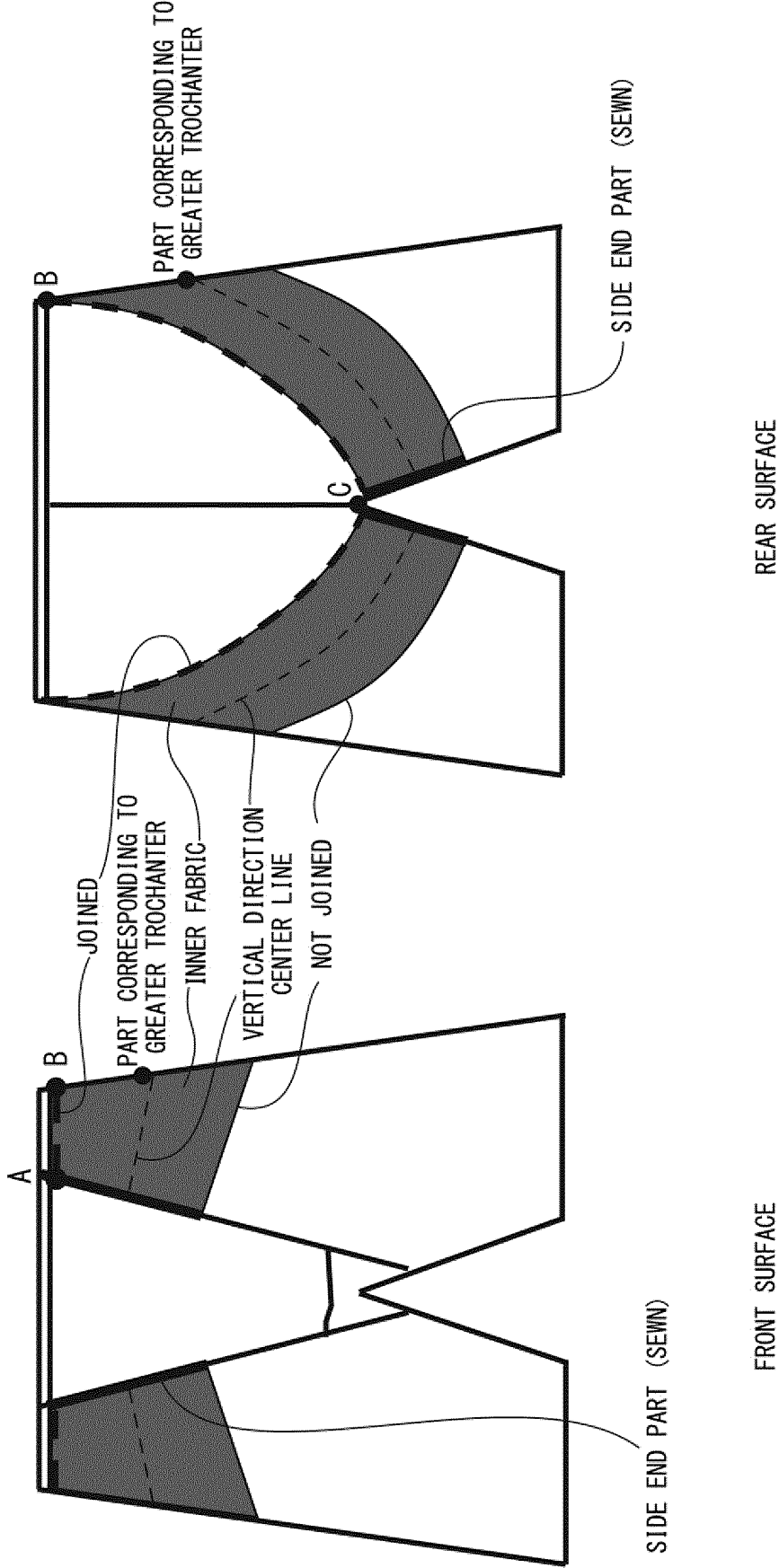


FIG. 5

