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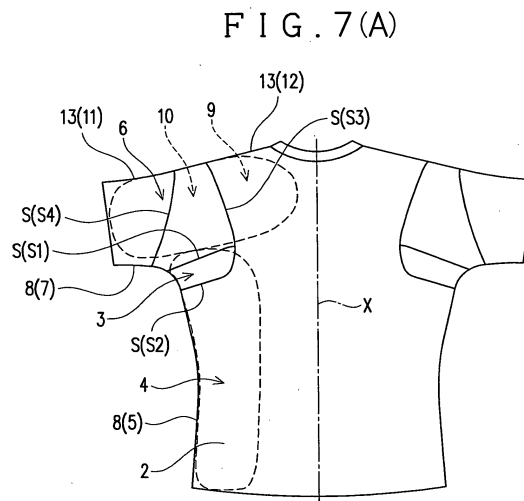
(71) Applicant: **ASICS Corporation**
Kobe-shi,
Hyogo 6508555 (JP)

(72) Inventors:
• **TSUJI, Yoshie**
Kobe-shi,
Hyogo 6508555 (JP)
• **TAKAMOTO, Yoshikuni**
Kobe-shi, Hyogo 6508555 (JP)
• **OMURO, Mamoru**
Kobe-shi, Hyogo 6508555 (JP)

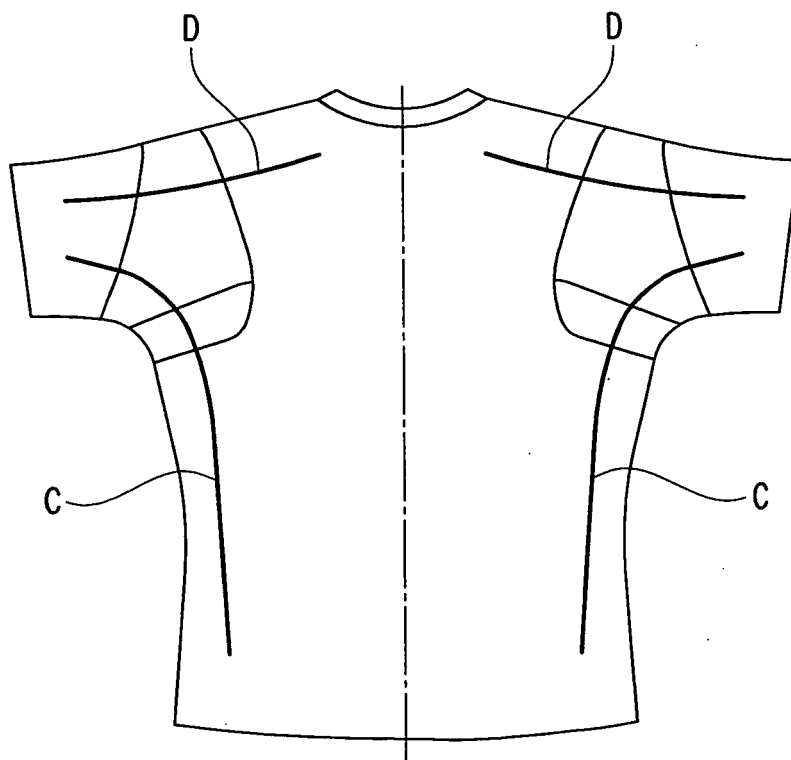
(74) Representative: **Stolmár, Matthias**
Stolmár Scheele & Partner
Blumenstrasse 17
80331 München (DE)

(54) **WEAR**

(57) The present invention aims to provide a wear that can be put on by a wearer without feeling of looseness, tightening, or shrinkage, and that enables smooth activities. A wear 1 according to the present invention is wear 1 configured using a fabric having stretchability, where a side region 4 of a back body part having a predetermined width from a body side part 2 towards a center in a width direction of a dorsal surface and extending along a vertical direction across an armpit part 3 is formed with a linear site S, whose stretchability in a predetermined direction along the width direction is smaller than adjacent portions, along the predetermined direction. Alternatively, with a predetermined area of a side end edge 8 from the body side part 2 to a sleeve part 6 being designated as one end, a plurality of linear sites S whose stretchability in a predetermined direction is smaller than adjacent portions are arranged in the back body part along the predetermined direction orthogonal to a tangent line of the side end edge 8 at the predetermined area.



F I G . 7 (B)



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to wears, in particular, to a wear having an upper body part with good feeling in wearing when a wearer carries out his or her activities.

BACKGROUND ART

10 **[0002]** Various wears that aim to alleviate or suppress the tightening feeling or shrinkage feeling when a wearer carries out activities such as moving the arm, and enhance the following ability with the activities are conventionally proposed.

[0003] Specifically describing, in the wear shown in Patent Document 1, a fabric is provided loosely in advance so that the fabric does not lack when a wearer extends his or her body such as stretching out his or her arm.

15 **[0004]** In the wear shown in Patent Document 2, a fabric having stretchability is used so that the fabric follows the stretch of a wearer's skin or the extension of his or her body.

[0005] Furthermore, in the wear shown in Patent Document 3, a structure in which a plurality of cut fabrics are sewed such that the stretching direction is consistent with the longitudinal direction is adopted instead of merely using a fabric that has stretchability in an aim of further enhancing the following ability of the wear.

[0006]

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Patent Document 1: Japanese Patent Application Laid-Open No. Hei-9-95809

Patent Document 2: Japanese Patent Application Laid-Open No. 2004-44033

Patent Document 3: Japanese Patent Application Laid-Open No. 2005-307369

25 DISCLOSURE OF THE INVENTION

Problems to be Solved by the Invention

30 **[0007]** However, in the wear shown in Patent Document 1, the dimension of a fabric is set in accordance with a state in which a wearer extends his or her body such time as an arm is extended, and thus the side end edge of the wear is long and extra fabric occurs when the wearer assumes a normal position such as lowering the arm, whereby the wearing feeling is unsatisfactory as loose feeling and the like arise and the cumbersome extra fabric inhibits smooth activities.

35 **[0008]** The wear shown in Patent Document 2 uses a fabric having stretchability, and thus reduces the amount of extra fabric and alleviates the loose feeling, and suitably prevents the rise of tightening feeling or shrinkage feeling along the stretching direction of the fabric. However, the tightening feeling or the shrinkage feeling is not necessarily resolved only by using the fabric having stretchability for the following reasons.

40 **[0009]** In other words, the fabric having stretchability stretches in the tension acting direction when tension is applied on a predetermined portion, but the middle part deforms or the fabric loosens in a direction orthogonal to the direction in which tension acts (see FIG. 2(A)). As the fabric configuring the wear continuing in a tubular shape (at least at the waistline or the arm line), secondary tension acts in a direction orthogonal to the tension acting direction on the surrounding fabric when the fabric deforms, thereby gathering the surrounding fabric. As a result, the skin of the wearer is pulled by the gathered fabric, and the wearer still feels the tightening feeling or the shrinkage feeling. The tightening of the fabric is sometimes observed as wrinkles occurring along the stretching direction of the fabric.

45 **[0010]** Furthermore, the wear shown in Patent Document 3 has the stitches formed by sewing the plurality of fabrics, which are arranged along the stretching direction of the fabric. The stitch is the site where the stretchability is small compared to the portion of the adjacent fabrics. Therefore, if the stitches are arranged along the stretching direction of the fabric, the fabric hardly stretches (see FIG. 2(B)), which causes tightening feeling or shrinkage feeling and extra force to be required to carry out activities, thereby inhibiting smooth activities.

50 **[0011]** Therefore, the conventional wears have problems that the loose feeling, the tightening feeling or the shrinkage feeling cannot be suitably resolved. The present invention aims to provide a wear that wearers can wear without feeling looseness, tightening or shrinkage, and that allows smooth activities to be performed.

Means for Solving the Problems

55 **[0012]** The wear according to the present invention is a wear configured using a fabric having stretchability, wherein a side region of a back body part (dorsal surface portion) having a predetermined width from a body side part towards a center in a width direction of a dorsal surface and extending along a vertical direction across an armpit part is formed along a predetermined direction with a linear site whose stretchability in the predetermined direction along the width

direction is smaller than adjacent portions.

[0013] According to the wear configured as above, the following property of the wear when a wearer carries out the activities such as moving the arm becomes high. In other words, when performing the activities of moving the arm such as raising the arm or bending the arm forward, the skin of the wearer stretches greatly in a region along the vertical direction from the body side of the dorsal surface to the armpit. The side region of the wear is a region corresponding to the region where the stretch of the skin is large, where the fabric of the side region also stretches with the stretch of the skin of the wearer when the wearer carries out the activities of moving the arm.

[0014] In this case, since the linear site having stretchability in the predetermined direction along the width direction, which is smaller than adjacent sites is arranged in the side region, the side region where the fabric stretches is divided into a plurality of portions by the linear site, and the side region stretches by the plurality of portions rather as a whole. This state can also be assumed as a state the tension is shielded at the middle by the linear site. Therefore, the amount the fabric is gathered with the stretch of the fabric from the orthogonal direction thereof can be suppressed small.

[0015] The wear according to the present invention is given consideration such that the linear site with small stretchability is not arranged along the stretching direction of the fabric, and thus the stretch of the fabric is not unnecessarily limited as in the wear of Patent Document 3. If the linear site is arranged along the predetermined direction, the fabric can be more easily stretched in the stretching direction to the same or greater extent as when the linear site is not arranged. Thus, extra amount of fabric can be suppressed small, and the loose feeling can be alleviated.

[0016] In the wear according to the present invention, a plurality of linear sites, whose stretchability in a predetermined direction along the vertical direction is smaller than adjacent sites, may be arranged along the predetermined direction in an upper region from a sleeve part to a shoulder part at the back body part.

[0017] According to the wear of the above configuration, the following property of the wear of when the wearer carries out the activities can be further enhanced. In other words, when the wearer carries out the activities, the skin of the wearer stretches greatly not only in the region along the vertical direction from the body side in the dorsal surface to the armpit but also in the region from the armpit to the arm. When performing the activities of bending the arm forward, the skin of the wearer greatly stretches even in the region from the suprascapular part of the dorsal surface to the arm. The upper region from the sleeve part to the shoulder part at the back body part is a region corresponding to the region where the stretch of the skin is large. The fabric of the wear not only stretches with the stretch of the skin but also stretches with the pulling of the sleeve part when extending the arm.

[0018] As one example, at least one of the linear sites of the upper region extends from an upper end edge to a lower end edge of the sleeve part. The sleeve part is a portion corresponding to a wearer's arm, and as such portion is also a portion the fabric stretches when a wearer carries out activities, the rise of tightening feeling or shrinkage feeling can be more effectively alleviated or suppressed by arranging the linear site at the relevant sleeve part.

[0019] It is preferred that two linear sites are formed near the armpit part in the side region and a portion positioned between the two linear sites is set with stretchability in the vertical direction larger than adjacent portions.

