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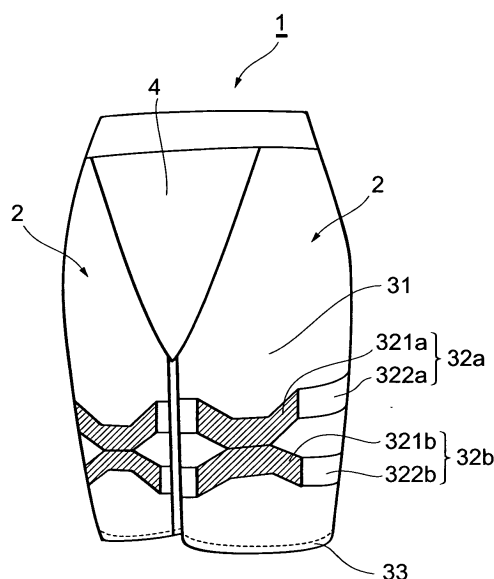
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(54) **GARMENT**

(57) [Problem] To provide a garment that is worn attached to a body and has improved freedom of design in terms of the tightening force or shape of a tightening portion that manipulates the body shape of a wearer, corrects the wearer's posture, and improves the wearer's motor ability.

[Means of Solution] A garment attached tightly to a body, comprising a belt-like tightening portion 32a, b that has a strong tightening portion 321 a, b, which is a part having a relatively strong tightening force, and a weak tightening portion 322a, b, which is a part having a relatively weak tightening force, the strong and weak tightening portions being switched in a belt-like longitudinal direction, wherein, in the tightening portion 32a, b, yarns for reinforcing the tightening forces are continuously knitted into a ground structure throughout the strong tightening portion 321a, b and the weak tightening portion 322a, b, and a knit structure of the yarns for reinforcing the tightening forces has a greater number of looping structures in the strong tightening portion 321a, b than the weak tightening portion 322a, b, and has a greater number of insertion structures in the weak tightening portion 322a, b than the strong tightening portion 321a, b.

Fig.1



Description

[Means for Solving the Problems]

Technical Field

[0001] The present invention relates to a garment, and particularly to a garment worn attached to a body.

Background Art

[0002] A girdle, a body suit, a brassiere, a swim suit, shorts, and other conventional garments that are worn attached tightly to a body have a tightening portion formed on a predetermined section of such garments in order to manipulate the body shape of a wearer, correct the wearer's posture, and improve the wearer's motor ability by means of the tightening force of the tightening portion. In order to form a garment having such a tightening portion, a filler cloth is applied to a part of the garment to provide a strong tightening force, or the thickness of an elastic yarn to be knitted is made thicker. However, application of a filler cloth is not preferred, since the thickness of the fabric of the tightening portion increases by the thickness of the filler cloth. Also, when forming the tightening portion by increasing the thickness of the elastic yarn to be knitted, the border between the parts with different tightening forces extends only in a direction in which the elastic yarn is knitted, and thus a desired shape of tightening portion cannot be obtained.

[0003] Therefore, as described in Patent Document 1, regarding the knit structure of the fabric, a part to be provided with the tightening force is formed into a satiny structure, and other parts into a mesh-like structure, so that a desired shape of tightening portion is obtained without using a filler cloth.

[Patent Document 1] Japanese Patent Registered No. 3461316

Disclosure of the Invention

[Problems to be Solved by the Invention]

[0004] However, in the technology of Patent Document 1, the difference in magnitude of tightening force to be obtained is based on the difference in types of the knit structures, thus a large difference between the sections with and without the filler cloth when the filler cloth is used cannot be obtained. Moreover, in order to secure a difference in tightening force between the knit structures of a knit fabric, flexibility in adopting the knit structures decreases. The present invention has been contrived to solve the aforementioned problems, and its object is to provide a garment that is capable of obtaining a desired shape of tightening portion without using a filler cloth, and obtaining a sufficient difference in tightening force between sections to be and not to be provided with a strong tightening force, and that has a small limitation in adopting a ground structure serving as a base of a knitted fabric.

[0005] In order to achieve this object, the garment of the present invention is a garment attached tightly to a body, comprising a belt-like tightening portion that has a strong tightening portion, which is a part having a relatively strong tightening force, and a weak tightening portion, which is a part having a relatively weak tightening force, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction, wherein, in the tightening portion, a yarn for reinforcing the tightening force is continuously knitted into a ground structure throughout the strong tightening portion and the weak tightening portion, and a knit structure of the yarn for reinforcing the tightening force has a greater number of looping structures in the strong tightening portion than the weak tightening portion, and has a greater number of insertion structures in the weak tightening portion than the strong tightening portion.