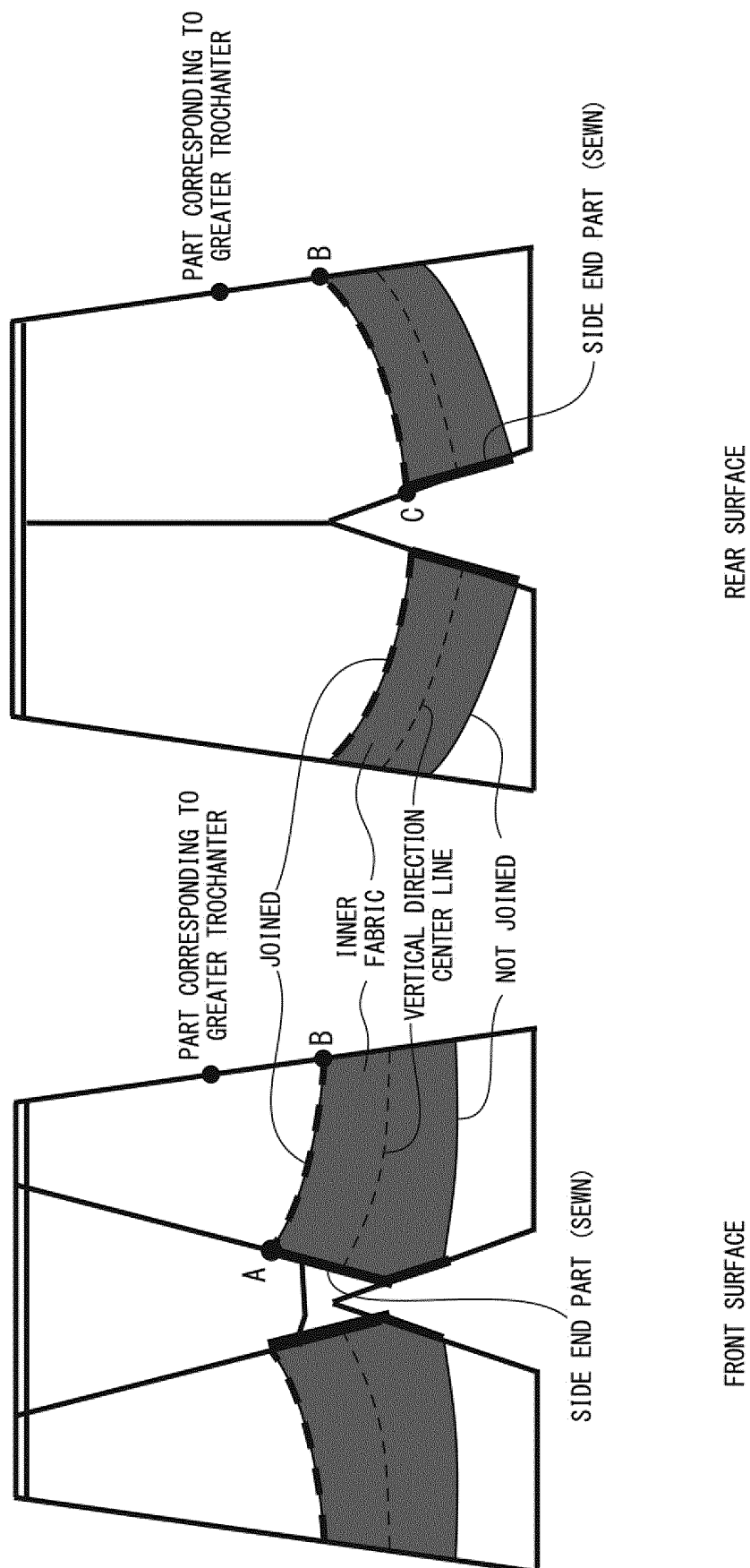


FIG. 6

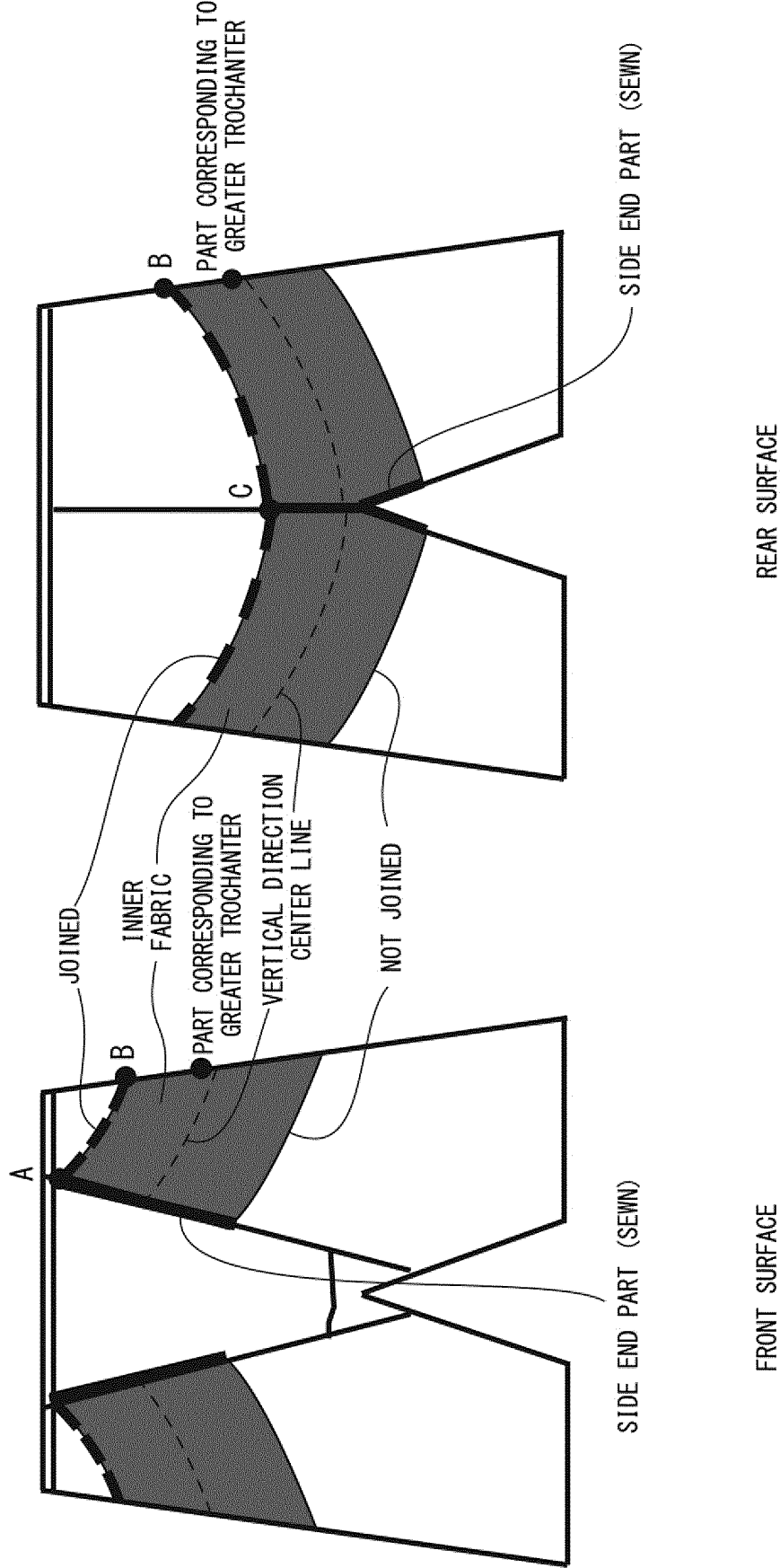