[0020] The portion near the armpit part formed with the two linear sites corresponds to a region under the armpit or a region where the stretch of the skin is particularly large among the regions along the vertical direction from the body side of the dorsal surface to the armpit where the skin of the wearer greatly stretches when performing the activities of moving the arm, and thus the fabric positioned at the portion near the armpit part stretches greatly with the stretch of the skin. Therefore, according to the above configuration, as the portion near the armpit part is divided into a plurality of portions by the linear site, the amount the fabric is gathered with the stretch of the fabric from the orthogonal direction thereof can be suppressed small.

[0021] Furthermore, since the portion positioned between the two linear sites is configured to have large stretchability in the vertical direction, the fabric can suitably follow the particularly large stretch of the skin. Furthermore, since the two linear sites are arranged close to a narrow region, namely the vicinity of the armpit part, the drawback that "the amount the surrounding fabric is gathered by the portion positioned between the two linear sites is large by setting the stretchability in the vertical direction large" can be suppressed small. Specifically, as the deformation of the fabric in the direction orthogonal to the stretching direction is large the larger the stretchability in the stretching direction, the extent the fabric is gathered from the width direction is also large if the portion positioned between the two linear sites is formed to have large stretchability in the vertical direction. In such configuration, the amount the fabric is gathered is not unnecessarily large by setting the interval (dimension in vertical direction) of the two linear sites small. According to such configuration, the rise of the tightening feeling or the shrinkage feeling can be more effectively alleviated or suppressed.

[0022] At least one of the linear site of the upper region and the linear sites of the side region are preferably continuously formed. According to such configuration, a plurality of linear sites can be formed in one task. This also excels in designability.

[0023] The linear site is preferably configured by stitches formed by sewing the fabric. According to such configuration, the linear site of low stretchability can be easily formed by sewing the fabric without arranging a separate member, and the like.

[0024] Alternatively, the wear according to the present invention is a wear configured using a fabric having stretchability,

wherein with a predetermined area of a side end edge from a body side part to a sleeve part being designated as one end, a plurality of linear sites whose stretchability in a predetermined direction is smaller than adjacent portions are arranged in a back body part along the predetermined direction orthogonal to a tangent line of the side end edge at the predetermined area.

[0025] Preferably, with a predetermined area of an upper end edge from the sleeve part to a shoulder part being designated as one end, a plurality of linear site whose stretchability in a predetermined direction is smaller than adjacent portions are arranged in the back body part along the predetermined direction orthogonal to a tangent line of the upper end edge at the predetermined area. Advantages of the Invention

[0026] Therefore, the wear of the present invention can be worn by the wearer without feeling looseness, tightening, or shrinkage and enables smooth activities.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027]

FIGS. 1 are views showing stretching modes of a skin, where FIG. 1(A) shows a case of an activity of raising the arm and FIG. 1(B) shows a case of an activity of bending the arm forward.

FIGS. 2 are views showing stretching modes of a fabric, where FIG. 2(A) shows a case where stitches are not provided, FIG. 2(B) shows a case where stitches are provided along a longitudinal direction of the fabric, and FIG. 2(C) shows a case where stitches are provided along a width direction of the fabric.

FIGS. 3 show samples used in an experiment for verifying the stretching mode of the fabric, where FIG. 3(A) shows a sample not formed with stitches, FIG. 3(B) shows a sample formed with stitches along the longitudinal direction of the fabric, and FIG. 3(C) to FIG. 3(F) respectively show fabric pieces formed with one, two, three, and five stitches along the width direction of the fabric.

FIGS. 4 are graphs showing a stretching rate in the longitudinal direction of the fabric piece, where FIG. 4(A) shows the case of weft knitting and FIG. 4(B) is the case of tricot.

FIGS. 5 are graphs each showing a width holding rate and a load when the fabric piece is stretched by 20% in the vertical direction in which the stretching rate is small. FIG. 5(A) shows the case of weft knitting and FIG. 5(B) shows the case of tricot.

FIGS. 6 are graphs each showing the width holding rate and the load when the fabric piece is stretched by 20% in the horizontal direction where the stretching rate is large. FIG. 6(A) shows the case of weft knitting and FIG. 6(B) shows the case of tricot.

FIGS. 7 are views each showing a back body part of the wear according to one embodiment of the present invention, where FIG. 7(A) shows an outer appearance view, and FIG. 7(B) shows a view in which directions the tension mainly acts when the arm is moved are overlapped on the wear.

FIG. 8 is a pattern diagram of the wear according to the embodiment.

FIGS. 9 each show a state of experiment for verifying the effects of the wear according to the embodiment, where FIG. 9(A) shows a case of the wear according to the embodiment, FIG. 9(B) shows a case of the conventional wear, and FIG. 9(C) shows a shirtless case.

FIGS. 10 are views each showing the conventional wear used in the verification experiment, where FIG. 10(A) shows an outer appearance view of the back body part, and FIG. 10(B) shows a pattern diagram.

FIGS. 11 are graphs each showing the results of the experiment for verifying the effects of the wear according to the embodiment, where FIG. 11(A) to FIG. 11(D) indicate D2, D3, D4, D6, respectively.

DESCRIPTION OF REFERENCE CODES

[0028]

- 1 wear
- 2 body side part
- 3 armpit part
- 4 side region
- 5 end edge of body side part
- 6 sleeve part
- 7 lower end edge of sleeve part
- 8 side end edge
- 9 shoulder part
- 10 upper region

11 upper end edge of sleeve part
 12 end edge of shoulder part
 13 upper end edge
 20 front waist part fabric
 5 21 back waist part fabric
 22 sleeve end part fabric
 23 sleeve shoulder part fabric
 24 armpit part fabric
 A first main stretching direction
 10 B second main stretching direction
 C main tension direction
 D main tension direction
 S linear site
 S1 upper linear site
 15 S2 lower linear site
 S3 inner linear site
 S4 outer linear site
 SL stitch
 X center line in width direction
 20

BEST MODE FOR CARRYING OUT THE INVENTION

[0029] Prior to the description of the embodiments of the wear according to the present invention, the stretching mode of skin and the stretching mode of the fabric on which designing the pattern of the wear is based will be described.

<Stretching mode of skin>

[0030] First, one of the causes that cause the tightening feeling or the shrinkage feeling is that the stretch of the wear cannot follow the stretch of the skin of the wearer (i.e., stretch of the wear is smaller than the stretch of the skin). Therefore, how the skin of the wearer stretches needs to be understood in designing a wear that can suppress the tightening feeling or the shrinkage feeling. The inventors thus performed various activities and examined the stretch of the skin.

[0031] Since the arm, among the sites of the human body, is coupled with a joint of so-called ball joint type, a large stretch of the skin (skin distortion) is seen at the periphery of the joint when an activity of moving the arm (includes not only an activity of moving the arm itself, but also an activity of relatively moving the arm by moving other portions such as the waist of the body) is performed. Thus, the activity of raising the arm (shoulder abduction activity), an activity of bending the arm forward (shoulder horizontal bending activity), an activity of turning the body to the lateral side (trunk lateral-side flexion activity), an activity of bending the body forward (trunk forward bending activity), an activity of bending the body backward (trunk backward bending activity), an activity of bending the elbow (elbow bending activity), an activity of raising only one arm, an activity of swinging the arm, and an activity of twisting the body were carried out for activities of moving the arm. Each of such activities ranges from the basic activity performed in daily life to an activity performed in various sports such as running, soccer, tennis, and golf.

[0032] The verifying content in the stretch of the skin is to specify the region the skin greatly stretches when a human carries out various activities and to specify the stretching direction (this is assumed as the main stretching direction) over the entire region the skin stretches. As a method therefor, a method, which involves dividing the skin into a plurality of sections and examining the stretching mode of each section, and thus finding the overall stretching mode based on the stretching mode of every section was adopted. Specifically, the skin was divided into sections having a square shape of 20 to 30 mm square, a marker was placed at the vertex position of each section, and the change in position of the marker was analyzed with a three-dimensional activities analyzer.

[0033] As a result of such verification, the stretch of the skin was found to be basically summarized into two modes through each activity described above. Such two modes appear significantly in two activities, the activities of raising the arm and the activities of bending the arm forward. The stretching mode in the activities of raising the arm and the activities of bending the arm forward are shown in FIGS. 1. In FIG. 1(A) and FIG. 1(B), the stretch of the skin is greater in the region of darker contrasting density.

[0034] First, one of the two stretching modes of the skin appears, as shown in FIG. 1(A), in the activities of raising the arm. A region 50 where the skin greatly stretches in such activities includes a region 51 along a vertical direction from the body side of the dorsal surface to the armpit, and a region 52 along a longitudinal direction from the armpit to the arm. The main stretching direction in the activities of raising the arm lies along the vertical direction (this is referred to as first main stretching direction A). More specifically, the first main stretching direction A is a direction near the waist

and from a site on the inward side in the width direction of the dorsal surface to the armpit and a direction, continuing to the above direction, from the armpit to the front surface of the arm.

[0035] The two stretching modes of the skin both appear, as shown in FIG. 1(B), in the activities of bending the arm forward. A region 60 where the skin greatly stretches in the activities of bending the arm forward includes a region 61 along the vertical direction from the body side of the dorsal surface to the armpit, and a region 62 from the upper part of the shoulder to the arm. One of the main stretching directions in the activities of bending the arm forward is the same as the main stretching direction mentioned above (this is referred to as main stretching direction A'). Another main stretching direction in the activities of bending the arm forward lies along the width direction of the dorsal surface and the longitudinal direction of the arm (this is referred to as second main stretching direction B). More specifically, the second main stretching direction B is a direction from the lower part of the shoulder bone to the armpit, and a direction, continuing to the above direction, from the armpit to the front surface of the arm.

<Stretching mode of fabric>

[0036] The stretching mode of the fabric will now be described based on FIGS. 2 to 6.

[0037] The fabric having stretchability stretches in a tension acting direction when tension is applied to a predetermined portion, and also deforms or loosens in a direction orthogonal to the tension acting direction, which deformation or loosening is more significant towards the middle part. FIG. 2(A) shows a rectangular fabric by way of example, where the middle part of the fabric contracts in a width direction orthogonal to the longitudinal direction when tension is applied along the longitudinal direction of the fabric, whereby a portion that lacks in fabric is caused on both sides of the longitudinal direction. With wears, the surrounding fabric gathers to compensate for such portion, which causes the wearer to feel tightening or shrinkage.

[0038] As shown in FIG. 2(B), if stitches SL are provided along the longitudinal direction of the rectangular fabric, the stitches SL function as a linear site having smaller stretchability than adjacent portions, and thus the fabric is less likely to stretch even if tension is applied in the longitudinal direction. In other words, the fabric is less likely to stretch and the wearer feels tightening with a wear in which the linear site is provided in the stretching direction of the fabric (e.g., wear of Patent Document 2).