[0006] According to this garment, the yarn for reinforcing the tightening force is continuously knitted into the ground structure in the belt-like tightening portion, so that the strong tightening portion is formed mainly by the looping structures and the weak tightening portion is formed mainly by the insertion structures. Therefore, the strong tightening portion is formed into a desired shape at an appropriate position of the knitted fabric, and a sufficient difference in the tightening force between the strong tightening portion and the other portion and also between the strong tightening portion and the weak tightening portion can be obtained.

[0007] Furthermore, the garment of the present invention is a garment attached tightly to a body, comprising a belt-like tightening portion, wherein the tightening portion and at least a part of a fabric main body portion that is adjacent to the tightening portion comprise a common ground structure, the tightening portion has a strong tightening portion, which is a part having a relatively strong tightening force, and a weak tightening portion, which is a part having a relatively weak tightening force, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction, in the tightening portion, a yarn for reinforcing the tightening force is continuously knitted into a ground structures throughout the strong tightening portion and the weak tightening portion, and a knit structure of the yarn for reinforcing the tightening forces has a greater number of looping structures in the strong tightening portion than the weak tightening portion, and has a greater number of insertion structures in the weak tightening portion than the strong tightening portion.

[0008] In this case, in the garment of the present invention the yarn for reinforcing the tightening force is continuously knitted into the ground structure in the belt-like tightening portion, so that the strong tightening portion is formed mainly by the looping structures and the weak tightening portion is formed mainly by the insertion structures. Therefore, the strong tightening portion is formed

into a desired shape at an appropriate position of the knitted fabric, a sufficient difference in the tightening force between the strong tightening portion and the other portion and also between the strong tightening portion and the weak tightening portion can be obtained, and the ground structure can be obtained as a structure that is common between the tightening portion and the fabric main body portion which is adjacent to the tightening portion.

[0009] Moreover, the garment of the present invention is a garment attached tightly to a body, comprising a belt-like tightening portion, wherein a fabric main body portion comprises a plurality of knitted fabric parts that are formed respectively from ground structures having different tightening forces, and border lines of the plurality of knitted fabric parts intersect with the belt-like tightening portion, the tightening portion has a strong tightening portion, which is a part having a relatively strong tightening force, and a weak tightening portion, which is a part having a relatively weak tightening force, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction, in the tightening portion, a yarn for reinforcing the tightening force is continuously knitted into each of the ground structures throughout the strong tightening portion and the weak tightening portion, and a knit structure of the yarn for reinforcing the tightening forces has a greater number of looping structures in the strong tightening portion than the weak tightening portion, and has a greater number of insertion structures in the weak tightening portion than the strong tightening portion, and out of the plurality of knitted fabric parts, a knitted fabric part with a relatively strong tightening force overlaps with at least a part of the strong tightening portion.

[0010] In this case, in the garment of the present invention the yarn for reinforcing the tightening force is continuously knitted into the ground structure in the belt-like tightening portion, so that the strong tightening portion is formed mainly by the looping structures and the weak tightening portion is formed mainly by the insertion structures. Therefore, the strong tightening portion is formed into a desired shape at an appropriate position of the knitted fabric, and a sufficient difference in the tightening force between the strong tightening portion and the other portion and also between the strong tightening portion and the weak tightening portion can be obtained. Moreover, the fabric main body portion is configured by a plurality of knitted fabric portions that are formed by the ground structures having different tightening forces, wherein a part where the knitted fabric portion with a strong tightening force overlaps with the strong tightening portion can produce a strong tightening force by means of the tightening forces of the both overlapping each other.

[0011] When the strong tightening portion has a part inclined in the longitudinal direction of the weak tightening portion, the pressure at a particularly strong tightening portion can be alleviated because the entire tightening

portions are not formed into rings of the same circumference.

[0012] Note that the garment attached to the body as described in the present specification is applied not only to a case where the garment is attached in direct contact with the body surface but also a case where the garment is attached to the body via an inner cloth.

[0013] The present invention can provide a garment that is worn attached tightly to a body and has improved freedom of design in terms of the tightening force or shape of a tightening portion that manipulates the body shape of a wearer, corrects the wearer's posture, and improves the wearer's motor ability.