FIG. 7

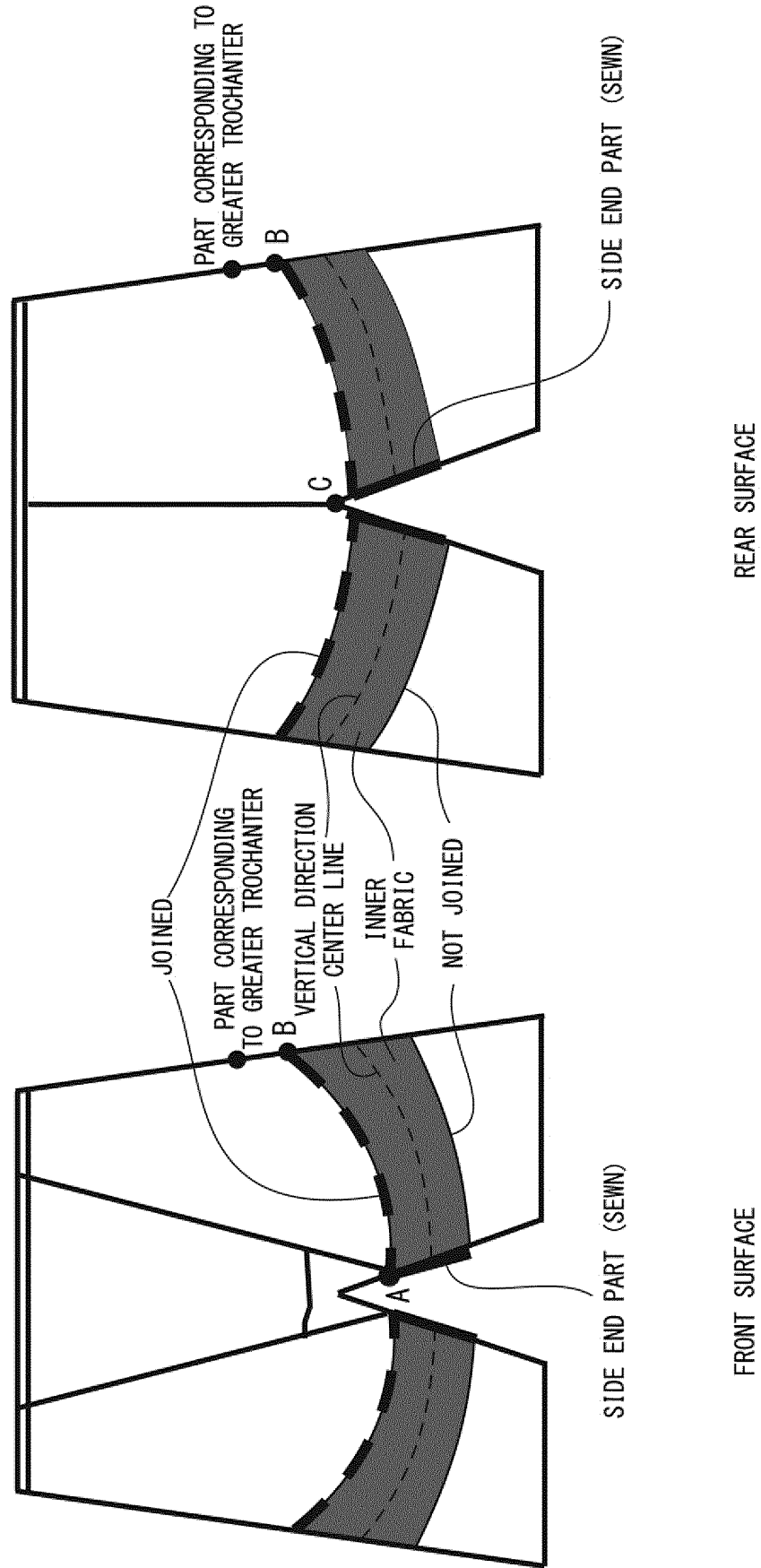