"Experiment 1"

[0039] The inventors conducted Experiment 1 to verify such aspect, the contents and the results of which are shown below. With regards to the sample of Experiment 1, two fabric pieces each having a size of 50 mm x 300 mm were prepared, where one of the fabric pieces is provided as sample a (FIG. 3(A)), and the other is provided as sample b with stitches in the longitudinal direction (FIG. 3(B)). Two types, namely weft knitting and tricot, were prepared for the raw materials of the fabric pieces. The two types of raw materials have so-called anisotropic property in which the stretching rates in two directions, namely horizontal and vertical directions, are different from each other. In each sample of Experiment 1, the vertical direction with smaller stretching rate is set as the longitudinal direction of the fabric piece. Using a tensile tester, four samples were held with an inter-chuck distance of 200 mm, and stretched by 20%. The load (gf) in this case is shown in Table 1. The other fabric piece is formed with stitches by sewing separate fabric pieces into one.

[0040]

[Table 1]

	No stitch (gf)	One in longitudinal direction (gf)
Weft knitting	347	422
Tricot	140	215

"Experiment 2"

[0041] The inventors then conducted Experiments 2 and 3, and carried out the verification for the stretching mode of the fabric when stitches are provided along the width direction. With regards to the sample of Experiment 2, five fabric pieces each having a size of 50 mm x 300 mm were prepared, where one of the fabric pieces is provided as sample a (FIG. 3(A)), and the other four are provided as samples c, d, e, and f with one, two, three, and five stitches SL formed at equal interval (FIGS. 3(C) to 3(F)). Two types, namely weft knitting and tricot, which are raw materials having anisotropic property, were prepared for the raw materials of the fabric pieces. In each sample of Experiment 2, of the two directions, namely horizontal and vertical directions respectively having different stretching rates, the vertical direction having a smaller stretching rate is set as the longitudinal direction of the fabric piece. Using a tensile tester, ten samples were

held with an inter-chuck distance of 200 mm, and stretched by 20%. Six marks P1 to P6 used in measurement are given at an even interval of 30 mm to each fabric piece.

[0042] First, the rate of change in each inter-mark distance L1 to L5 was measured at five areas to examine the stretching in the longitudinal direction of the fabric piece. The results are shown in FIGS. 4. FIG. 4(A) is for weft knitting and FIG. 4(B) is for tricot. The sample a is indicated with a solid line, the sample c with a broken line, the sample d with a dashed line, the sample e with a double-dashed line, and the sample f with a triple-dashed line. Next, so as to examine the stretching mode in the width direction of the fabric piece, a width holding rate (fabric width in stretching/original fabric width 50 mm) of the fabric widths W1 to W5 in five areas at a midpoint of between the marks of the fabric piece was measured to give an average value thereof. The load (gf) in time of stretching by 20% was also measured for each fabric piece. The results are also shown in FIGS. 5. FIG. 5(A) is for weft knitting and FIG. 5(B) is for tricot.

"Experiment 3"

[0043] Furthermore, the inventors conducted Experiment 3 by partially changing the conditions of Experiment 2 and performed the verification for the stretching mode of the fabric piece when stitches are provided along the width direction. Experiment 3 has the same content as Experiment 2 other than that, of the two directions, namely horizontal or vertical directions respectively having different stretching rates, the horizontal direction of larger stretching rate is set as the longitudinal direction of the fabric piece.

[0044] In experiment 3, so as to examine the stretching in the width direction of the fabric piece, the width holding ratio (fabric width in stretching/original fabric width 50 mm) of the fabric width at the midpoint of the five areas between the marks of the fabric piece was measured to give the average value thereof. The load (gf) in time of stretching by 20% was also measured for each fabric piece. The results are also shown in FIG. 6. FIG. 6(A) is for weft knitting and FIG. 6(B) is for tricot. The samples are respectively indicated as a', c', d', e', and f' for the sake of convenience of explanation.

[0045] From the results of Experiment 2 and Experiment 3, it was found that by forming the stitches SL (i.e., linear site with small stretching rate) along the width direction with respect to the fabric piece (i.e., direction orthogonal to the stretching direction of the fabric piece), the stretching region of the fabric is divided into a plurality of portions by the stitch SL (see FIG. 2(C)) and the deformation in the width direction of the fabric piece is suppressed small, and furthermore, the fabric tends to easily stretch in the longitudinal direction (i.e., stretching direction of the fabric piece). Furthermore, it was recognized that the more easily the fabric piece tends to stretch in the longitudinal direction, the greater the number of stitches SL in the width direction is. It was also found that the stretching amount in the stretching direction of the fabric piece is large in the vicinity of the stitches SL.

[0046] Reviewing the optimum relationship between the stretching direction of the fabric piece and the direction of the stitches, if the stitches are formed in a direction tilted by a predetermined angle with respect to the width direction of the fabric piece, the component in the longitudinal direction along the stretching direction of the stitches inhibits the stretch of the fabric piece. Therefore, a state in which such component in the longitudinal direction does not exist is most likely to allow the stretching, and thus the tilt angle is most preferably 0°, that is, the stretching direction of the fabric piece and the stitches are orthogonal. Thus, in wears, the linear site is preferably formed in a direction orthogonal to the tension acting direction in a region where the tension is applied. If the component in the width direction along the stretching direction of the stitches is greater than the component in the longitudinal direction, the effects by the component in the width direction are greater than the influence by the component in the longitudinal direction, and thus the stitches may be allowed to tilt by a predetermined angle with respect to the width direction of the fabric piece only in such case.

[0047] The wear according to the present embodiment is formed based on two standpoints. Describing from the specific configuration of the wear according to the present embodiment, the wear 1 is an upper body wear or a so-called T-shirt, as shown in FIGS. 7, that is configured using a fabric having stretchability, the wear having a size the same as or a size with slight margin to a wearer's body (e.g., size of about 110%).

[0048] The characteristic configuration of the wear according to the present embodiment will be described below, where the wear 1 has a side region 4 of a back body part having a predetermined width from a body side part 2 towards the center in the width direction of the dorsal surface and extending along a vertical direction to the armpit part 3 formed with a linear site S, whose stretchability in a predetermined direction along the width direction is smaller than adjacent portions, along the predetermined direction.

[0049] The body side part 2 is positioned at a boundary portion of the front body part and the back body part of the wear, and corresponds to the site from the rib towards the armpit of the wearer. The side region 4 of the wear is a region along the body side part 2, and is set in correspondence to the region 50 where the stretching amount of the skin is large when performing the activities of moving the arm. The width of the side region 4 is about half (one fourth of the distance between left and right body side parts 2, 2) of the length from an end edge 5 of the body side part 2 linearly extending in the vertical direction to a center line X in the width direction of the back body part. In other words, the side region 4 is a region of about half on both sides of the back body part. The end edge 5 of the body side part 2 and a lower end edge 7 of a sleeve part 6 together form a side end edge 8 of the wear, which uninterruptedly continues while curving.

The armpit part 3 is the portion corresponding to the armpit of the wearer and is positioned at the portion where the side end edge 8 changes from a linear form to a curved form.

[0050] The linear site S is the site having a length corresponding to the width of the side region 4, where one end is positioned on the end edge 5 of the body side part 2 and the other end is positioned at the middle of the body side part 2 and the center line X in the width direction of the back body part.

[0051] A plurality of linear sites S are formed in the side region 4. Specifically, in the side region 4, two linear sites S are formed near the armpit part 3 (upper linear site S1 and lower linear site S2), and the portion positioned between the two linear sites S1, S2 is set to have the stretchability in the vertical direction greater than adjacent portions. The two linear sites S1, S2 are arranged tilted with respect to the width direction such that the other end positioned on the inward side in the width direction is at an upper position than the one end positioned at the body side part 2.

[0052] More specifically, the upper linear site S1 and the lower linear site S2 are respectively arranged tilted by about 20° with respect to the width direction. The upper linear site S1 has a tolerable range of about -10° to +5°, and may be tilted by about 10° to 25° with respect to the width direction in view of the stretching direction of the portion of the skin to which the upper linear site S1 corresponds. Furthermore, the lower linear site S2 has a tolerable range of about -10° to +20° greater than the upper linear site S1, and may be tilted by about 10° to 40° with respect to the width direction in view of the stretching direction of the portion of the skin to which the lower linear site S2 corresponds.

[0053] The wear 1 has a plurality of linear sites S, whose stretchability in the predetermined direction along the vertical direction is smaller than adjacent sites, arranged along the predetermined direction in an upper region 10 from the sleeve part 6 to the shoulder part 9 of the back body part.

[0054] The sleeve part 6 and the shoulder part 9 are portions corresponding to the arm and the shoulder of the wearer, where an upper end edge 11 of the sleeve part 6 and an end edge 12 of the shoulder part form a continuous linear upper end edge 13. The upper region 10 is a region along the upper end edge 13 and is set in correspondence to a region 60 where the stretching amount of the skin is large when performing the activities of moving the arm. The width (or the height) of the upper region 10 is set to a length from the upper end edge 13 to a line in a width direction connecting the lower parts of the right and left sleeve parts 6, 6. In other words, the upper region 10 is a region including the sleeve part 6 of the back body part and is on the upper side of the sleeve part 6.

[0055] The linear site S is a site having a length corresponding to the width of the upper region 10, where one end is positioned on the upper end edge 13 and the other end is positioned on a line in the width direction connecting the lower parts of the right and left sleeve parts 6, 6.

[0056] The linear site S is formed in plurals in the upper region 10, and specifically, two linear sites are respectively arranged on the left and the right as an inner linear site S3 and an outer linear site S4. The inner linear site S3 is arranged tilted with respect to the vertical direction so that the other end faces the inner side in the width direction than the one end. The outer linear site S4 is arranged from the upper end edge 11 of the sleeve part 6 to the lower end edge 7. The outer linear site S4 is arranged tilted with respect to the vertical direction so that the other end faces the outer side in the width direction than the one end positioned on the upper end edge 13.

[0057] More specifically, the inner linear site S3 is arranged tilted by about 20° with respect to the vertical direction. The inner linear site S3 has a tolerable range of about -5° to +5°, and may be tilted by about 15° to 25° with respect to the vertical direction in view of the stretching direction of the portion of the skin to which the inner linear site S3 corresponds. Furthermore, the outer linear site S4 is arranged tilted by about 15° with respect to the vertical direction. The outer linear site S4 has a tolerable range of about -10° to +5° greater than the inner linear site S3, and may be tilted by about 5° to 20° with respect to the vertical direction in view of the stretching direction of the portion of the skin to which the outer linear site S4 corresponds. The sleeve part 6 is arranged tilted by about 7° with respect to the width direction.

[0058] The upper linear site S1 and the lower linear site S2 of the side region 4, and the inner linear site S3 of the upper region 10 are formed by connecting. The linear sites S1, S2, S3 are connected to each other at a portion at which the region connecting the lower end parts of the right and left sleeve parts 6, 6 and the region between the end edge 5 of the body side part 2 and the center line X in the width direction of the back body part intersect. The lower linear site S2 and the inner linear site S3 curve and form a smoothly continuing curved line. The upper linear site S1 and the inner linear site S3 connect to each other in a mode the upper linear site S1 abuts against the inner linear site S3. According to such configuration, a plurality of linear sites can be formed with one task, and an excellent designability is also achieved.