Brief Description of the Drawings

[0014]

[Fig. 1] A front perspective view of a girdle which is a garment of an embodiment of the present invention.

[Fig. 2] A schematic diagram showing one unit of a fabric according to the embodiment of the present invention.

[Fig. 3] A schematic diagram showing a knitting unit of the fabric according to the embodiment of the present invention.

[Fig. 4] A general explanatory diagram of a knit structure and an organizational diagram.

[Fig. 5] An organizational diagram showing a ground structure according to the embodiment of the present invention.

[Fig. 6] An organizational diagram showing a ground structure according to the embodiment of the present invention.

[Fig. 7] An organizational diagram of yarns for reinforcing tightening force according to the embodiment of the present invention.

[Fig. 8] A modification of an insertion structure of the yarns for reinforcing the tightening force according to the embodiment of the present invention.

[Fig. 9] A modification of a looping structure of the yarns for reinforcing the tightening force according to the embodiment of the present invention.

[Fig. 10] A schematic diagram showing a modification of tightening portions according to the embodiment of the present invention.

[Fig. 11] A front perspective view showing an example in which the present invention is applied to an abdominal cloth of the girdle.

[Fig. 12] A rear perspective view showing an example in which the present invention is applied to a girdle rear portion.

[Fig. 13] A rear perspective view showing an example in which the present invention is applied to a short girdle.

[Fig. 14] A rear perspective view showing other example in which the present invention is applied to

the short girdle.

[Fig. 15] A diagram in which other example of applying the present invention to the girdle viewed edge-on.

[Fig. 16] A schematic diagram showing the fabrics of the girdle shown in Fig. 15.

[Fig. 17] An organizational diagram showing the ground structure of the fabrics shown in Fig. 16.

[Explanation of the Reference Numerals]

[0015] 1: Girdle, 2: Body portion, 3: Fabric, 31: Fabric main body portion, 31a: Knitted fabric part with strong tightening force, 31b: Knitted fabric part with weak tightening force, 32a, 32b: Tightening portions, 321a, 321b: Strong tightening portions, 322a, 322b: Weak tightening portions, 33: Hem, 34: Border, 35: Borderline between knitted fabric part, 4: Abdominal cloth, 5: Short girdle,

Best Modes for Carrying Out the Invention

[0016] Hereinafter, a preferred embodiment of the garment of the present invention is described in detail. Note that through the explanation the same reference numerals are applied to the same elements or the elements with the same function, and overlapping explanation is omitted. Fig. 1 is a perspective view in which a girdle 1 of the present invention, an example of a garment worn attached to a body, is viewed from its front side. Note that in the following explanation "tightening portion" is a part configured from a fabric with lower stretchability than that of a fabric main body portion, and produces higher pressure than the periphery when the garment is worn. This pressure is called "tightening force."

[0017] Right and left bodies 2 of the girdle 1 each have two belt-like tightening portions 32a, 32b extending in a horizontal direction on a section corresponding to a thigh portion thereof. In these tightening portions 32a, 32b, the hatched parts surrounded by solid lines have relatively strong tightening force compared to weak tightening portions 322a, 322b as will be described hereinafter, and thus are called "strong tightening portions 321a, 321b." The parts that are surrounded by solid lines but are not hatched and extend to the right and left of the strong tightening portions 321a, 321b have relatively weak tightening force compared to the strong tightening portions 321a, 321b, and thus are called "weak tightening portions 322a, 322b." The strong tightening portion 321a and the weak tightening portion 322a form one continuous belt, and the strong tightening portion 321b and the weak tightening portion 322b similarly form one continuous belt. A central part of the upper strong tightening portion 321a is convexed downward (and concaved upward) so as to have a part inclined in a longitudinal direction of the weak tightening portion 322a, and a central part of the lower strong tightening portion 321b is convexed upward (and concaved downward) so as to have a part inclined in a longitudinal direction of the weak tightening portion 322b.

Then, the strong tightening portions 321a, 321b forming a horizontally long X shape are formed by superposing the both of the above-described convexed and concaved parts.