FIG. 8

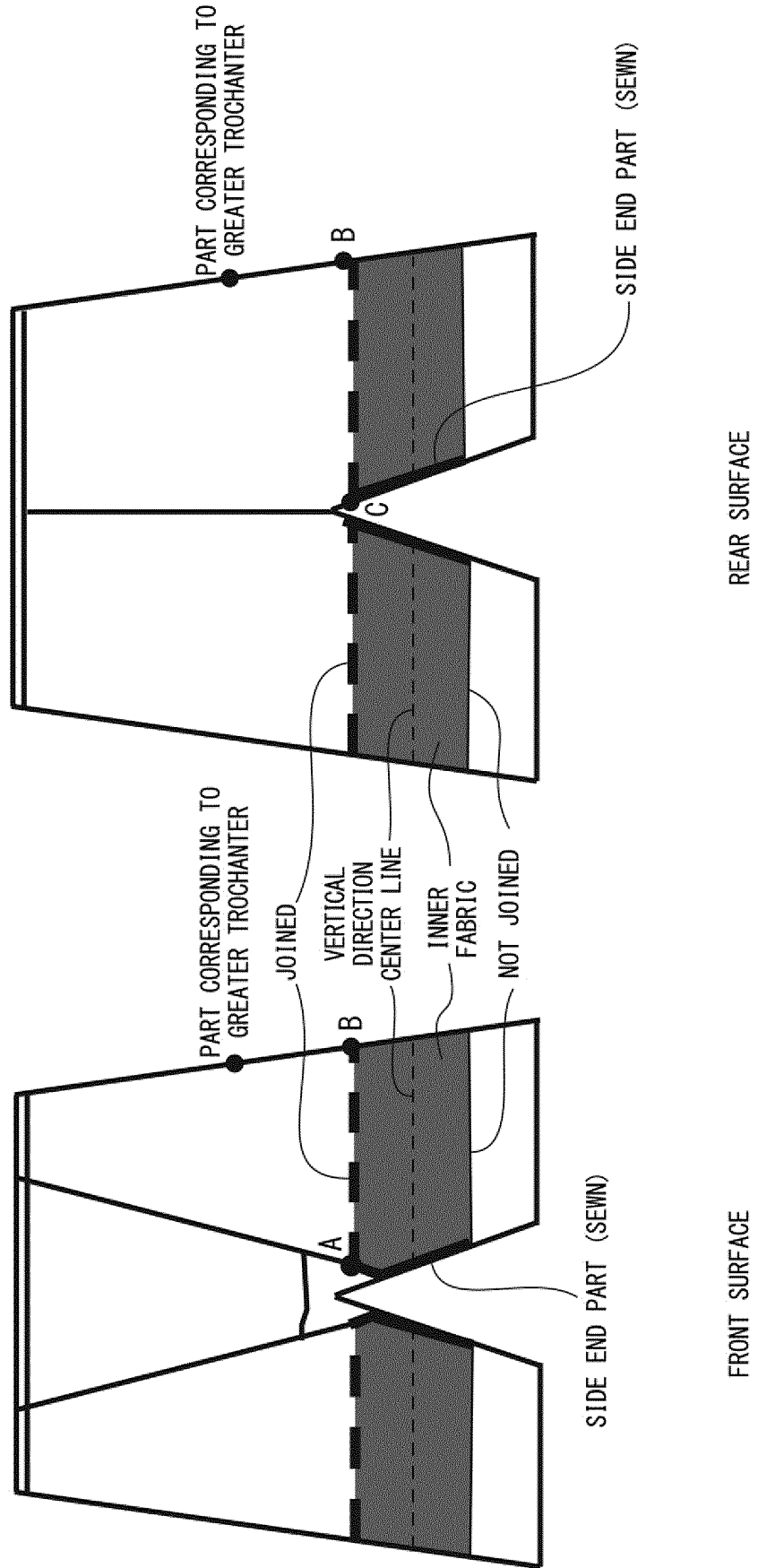


FIG. 9