[0059] The linear site S1, S2, S3, and S4 each are arranged in view of the direction of the tension that acts on the area where they are arranged, and are preferably arranged so as to be orthogonal to the direction of the tension. FIG. 7(B) shows a case when the directions (referred as main tension direction) C and D, in which tension mainly acts when performing the activities of raising the arm and the activities of bending the arm forward, are overlapped on the wear 1, where the linear sites S1, S2, S3, S4 each intersect so as to be orthogonal to the main tension directions C and D. The main tension direction C lies along the side end edge 8 configured by the end edge 5 of the body side part 2 and the lower end edge 7 of the sleeve part 6, and the main tension direction D lies along the upper end edge 13 configured by the upper end edge 11 of the sleeve part 6 and the end edge 12 of the shoulder part 9.

[0060] In other words, with predetermined portions of the side end edge 8 from the body side part 2 to the sleeve part

6 as one end, the linear sites S1, S2, and S4 each are specified as being arranged along a predetermined direction orthogonal to a tangent line of the side end edge 8 at the corresponding predetermined portion, and with predetermined portions of the upper end edge 13 from the sleeve part 6 to the shoulder part 9 as one end, the linear sites S3, S4 each are specified as being arranged along a predetermined direction orthogonal to a tangent line of the upper end edge 13 at the corresponding predetermined portion.

[0061] The linear sites S1 to S4 are configured by stitches formed by sewing the fabric. More specifically, the stitches are formed by sewing separate cut fabrics. The linear sites each can be thus easily formed by sewing the fabrics.

[0062] That is, the wear 1 is fabricated based on the pattern as shown in FIG. 8 and is formed by independent separate fabric pieces. Specifically, the wear 1 is configured by a front waist part fabric 20 configuring the waist portion of the front body part, a back waist part fabric 21 configuring the waist of the back body part, a sleeve end part fabric 22 configuring the end of the sleeve, a sleeve shoulder part fabric 23 configuring the portion from the sleeve to the shoulder, and an armpit part fabric 24 connecting the sleeve and the waist portion and being positioned under the armpit.

[0063] The front waist part fabric 20, the back waist part fabric 21, the sleeve end part fabric 22, and the sleeve shoulder part fabric 23 use weft knitting for the raw material having stretchability, and the vertical direction of the raw material having smaller stretchability is arranged to lie along the vertical direction. More specifically, the front waist part fabric 20 and the back waist part fabric 21 have the longitudinal direction of the raw material parallel to the vertical direction, and the sleeve end part fabric 22 and the sleeve shoulder part fabric 23 have the longitudinal direction of the raw material tilted by about 7° with respect to the vertical direction. The armpit part fabric 24 uses tricot for the raw material having larger stretchability than the weft knitting, and the lateral direction of the raw material having larger stretchability is arranged to lie along the vertical direction. More specifically, the armpit part fabric 24 has the longitudinal direction of the raw material tilted by about 7° with respect to the vertical direction.

[0064] According to the wear 1 of the present embodiment, a wearer can wear and carry out smooth activities without feeling looseness, tightening, or shrinkage.

[0065] In other words, as the wear 1 according to the present embodiment has the upper linear site S1 and the lower linear site S2 formed in the side region 4 and the inner linear site S3 and the outer linear site S4 formed in the upper region 10, the side region 4 or the upper region 10 at which the fabric stretches is divided to a plurality of portions by each linear site S1, S2 or S3, S4, so that the side region 4 or the upper region 10 stretches by the plurality of portions rather than as a whole. Therefore, the amount the fabric is gathered with the stretch of the fabric from the orthogonal direction thereof can be suppressed small.

[0066] Consideration is made that the wear 1 according to the present embodiment does not have the linear site S of small stretchability arranged along the stretching direction of the fabric, and thus the stretch of the fabric is not unnecessarily limited. If the linear site S is arranged along the predetermined direction, the fabric can be easily stretched in the stretching direction at the same or greater extent to when the linear site S is not formed. Therefore, when the activities of moving the arm is performed with the lower part of the wear 1 tucked in the pants, the amount the wear 1 moves up can be suppressed small. As the amount of extra fabric can be suppressed small, the length of the side end edge 8 of the wear 1 can be set short and the loose feeling can be alleviated.

[0067] Furthermore, the portion near the armpit part formed with the upper linear site S1 and the lower linear site S2 corresponds to the region under the armpit or the region where the stretch of the skin is particularly large among the regions along the vertical direction from the body side of the dorsal surface to the armpit where the skin of a wearer greatly stretches when performing the activities of moving the arm, and thus the fabric positioned at the portion near the armpit part stretches greatly with the stretch of the skin. Therefore, the portion where the stretch of the fabric is particularly large is divided into a plurality of portions by the linear sites S1, S2, so that the amount the fabric is gathered with the stretch of the fabric in the orthogonal direction thereof can be suppressed small.

[0068] Furthermore, since the armpit part fabric 24 having large stretchability in the vertical direction is arranged at the portion positioned between the linear sites S1 and S2, the fabric can suitably follow the large stretch of the skin. Moreover, since the upper linear site S1 and the lower linear site S2 are arranged proximate to each other, the problem that "the amount the surrounding fabric is gathered by the armpit part fabric 24 arranged at the portion positioned between two linear sites S1 and S2 is large according to the configuration of setting the stretchability in the vertical direction large" can be suppressed small. According to such configuration, the rise of tightening feeling or shrinkage feeling can be more effectively alleviated or suppressed.

[0069] The following experiments were conducted to verify the effects of the wear having the above configuration.

[0070] As shown in FIG. 9, in the experiment, a subject performed the activities of moving his arm, and the change in ratio of expansion and contraction (Measurement 1) of the fabric (skin for shirtless case) and the amount of lift of the wear (Measurement 2) were measured in a case where the subject wears the wear and in a case where he is naked to the waist. In the activities, the subject performed the activities of raising his arm to the side from the arm dropped state to directly above (shoulder abduction activities). Two types of wears, a conventional short-sleeved T-shirt type wear and the wear according to the present embodiment, were prepared. The case in which the wear according to the present embodiment was worn is Example (FIG. 9(A)), the shirtless case or naked to the waist is Comparative Example 1 (FIG.

9(B)), and the case in which the conventional wear was worn is Comparative Example 2 (FIG. 9(C)). The conventional wear of Comparative Example 2 has an outer appearance as shown in FIG. 10(A), and is fabricated based on the pattern shown in FIG. 10(B) and is configured by a front waist part fabric 120, a back waist part fabric 121, and a sleeve part fabric 122.

"Measurement 1"

[0071] The change in ratio of expansion and contraction of the fabric (skin in the Comparative Example 1) was performed targeting on a region from the site near the hip at the dorsal surface through the vicinity of the armpit part (armpit in the Comparative Example 1) and to the sleeve part upper end edge (upper part of upper arm in the Comparative Example 1), where a curve was set within the region and eight points were provided at substantially equal interval on the curve. The ratio of expansion and contraction (length of line segment in time of stretching/original length) of the seven line segments (D1 to D7) for every raising angle of the arm was measured. (The original length is the length in the unworn state in which the fabric is not stretched at all in the Example and the Comparative Example 2 related to the wear). Of the results, the relationship of the change of D2, D3, D4, D6 and the raising angel of the arm is shown in FIG. 11(A) to FIG. 11(D). The Example is shown with a thick solid line, the Comparative Example 1 with a broken line, and the Comparative Example 2 with a thin solid line. In each graph, the vertical axis is the ratio of expansion and contraction, where the positive value indicates that the fabric (skin in the Comparative Example 1) is stretched. The negative value indicates that the fabric (skin in Comparative Example 1) is contracted, but indicates that the fabric is overlapping, that is, looseness occurred in greater than or equal to a certain value since the contraction of the fabric is limited in the case of wear.

[0072] First, with respect to D2, D3, D4 positioned on the upper side of the base of the arm, when the arm is raised (raising angle of about 150°), the Example, which is the wear according to the present embodiment, shows a value close to the Comparative Example 1, which is the shirtless case, compared to the Comparative Example 2, which is the conventional wear. This shows that the wear of the Example excels in following property with respect to the activities.

[0073] With respect to D4 corresponding to the base of the sleeve, a large negative value is indicated when the arm is lowered (raising angle of about 0 to 50°) in the Comparative Example 2, which means that the fabric is very loose. In the Example, a value close to the Comparative Example 1 which is the shirtless case, which indicates that means the looseness is suppressed. Furthermore, with respect to D6 positioned near the armpit part of the side region corresponding to the body side, larger stretching is seen in the Example than in the Comparative Example 2 when the arm is raised (raising angle of about 150°).

"Measurement 2"

[0074] In measuring the amount of lift of the wear, a mark M is given to the wear as the upper end position of the pants with the lower part of the wear tucked in the pants, and the distance between the position of the mark M and the upper end position of the pants after the activities was measured. As a result, the lift was 8 cm in the Comparative Example 2, which is the conventional wear, and the lift was 4 cm in the Example, which is the wear according to the present embodiment, meaning that the lift is smaller in the wear according to the present embodiment. By reference, when the subject having a height of 172 cm performed the activities of raising the arm, the change in distance between the uppermost point and the lowermost point of the points was 15 cm.

[0075] The wear according to the present invention is not limited to the above embodiments, and various modifications may be made within the range not deviating from the scope of the present invention.

[0076] For example, description has been made that in the wear according to the embodiment, the linear site facing the width direction has a length corresponding to the width of the side region without limitation the preset invention thereto, and it may be formed to run out from the side region (i.e., longer than the width of the side region) as long as it does not enter the upper region. Therefore, it may be formed over the entire width between the left and right body sides (e.g., site near the hip) at the back body part. As the linear site facing the width direction is not formed in the upper region even in such a case, the wearing feeling is not affected when performing the activities of moving the arm. In this regard, the linear site facing the vertical direction can be similarly recognized and may be formed over the entire length in the vertical direction as long as it is not formed in the side region. The linear site formed at the sleeve part may not extend from the upper end edge to the lower end edge.

[0077] Description has been made that the linear site is formed near the armpit part in the side region without limitation the present invention thereto, and may be formed at positions on the lower side of the vicinity of the armpit part. The number to be arranged is also not limited to. The linear site formed in the upper region can be similarly recognized.

[0078] In the above-described embodiment, the front body part and the back body part are configured by separate fabrics and then sewed together, but it is not limited thereto, and the front body part and the back body part may be continued such that the stitches do not exist at the end edge of the body side part.

[0079] Furthermore, the linear site is not limited to being formed by stitches as long as it is configured such that the ratio of expansion and contraction is smaller than adjacent portions, and may be formed through a method of joining the member (fabric, resin, etc.) that lowers the ratio of expansion and contraction with respect to the fabric, and the like. A resin and the like may be impregnated to the fabric. The stitches are not limited to being formed by sewing independent separate fabrics, and may be formed by gathering and sewing a single fabric, or the stitches may be simply formed on the fabric instead of sewing the fabric.

[0080] The linear site is not limited to being continued from one end to the other end, and one linear site may be configured by a plurality of discontinuous linear site pieces lined on the same line.