[0018] The strong tightening portions 321a, 321b each are located in a position corresponding to a front central part of each thigh of a wearer. Therefore, the wearer's quadriceps muscle positioned in each of the strong tightening portions 321a, 321b of the girdle 1 is strongly tightened and stimulated. Also, the weak tightening portions 322a, 322b having a relatively weak but larger tightening force than the fabric main body portion 31 are located at the extensions of the strong tightening portions 321a, 321b. Therefore, the entire thighs are also tightened sufficiently and, particularly, the quadriceps muscle of the front central part of each thigh is strongly tightened so that the legs of the wearer can kick largely when walking, whereby a beautiful body shape can be maintained. Moreover, the strong tightening portions 321a, 321b are formed into the shape of an X having a part inclined in the longitudinal direction of the weak tightening portions 322a, 322b. Therefore, compared to a case where the strong tightening portions 321a, 321b are in the form of strait lines extending in the same circumference, the two strong tightening portions 321a, 321b concentrate on the central parts of the thighs of the wearer without compressing the thighs in the form of a ring, and thereby a tightening force can be dispersed in horizontal and vertical directions.

[0019] Next, a fabric 3 configuring the body 2 of the girdle 1 is described with reference to Fig. 2. Fig. 2 is a schematic diagram showing one unit of fabric 3 for creating the body 2 on the left side of the girdle 1. The fabric 3 is a warp knitted fabric knitted by yarns supplied in the direction shown by the arrow S, and has the two belt-like tightening portions 32a, 32b formed at a part of the fabric main body portion 31 configured by a ground structure. The tightening portions 32a, 32b are configured by the strong tightening portions 321a, 321b and the weak tightening portions 322a, 322b as described with reference to Fig. 1. Furthermore, hems 33 for preventing raveling of the yarns are formed at upper and lower edges respectively. In order to produce the girdle 1, the left body 2 is cut from the fabric shown in Fig. 2, similarly the right body 2 is cut from a fabric symmetric with the one shown in Fig. 2, and these bodies 2, an abdominal cloth 4 and a crotch are stitched together.

[0020] Next, Fig. 3 shows a state in which eight units of the fabric 3 of Fig. 2 are integrated by a warp-knitting machine. The fabrics 3 are disposed such that two units thereof are disposed in a long-side direction and four units in a short-side direction. The hems 33 are formed on the borders on the long sides of each fabric 3. The fabrics 3 on both sides of one yarn located at the center in the width direction of the hems 33 are knitted into a knitted fabric, which is configured such that these fabrics 3 can be separated from each other with the divided hems 33, by pulling the yarn. A border 34 on a short side of

each fabric 3 is formed so as to be distinguishable, by changing the knit structure from the after-described ground structure to 1 x 1 tricot structure by six courses. The eight units are knitted simultaneously and integrally by the warp-knitting machine. The direction of knitting at this moment is shown by the arrow S.

[0021] Before explaining the knit structure of the knitted fabric according to the present embodiment, the knit structure and an organizational diagram will be described first based on Fig. 4. In Fig. 4, black dots represent the positions of needle heads in each course, and a space between black dots in a horizontal direction represents a needle space portion. A row of black dots arranged in the horizontal direction represents one course and shows how one yarn can be knitted in each of the courses C 1 through Cn when the yarn is supplied in the direction of the arrow S.

[0022] Moreover, the knit structure is divided largely into two structures: a looping structure and an insertion structure. The looping structure is a structure for forming a loop by guiding a yarn using a guide bar and then wrapping the yarn. When the loops intersect with each other to form a closed stitch, this stitch is called "closed loop," and when the loops are opened without intersecting with each other, thus obtained stitch is called "open stitch." Yarns Ya through Yd shown in Fig. 4 each are an example of the looping structure, wherein the yarns Ya and Yd are the looping structures configured by the closed loops in all courses, while the yarns Yb and Yc each are the looping structures configured by the open loops in all courses. Furthermore, in order to represent the knitting of the yarns by means of the positions of the needle space portions, numbers 1, 2, 3 and the like are applied in this order to the left, with the right-most needle space portion through which each yarn is guided and caused to pass by the guide bar is 0 (sometimes 0, 2, 4, 6 and the like are used depending on the type of the knitting machine). For example, in the case of the yarn Ya, it moves from the needle space portion 1 to the needle space portion 2 in the course C1, moves from the needle space portion 1 to the needle space portion 0 in the course C2, and thereafter repeats this movement, hence this movement is expressed as "1, 2/1, 0//." The knit structure of the yarn Ya is called "1/1 tricot structure" or "denbigh structure." Also, the structures of the yarns Yc, Yd are called "chain structure."