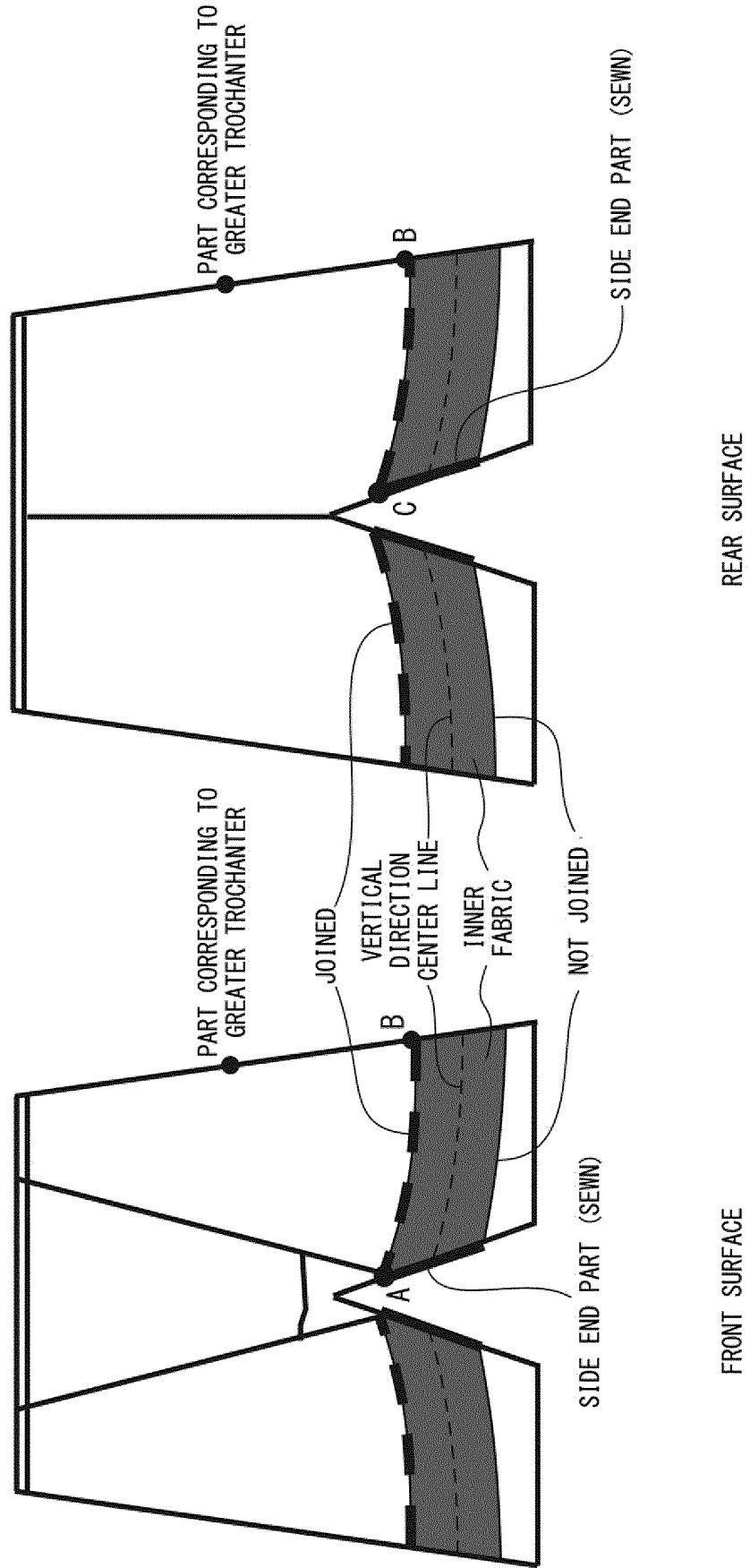


FIG. 10