[0081] In the above-described embodiment, the wear has been described based on the upper body wear of short-sleeved T-shirt type, but it is not limited thereto, and may be long-sleeved, or may have an upper body part having the above configuration and being integrated with a pants.

Claims

1. A wear configured using a fabric having stretchability, wherein a side region of a back body part having a predetermined width from a body side part towards a center in a width direction of a dorsal surface and extending along a vertical direction across an armpit part is formed along a predetermined direction with a linear site whose stretchability in the predetermined direction along the width direction is smaller than adjacent portions.
2. The wear according to claim 1, wherein a plurality of linear sites, whose stretchability in a predetermined direction along the vertical direction is smaller than portions adjacent to the plurality of linear sites, is arranged along the predetermined direction in an upper region from a sleeve part to a shoulder part at the back body part.
3. The wear according to claim 2, wherein at least one of the linear sites of the upper region extends from an upper end edge to a lower end edge, of the sleeve part.
4. The wear according to any one of claims 1 to 3, wherein two linear sites are formed near the armpit part in the side region, a portion positioned between the two linear sites being set with stretchability in the vertical direction larger than adjacent portions.
5. The wear according to any one of claims 1 to 4, wherein at least one of the linear site of the side region and the linear sites of the upper region are continuously formed.
6. The wear according to any one of claims 1 to 5, wherein the linear site is configured by stitches formed by sewing the fabric.
7. A wear configured using a fabric having stretchability, wherein with a predetermined area of a side end edge from a body side part to a sleeve part being designated as one end, a plurality of linear sites whose stretchability in a predetermined direction is smaller than adjacent portions are arranged in a back body part along the predetermined direction orthogonal to a tangent line of the side end edge at the predetermined area.
8. The wear according to claim 7, wherein with a predetermined area of an upper end edge from the sleeve part to a shoulder part being designated as one end, a plurality of linear sites whose stretchability in a predetermined direction is smaller than adjacent portions are arranged in the back body part along the predetermined direction orthogonal to a tangent line of the upper end edge at the predetermined area.

FIG. 1(A)

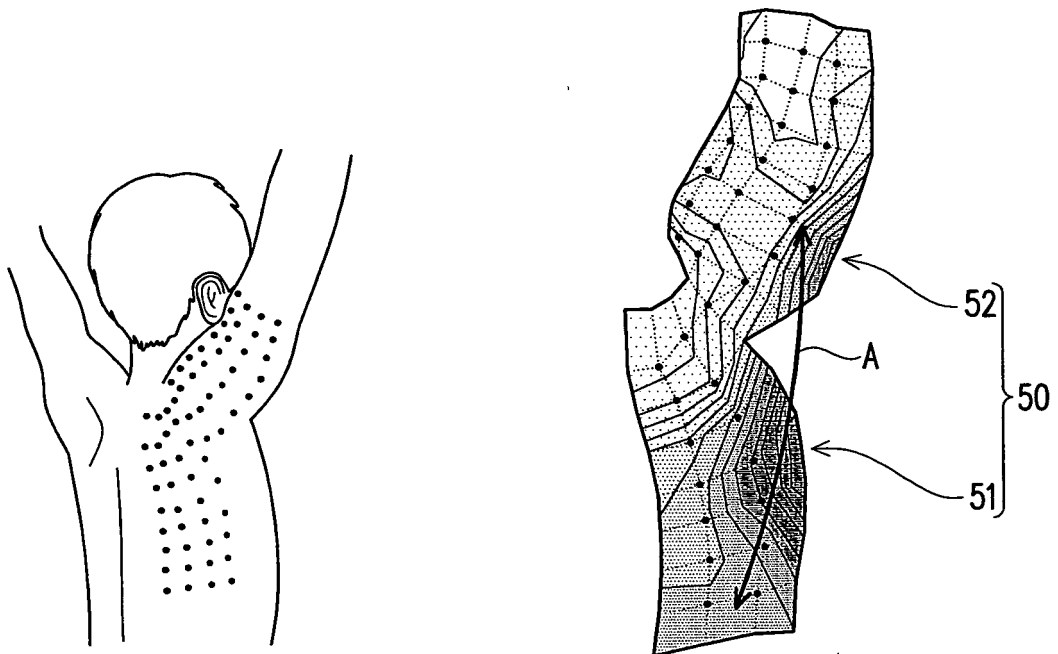
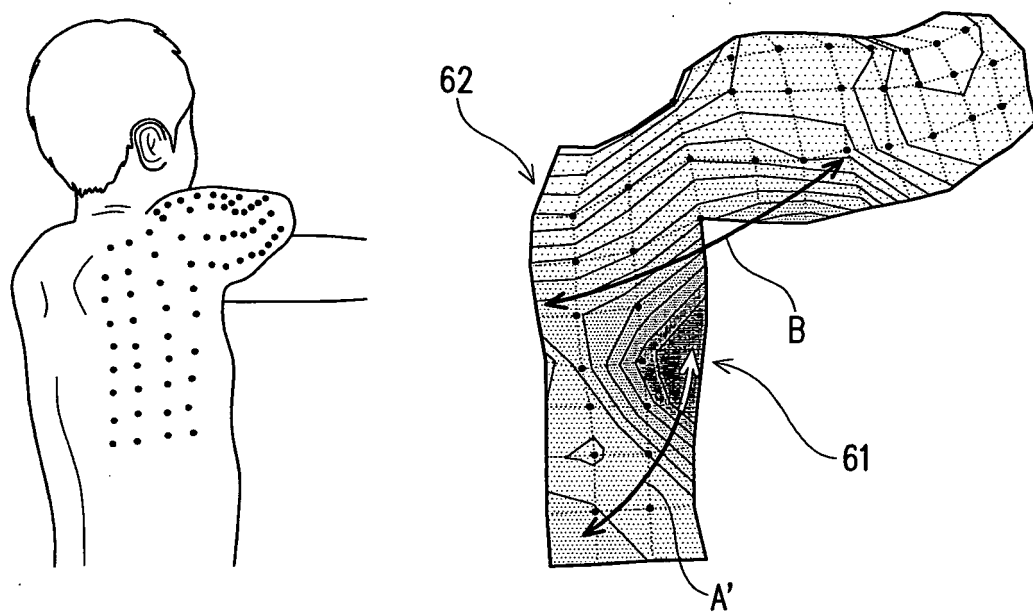
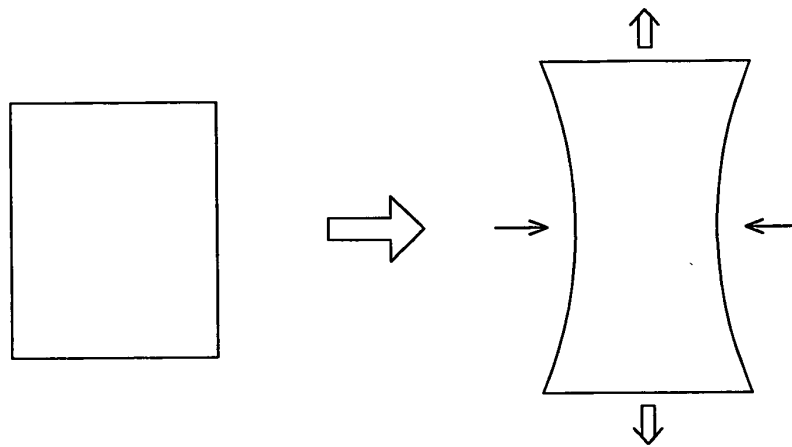


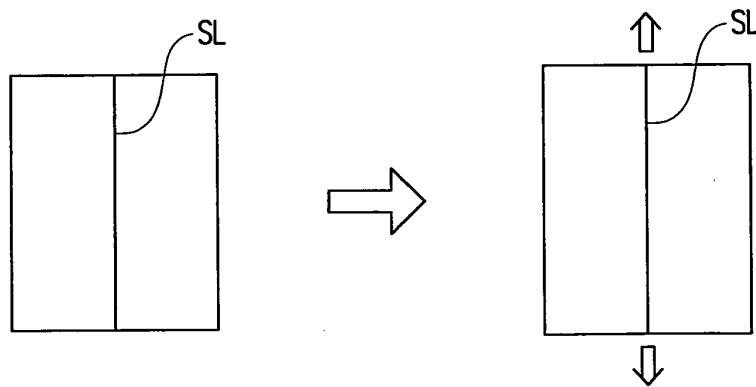
FIG. 1(B)



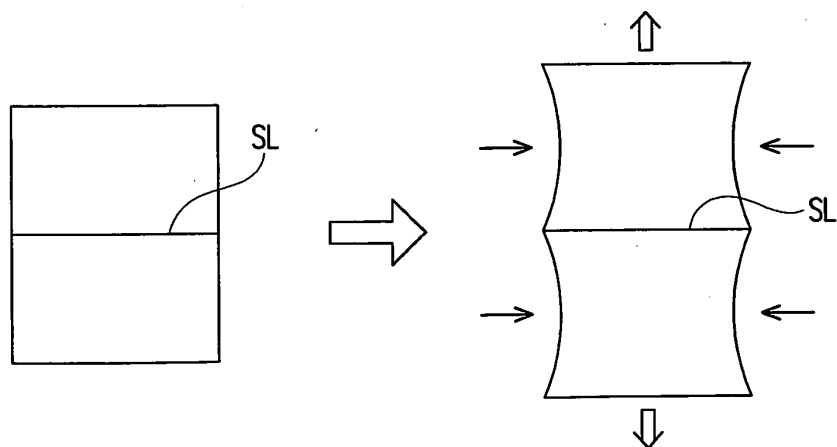
F I G . 2 (A)



F I G . 2 (B)



F I G . 2 (C)