[0023] The insertion structure is a structure in which an insertion yarn is inserted into other structure. The insertion yarn itself does not form a stitch and is laid between, for example, a needle loop and a sinker loop of other structure. Yarns Ye and Yf shown in Fig. 4 are examples of the insertion structure. The yarn Ye is an insertion structure moving alternately in adjacent two needle space portions only, such that the guide bar swings in and out of the position of the needle space portion 1 in the course C1, swings in and out at the position 0 in the course 2, and thereafter repeats this movement, hence this movement is expressed as "1, 1/0, 0//." The

yarn Yf is an insertion structure that is caused to swing in the horizontal direction (course direction) in one needle space portion, and thus is expressed as "2, 2/0, 0//."

[0024] Next, the knit structures according to the present embodiment is described with reference to Fig. 5 through Fig. 7. Note that in order to obtain the knitted fabric of the present embodiment, a knitting machine such as RSE5EL manufactured by Karl Mayer Co. can be used. Fig. 5 shows the knit structure, which is the knit structure of the fabric main body portion 31 of the fabric 3 and is also the ground structure of the knitted fabrics of the tightening portions 32a, 32b. A yarn Y1 is, for example, a nylon yarn of 56 dtex, which is caused to pass through a guide bar of a comb L1 and supplied in the direction of the arrow S to perform knitting. In all of the courses, the closed loops are formed, and six courses C1 through C6 consist one repeating unit R, which is expressed as "1, 2/1, 2/1, 2/1, 0/1, 0/1, 0//." A yarn Y2 is a polyurethane yarn of 310 dtex, which is caused to pass through a guide bar of a comb L2 and supplied in the direction of the arrow S to perform knitting. All of the courses consist an insertion structure, wherein the six courses C1 through C6 consist one repeating unit R, which is expressed as "2, 2/1, 1/3, 3/1, 1/2, 2/0, 0//."

[0025] These yarns Y1 and Y2 are knitted at the positions of all needle points, whereby a satin ground structure of the fabric 3 is knitted. This state is shown as an organizational diagram in Fig. 6. However, the ground structure of the fabric 3 is not limited to those shown in Figs. 5 and 6, and thus 1/1 tricot structure, 1/2 tricot structure, 1/3 tricot structure, structure having a combination of these structures, a combination of a chain structure and an insertion structure, or other appropriate structure can be adopted. Moreover, the thickness or types of the yarns can also be selected appropriately.

[0026] Fig. 7 is an organizational diagram showing how the yarns are knitted into the ground structure in order to reinforce the tightening force. Yarn Y3 and yarn Y4 each are a FTY 22t x 33t elastic yarn obtained by twisting a 33 dtex nylon yarn around a 22 dtex polyurethane yarn as a wick. The reason for using such yarn having a polyurethane yarn and a nylon yarn entwined with each other is to reduce the difference in dyeing effect between the fabric main body portion and this yarn, which is caused by the fact that the dyeing characteristics of the polyurethane yarn is poorer than those of the nylon yarn. Moreover, a yarn of an appropriate type and thickness can be adopted as the yarn Y3 and yarn Y4. For example, a thick yarn can be adopted as the yarn Y3 and yarn Y4 for obtaining stronger tightening force.

[0027] The yarn Y3 is caused to pass through the guide bar of a comb L3, supplied in the direction of the arrow S, and knitted. The yarn Y4 is caused to pass through the guide bar of a comb L4, supplied in the direction of the arrow S, and knitted. Specifically, the yarn Y4 shown in Fig. 7 is knitted into all wales in the belt of the tightening portion 32a formed continuously from the bottom to the top in the order of the weak tightening portion 322a,

strong tightening portion 321a, weak tightening portion 322a, strong tightening portion 321a, and weak tightening portion 322a, as shown in Fig. 3. Similarly, the yarn Y3 shown in Fig. 7 is knitted into all wales in the belt of the tightening portion 32b formed continuously from the bottom to the top in the order of the weak tightening portion 322b, strong tightening portion 321b, weak tightening portion 322b, strong tightening portion 321b, and weak tightening portion 322b, as shown in Fig. 3.