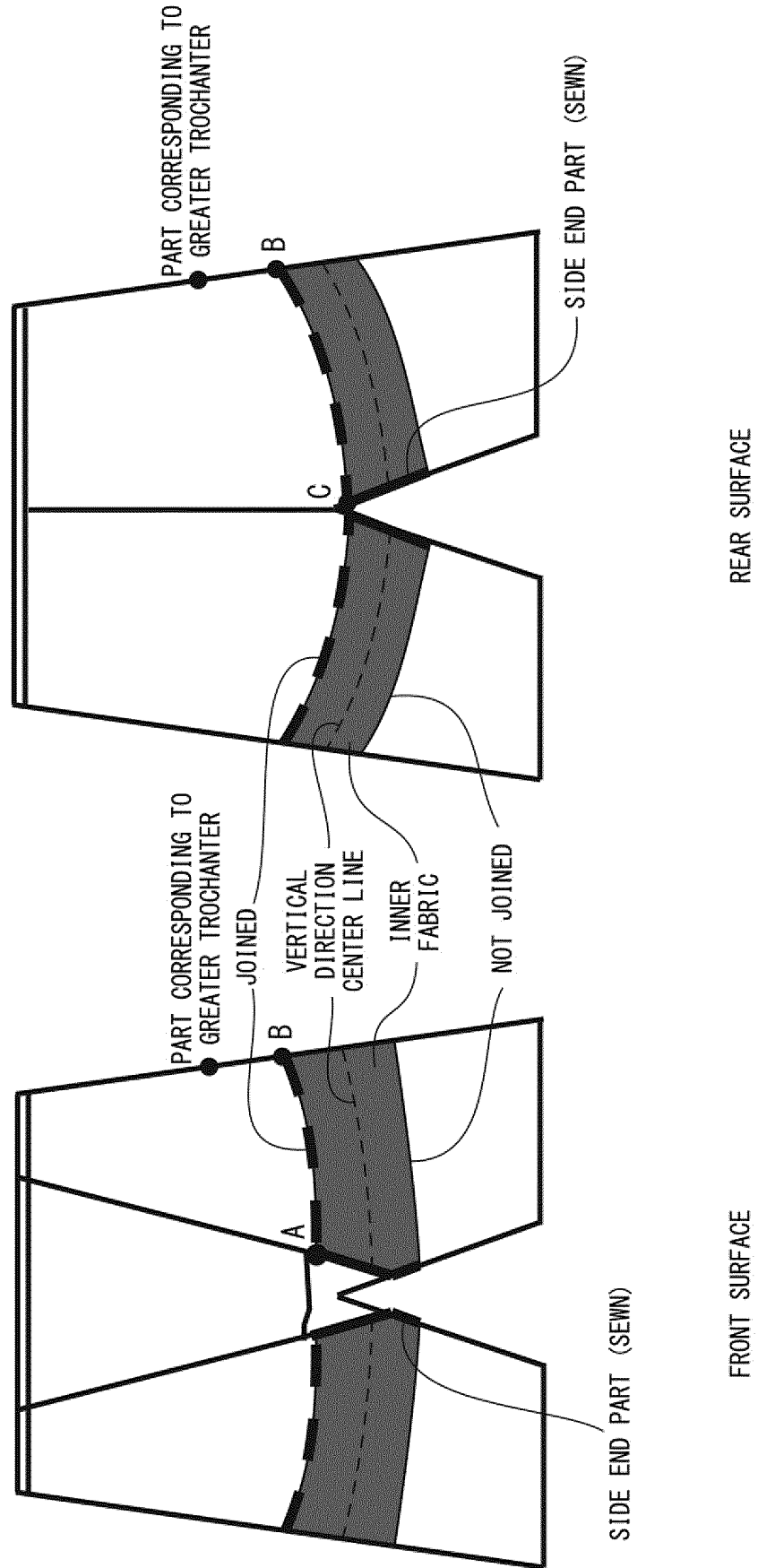


FIG. 11

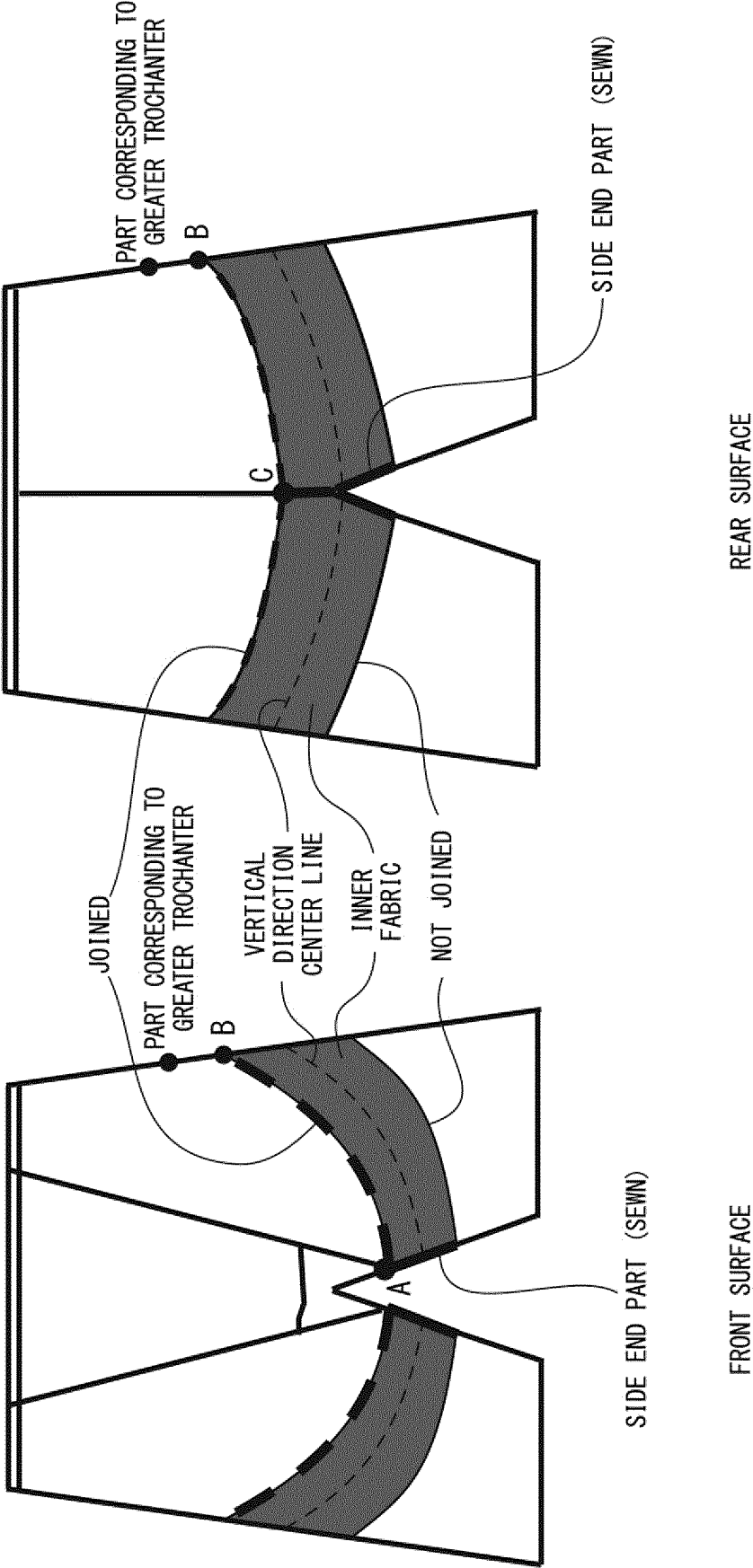