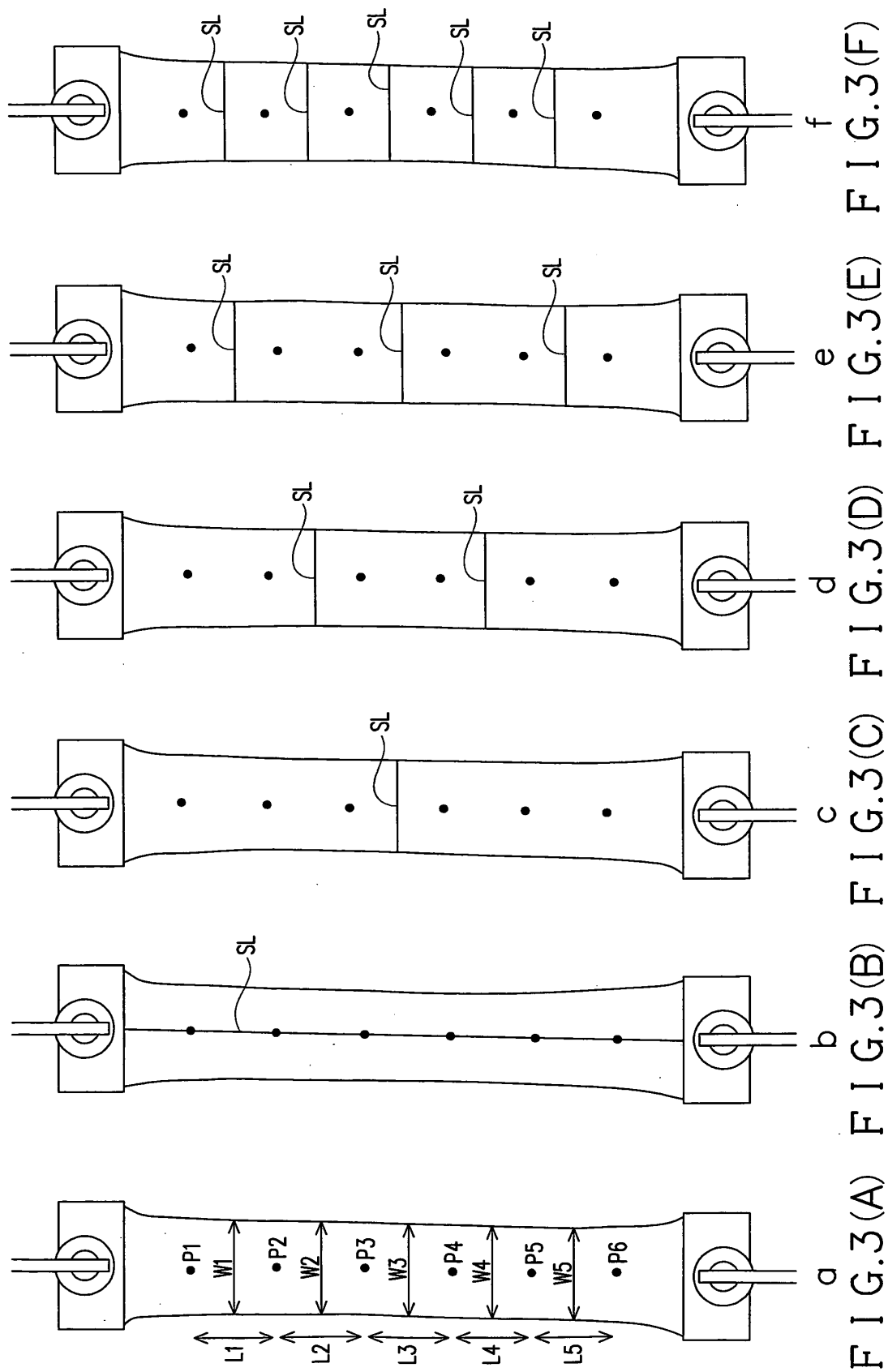


FIG. 4(A)

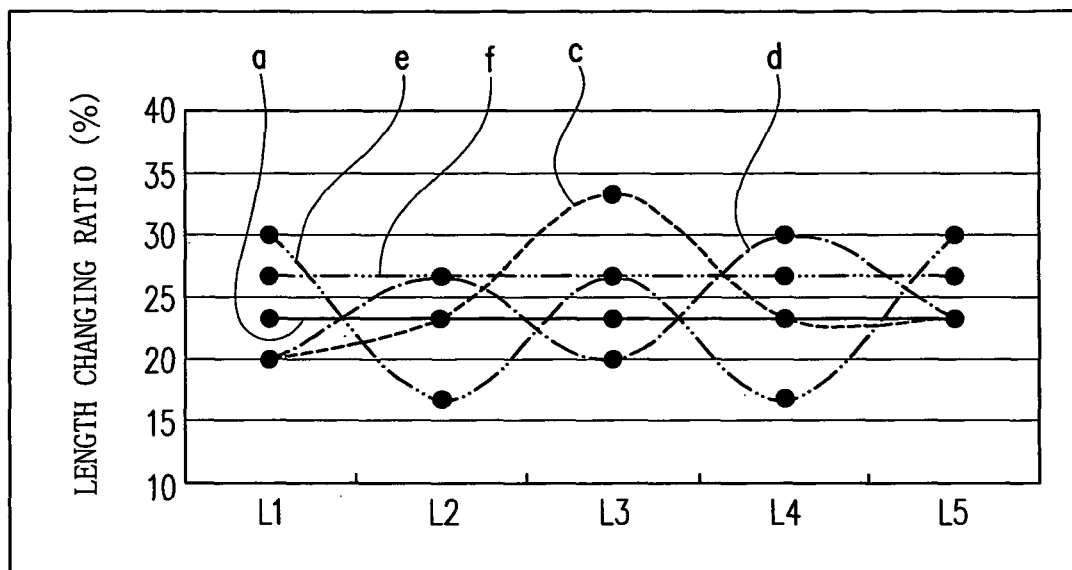


FIG. 4(B)

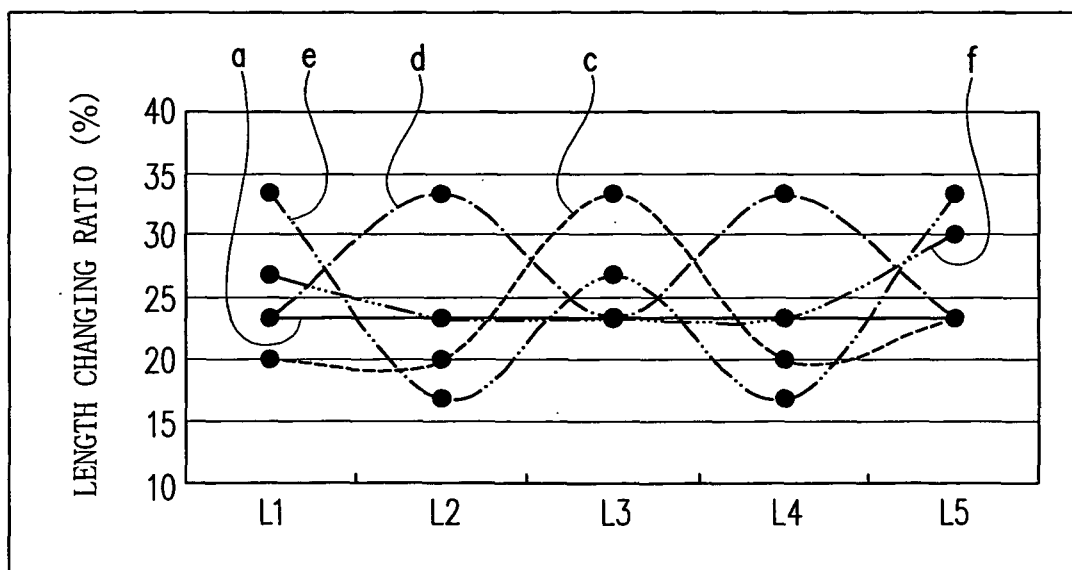


FIG. 5(A)

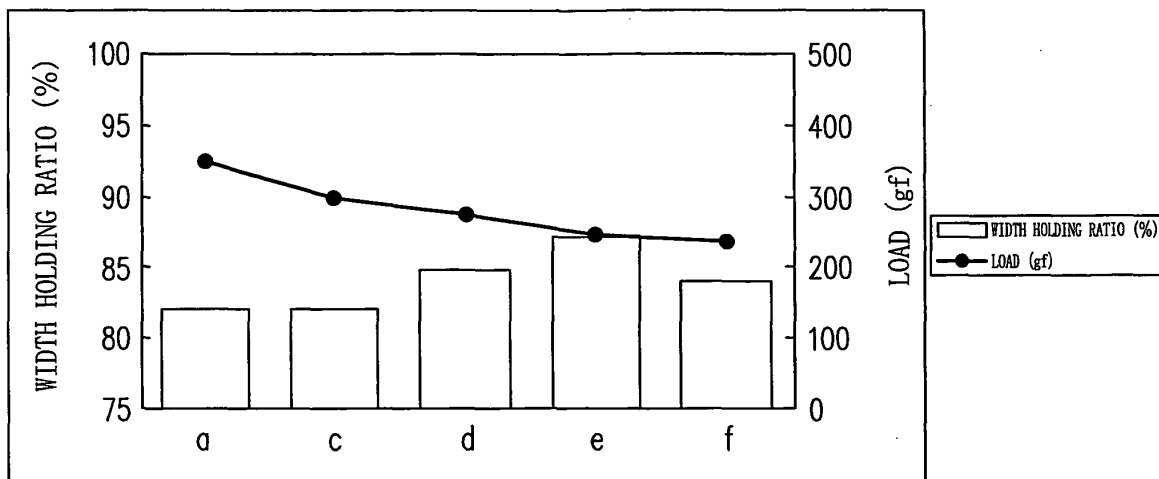


FIG. 5(B)

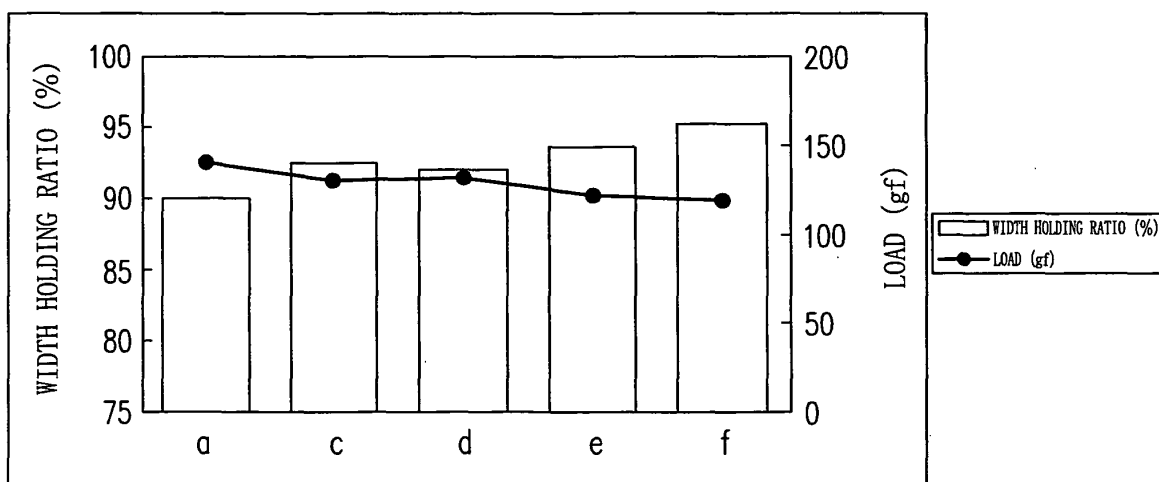


FIG. 6(A)