[0028] These yarns Y3 and Y4 are knitted simultaneously with the yarn Y1 and the yarn Y2 that form the ground structures, but these yarns are explained separately for the convenience of explanation. The yarn Y3 and yarn Y4 in the courses of a range A1 are both knitted into the ground structure knitted by the yarns Y1 and Y2, in the form of the insertion structure "1, 1/0, 0//", where a yarn moves between only two adjacent needle space portions alternately. This section corresponds to the weak tightening portions 322a and 322b located at the bottom of the fabric 3 shown in Fig. 3, wherein the yarn Y3 is knitted into the weak tightening portion 322b and the yarn Y4 into the weak tightening portion 322a. Since the structures of the yarn Y3 and yarn Y4 are the insertion structures where a yarn moves between only the adjacent two needle space portions alternately, the quantity of required yarns is small and the quantity of yarns to be supplied is controlled to a small quantity by an electronic control device. Since the yarn Y3 and yarn Y4 are knitted into the ground structure knitted by the yarn Y1 and yarn Y2, the weak tightening portions 322a, 322b are formed into fabrics denser than the peripheral fabric main body portion 31 formed only by the ground structures and thus generate a strong tightening force. However, compared to the strong tightening portions 321a, 321b described hereinafter, the weak tightening portions 322a, 322b have low density and relatively small tightening force and thus are not as visually apparent as the strong tightening portions 321a, 321b.

[0029] The yarn Y3 and yarn Y4 gradually shift so as to approach each other on the basis of the chain structures in the courses within a range A2. Then, in the courses within a range A3, the yarn Y3 and yarn Y4 are formed by only the linear chain structures that are parallel to each other. Although not illustrated in Fig. 7, in the courses within the range next to the range A3, as opposed to A2, the structure to shift in the direction spreading each other on the basis of the chain structures is continued. The range from A2 to this range corresponds to the substantially X-shaped strong tightening portions 321a, 321b shown in Fig. 3, wherein the yarn Y3 is knitted into the strong tightening portion 321b, and the yarn Y4 into the strong tightening portion 321a. Since the yarn Y3 and yarn Y4 configure the looping structures, the quantity of required yarns is large, and the quantity of yarns to be supplied is controlled to a large quantity by the electronic control device. Therefore, in the strong tightening portions 321a, 321b, fabrics are formed into denser fabrics, compared to not only the peripheral fabric main body

portion 31 but also the weak tightening portions 322a, 322b. Moreover, the chain structures are strongly apt to prevent the extension (reduce the degree of elongation) in the warp direction of the fabric (knitting direction, which is the direction of the arrow S), compared to the other structures. Therefore, combined with the fact that the fabrics are formed densely, the strong tightening portions 321a, 321b can generate a strong tightening force.

[0030] Although not illustrated in Fig. 7, after forming the structures based on the chain structures knitted into the strong tightening portions 321a, 321b, the yarn Y3 and yarn Y4 are knitted into the weak tightening portions 322a, 322b, in the form of the insertion structures similar to those formed in the range A1. Thereafter, courses subsequent to A2 continue in the form of the chain structures knitted into the part configured by the strong tightening portions 321a, 321b shown at the top of Fig. 3, and finally the courses end up with the insertion structures knitted into the part configured by short weak tightening portions 322a, 322b. As shown in Fig. 7, the yarn Y3 and yarn Y4 are substantially symmetry with respect to a line. Although Fig. 7 illustrates only one of each yarns Y3 and Y4 and a part of each of the ranges A1, A2 and A3, the same shapes as those of the tightening portions 32a, 32b shown in Fig. 3 are formed by drawing, in Fig. 7, all of the yarns Y3 and Y4, which are knitted into the tightening portions 32a and 32b respectively, throughout the whole ranges.

[0031] Here, the insertion structures formed in the range A1 and the like are not limited to the insertion structure of "1, 1/0, 0//" where a yarn moves between only two adjacent needle space portions alternately as shown in Fig. 7, and thus may be the insertion structure of "2, 2/0, 0//" shown by a yarn Y5, for example, or may be the insertion structures shown by a yarn Y6 and a yarn Y7, as shown in Fig. 8. Increasing the swing width of the inserted yarns in the horizontal direction (course direction) thereof increases the quantity of yarns used and the tightening force of the weak tightening portions 322a, 322b to be formed. In addition, as shown with a yarn Y8, appropriate looping structures may be incorporated in accordance with the insertion structures. In this case, the larger the proportion of the looping structures, the larger the quantity of yarns used and the greater the tightening force of the weak tightening portions 322a, 322b to be formed. However, the proportion of the looping structures of the weak tightening portions 322a, 322b is smaller than the looping structures included in the strong tightening forces 321a, 321b formed in the same belt, and the tightening force of the weak tightening portions 322a, 322b is relatively weaker than that of the strong tightening portions 321a, 321b.