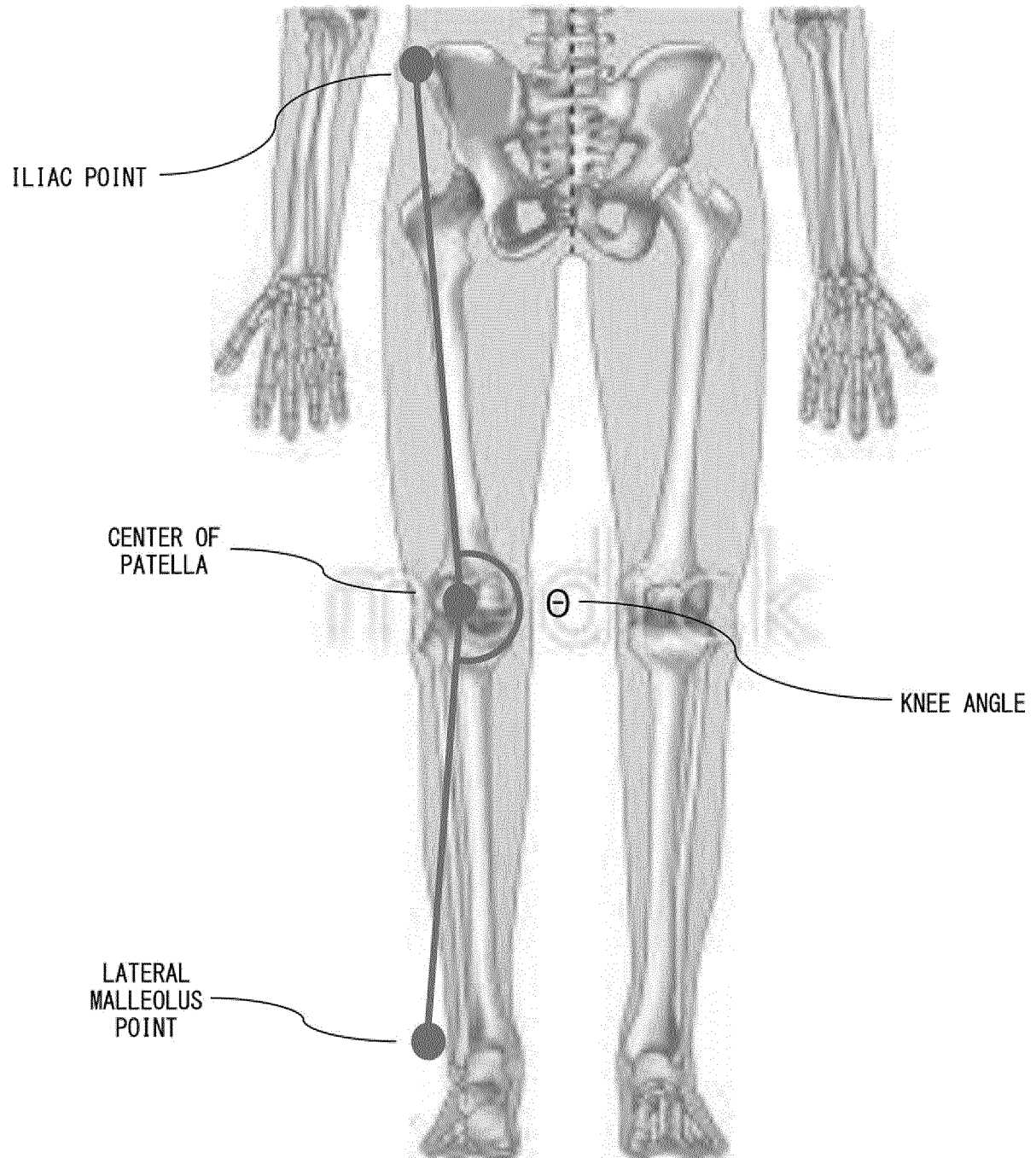