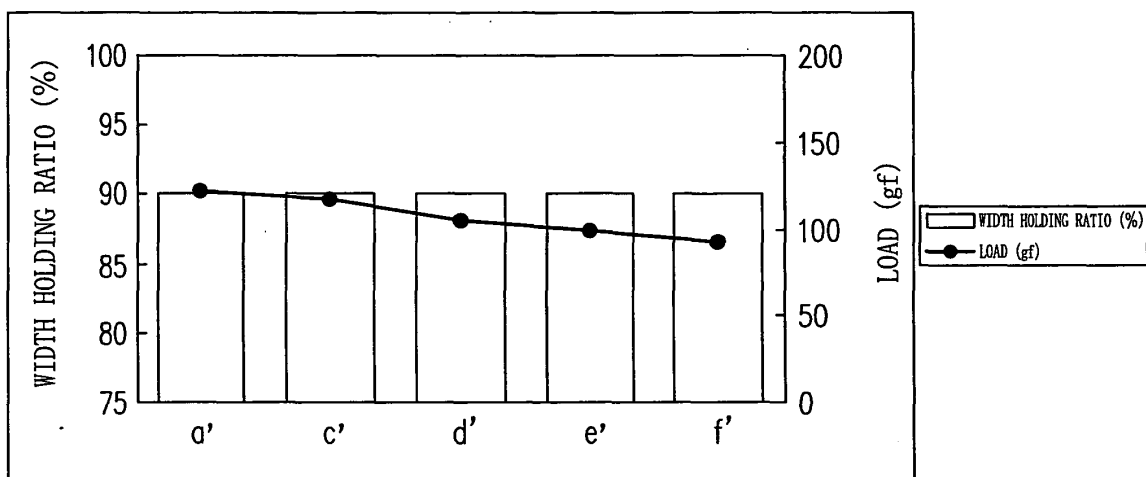


FIG. 6(B)

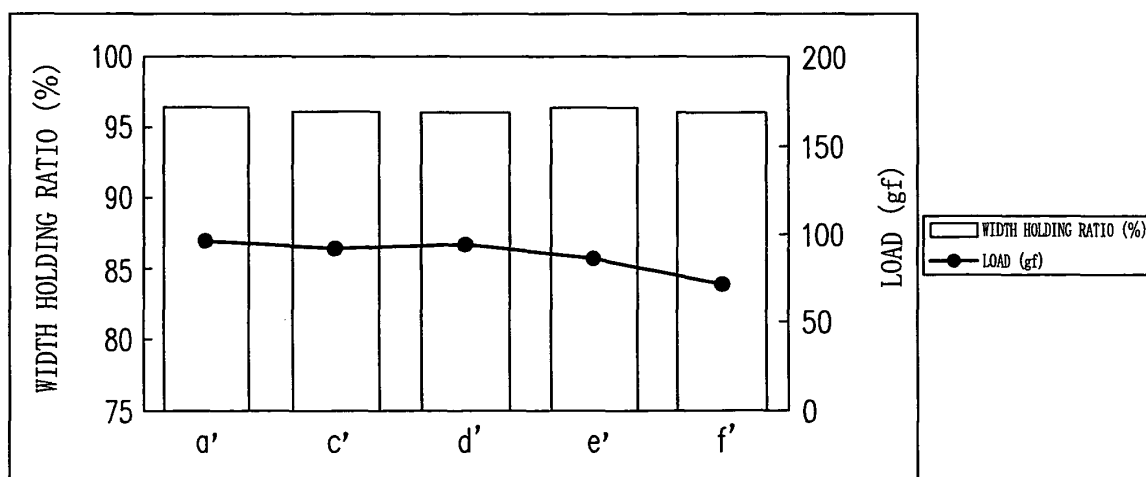


FIG. 7(A)

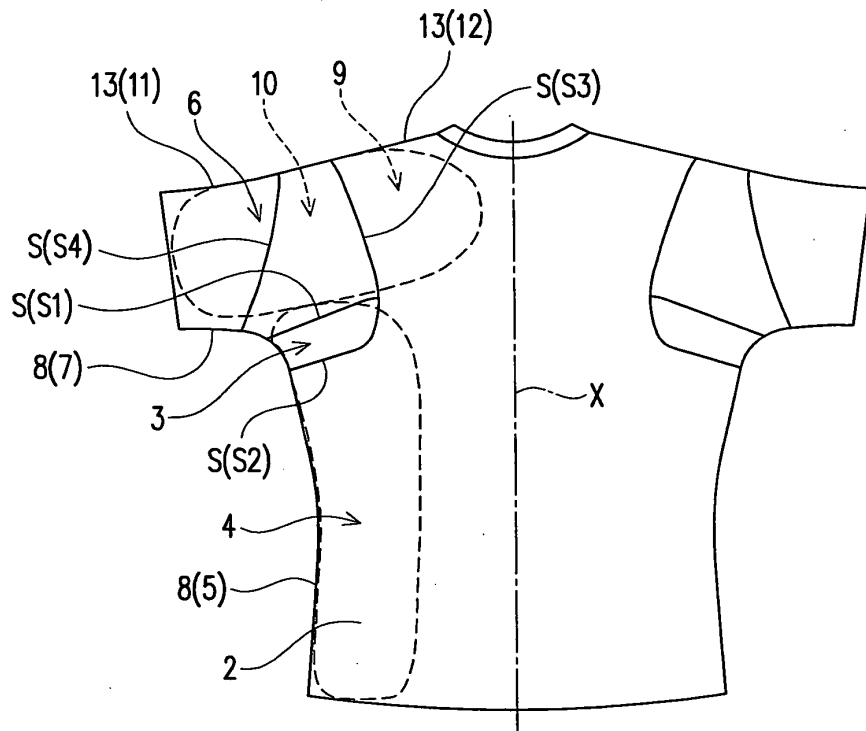


FIG. 7(B)

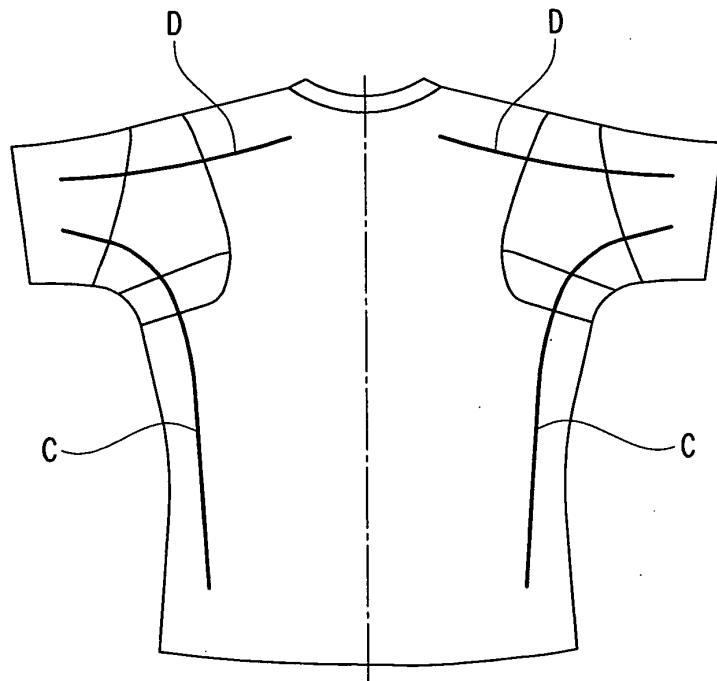


FIG. 8

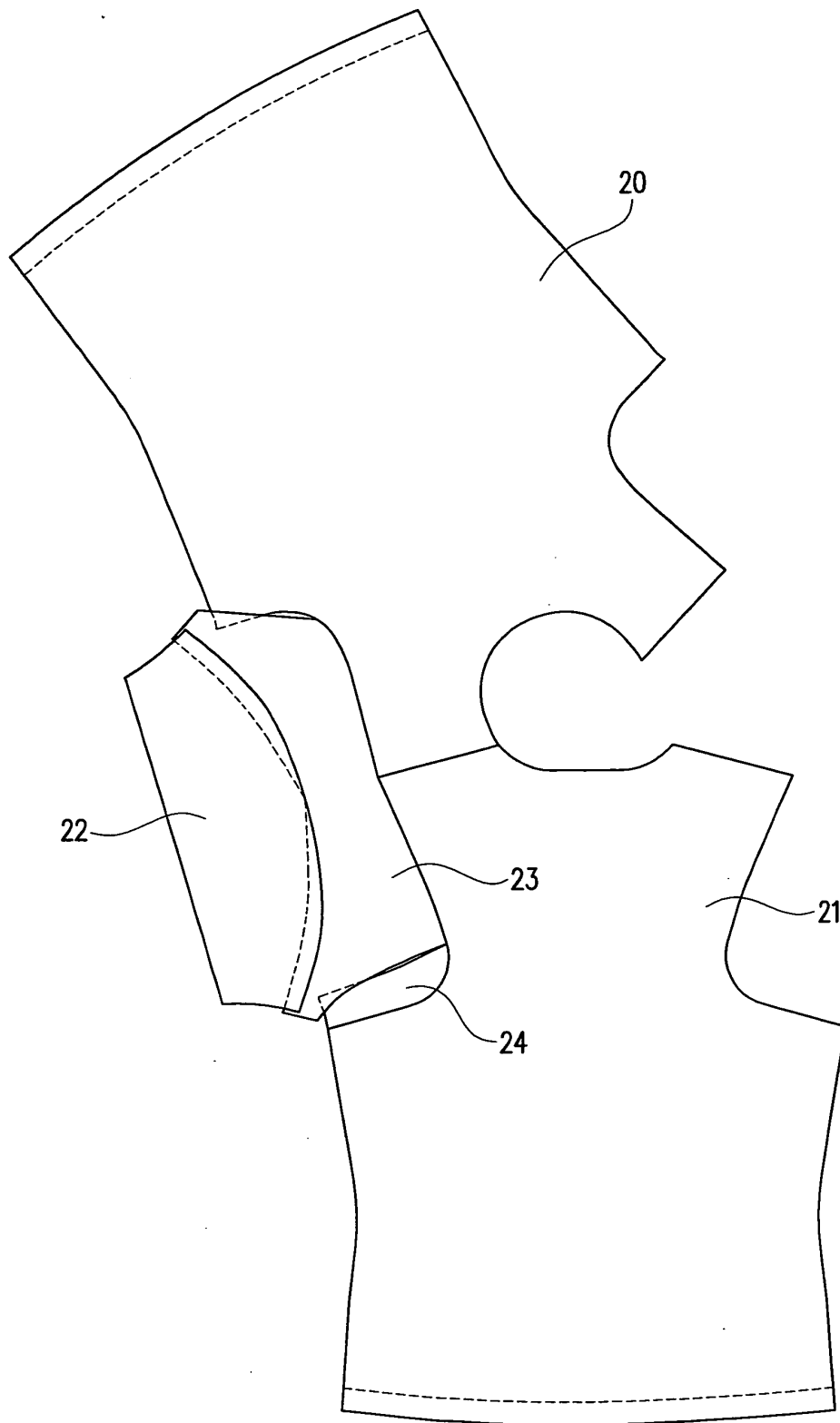


FIG. 9(A)

EXAMPLE

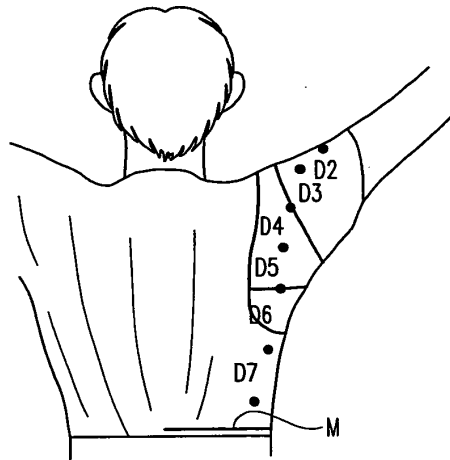


FIG. 9(B)