FIG. 12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/003082

A. CLASSIFICATION OF SUBJECT MATTER

A41B 11/14 (2006.01) i; A41C 1/00 (2006.01) i; A41D 1/06 (2006.01) i; A41D 1/08 (2018.01) i; A41D 13/00 (2006.01) i

FI: A41C1/00 D; A41D13/00 115; A41D1/06 501D; A41B11/14 E; A41D1/08

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)

A41C1/00; A41D13/00; A41D1/06-1/089; A41B11/14; A41B9/02-9/04

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

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2021

Registered utility model specifications of Japan 1996-2021

Published registered utility model applications of Japan 1994-2021

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2019-81974 A (SUMITOMO RUBBER INDUSTRIES, LTD.) 30 May 2019 (2019-05-30) paragraphs [0020]-[0022], [0027], [0037]-[0042], fig. 2A-2D	1-6
A	WO 2013/153624 A1 (WACOAL CORP.) 17 October 2013 (2013-10-17) paragraphs [0018]-[0021], [0034], [0052], fig. 1-2, 6-8	1-6
A	JP 2012-207345 A (WACOAL CORP.) 25 October 2012 (2012-10-25) paragraphs [0014]-[0022], fig. 1-4	1-6
A	WO 2019/124525 A1 (ASAHI KASEI CORPORATION) 27 June 2019 (2019-06-27) entire text, all drawings	1-6



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search
29 March 2021 (29.03.2021)Date of mailing of the international search report
06 April 2021 (06.04.2021)Name and mailing address of the ISA/
Japan Patent Office
3-4-3, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2021/003082

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		whole document	
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REFERENCES CITED IN THE DESCRIPTION

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- JP 2019081986 A, Kokai [0006]
- WO 2019124525 A [0239] [0243]