COMPARATIVE EXAMPLE 1

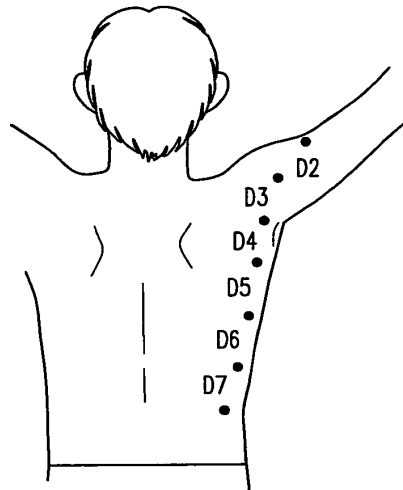
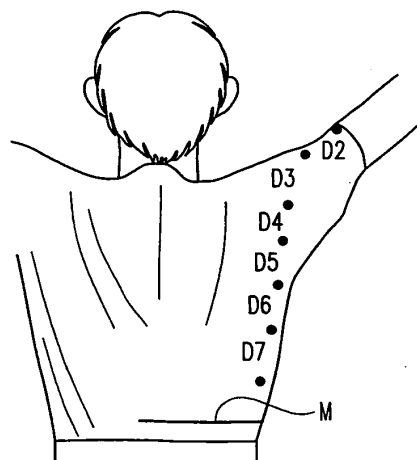
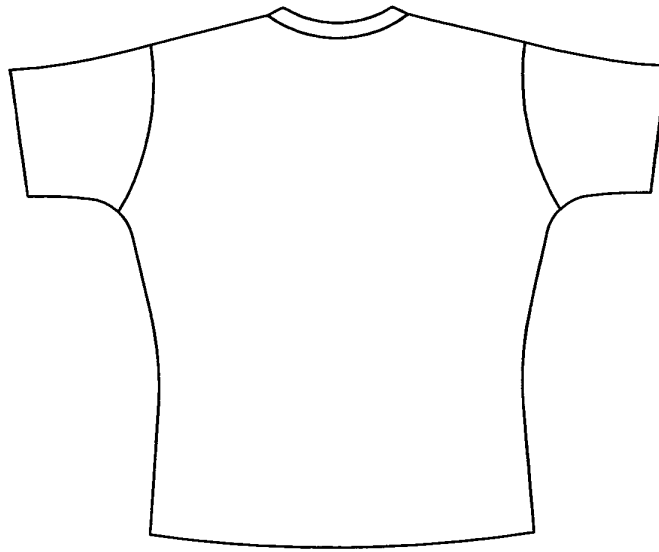


FIG. 9(C)

COMPARATIVE EXAMPLE 2



F I G .10(A)



F I G .10(B)

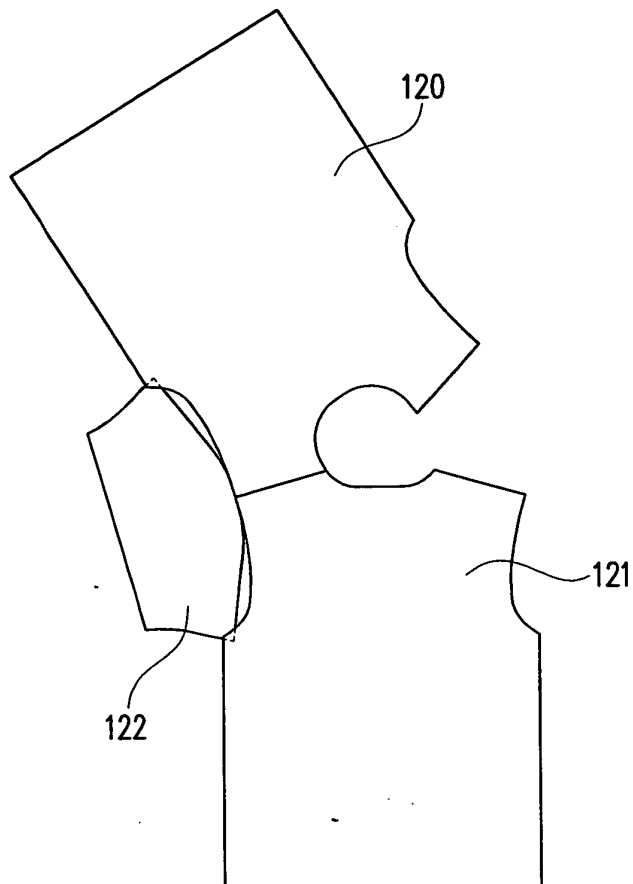


FIG. 11(A)

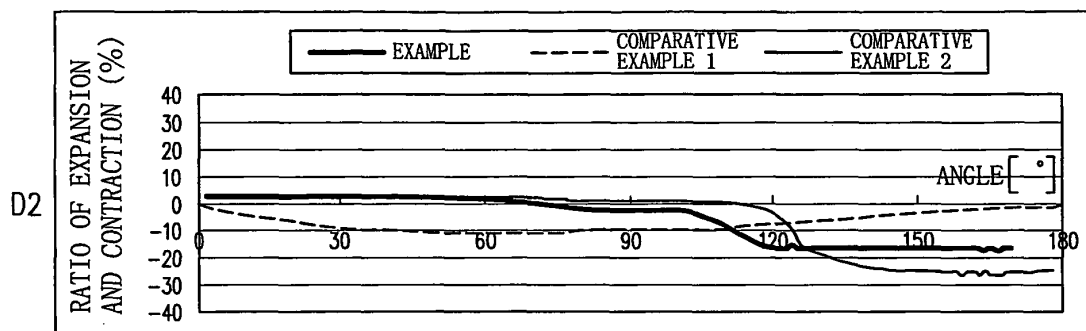


FIG. 11(B)

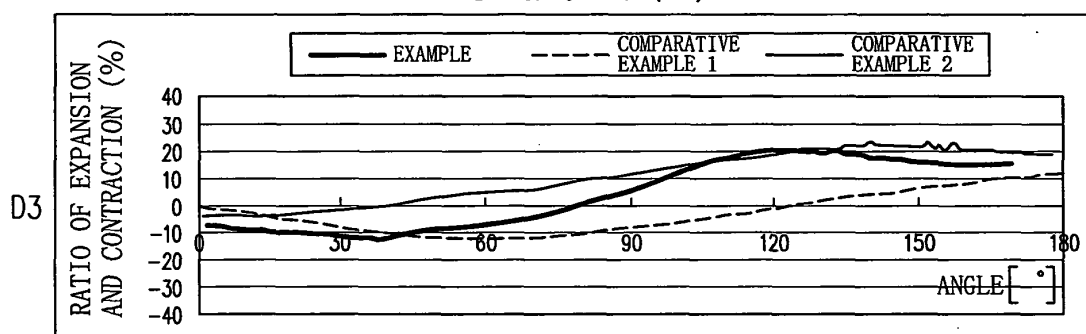


FIG. 11(C)

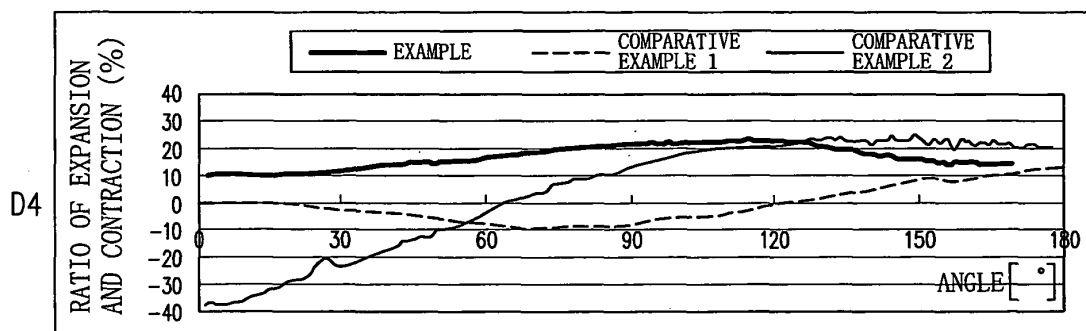
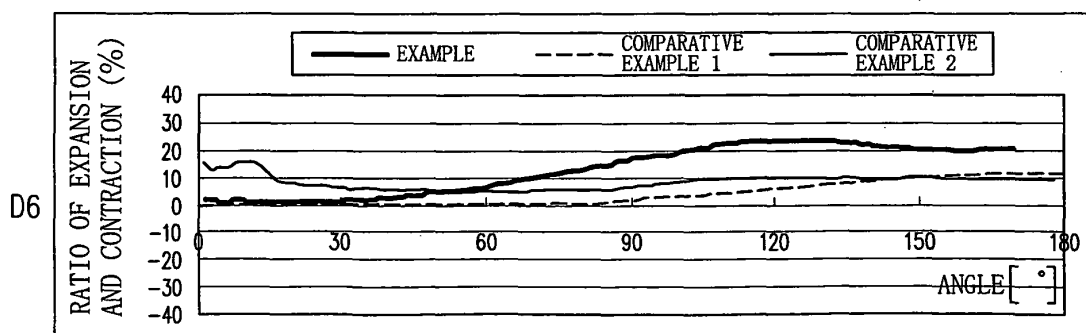


FIG. 11(D)



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/068806

A. CLASSIFICATION OF SUBJECT MATTER

A41D13/00(2006.01) i, A41D27/10(2006.01) i

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)

A41D13/00, A41D27/10

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

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
 Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

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 Y	JP 2000-212809 A (Chori Co., Ltd.), 02 August, 2000 (02.08.00), Par. Nos. [0003] to [0004]; Fig. 7 (Family: none)	1-2, 4-8 3
Y	JP 2001-11707 A (Sumitomo Rubber Industries, Ltd.), 16 January, 2001 (16.01.01), Full text; Fig. 5 & US 6353934 B1	3
P, X	JP 2007-16366 A (Kabushiki Kaisha Descente), 25 January, 2007 (25.01.07), Par. Nos. [0065] to [0070]; Fig. 3(b) (Family: none)	1, 4, 7

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

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"&" document member of the same patent family

Date of the actual completion of the international search
17 December, 2007 (17.12.07)Date of mailing of the international search report
08 January, 2008 (08.01.08)Name and mailing address of the ISA/
Japanese Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2007/068806

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2006-9210 A (Zetto Corp.), 12 January, 2006 (12.01.06), Fig. 1 (Family: none)	1-8
A	JP 2005-23447 A (MIZUNO INC.), 27 January, 2005 (27.01.05), Figs. 3 to 4 (Family: none)	1-8
A	JP 09-95809 A (Kabushiki Kaisha Toyama Gorudo Uin), 08 April, 1997 (08.04.97), Fig. 3 (Family: none)	1-8

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

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- JP 2005307369 A [0006]