[0032] Moreover, the looping structures formed in the ranges A2, A3 and the like may not necessarily be based on the chain structures shown in Fig. 7, but also may be based on the 1/1 tricot structure shown with a yarn Y9 in Fig. 9 or the structure having a combination of an open stitch and a closed stitch, as shown with a yarn Y10.

When not based on the chain structure, the effect of reducing the degree of elongation of the fabric in the stitching direction becomes low, but the tightening force can be adjusted accordingly. Moreover, the insertion structures may be combined based on the looping structures as shown with yarns Y11, Y12. In this case, the larger the proportion of the insertion structures, the lower the quantity of yarns used and the weaker the tightening force. However, the proportion of the insertion structures of the strong tightening portions 321a, 321b is lower than that of the weak tightening portions 322a, 322b formed in the same belt, and the tightening force of the strong tightening portions 321, 321b is relatively stronger than that of the weak tightening portions 322a, 322b.

[0033] It should be noted that, regarding the amount of yarns used, the above has described the simple situation where the amount of yarns to be supplied is controlled according to the structure type only, but the structure type does not always determine the amount of yarns used, or the tightening force is not always determined from the amount yarns used. For example, even the insertion structure of "1, 1/0, 0/" in which the swing width is small can adjust the amount of yarns to be supplied to be larger than that of an insertion structure having a larger swing width. However, the increase of the amount of yarns to be supplied does not necessarily lead to the increase of the tightening force.

[0034] As described above, devising the structures of the weak tightening portions 322a, 322b and the structures of the strong tightening portions 321a, 321b can provide appropriate tightening force to these tightening portions. Therefore, the difference in tightening force between the strong tightening portions 322a, 322b and the fabric main body portion 31 and the difference in tightening force between the strong tightening portions 322a, 322b and the weak tightening portions 321a, 321b can be designed appropriately. Moreover, the tightening force of the strong tightening portions 322a, 322b can be changed in a multistage manner in the knitting direction and, similarly, the tightening force of the weak tightening portions 321a, 321b can be changed in a multistage manner in the knitting direction.

[0035] Measurement of the wearing pressure was performed on the girdle 1 of the present embodiment that is created by the ground structures shown in Fig. 5 and Fig. 6 and the yarn structures for reinforcing the tightening force as shown in Fig. 7, and as a result the wearing pressure of the area where the strong tightening portions 321a, 321b are attached to a front thigh was 36 gf/cm², and the wearing pressure of the area where the fabric main body portion 31 without the tightening portions 32a, 32b is attached to a back thigh was 24.4 gf/cm², hence preferred wearing pressures and a wearing pressure difference were realized. That is, no significant effect is anticipated on the front thigh when the wearing pressure of the strong tightening portions 321a, 321b is low, but the wearer feels tightness when the wearing pressure of the strong tightening portions 321a, 321b is high. Moreover,

in order for the strong tightening portions 321a, 321b to exert the effect thereof, it is desired that the wearing pressure of the strong tightening portions 321a, 321b and the wearing pressure of the section that does not form the tightening portions differ from each other by at least 10 gf/cm². Note that the wearing pressures were measured with a contact pressure measuring instrument manufactured by AMI Co., Ltd. (Airpack type. The specifications: table type: AMI 3037-20; sensor section: 20 mm diameter; maximum measured value: approximately 15000 Pa; guide tube: 1.5 m), by putting the girdle 1 on a dummy (made of FRP). Regarding the waist of the dummy, the length therefrom to the floor is 553 mm, the peripheral diameter is 650 mm, the lateral diameter is 230 mm, and the thickness is 165 mm. Regarding the hip of the dummy, the length therefrom to the floor is 385 mm, the peripheral diameter is 895 mm, the lateral diameter is 320 mm, and the thickness is 215 mm. Regarding a groin of the dummy, the length therefrom to the floor is 285 mm, the peripheral diameter is 520 mm, the lateral diameter is 150 mm, and the thickness is 170 mm. Regarding the section where the interspinal point of the dummy is located, the length therefrom to the floor is 435 mm, the peripheral diameter is 845 mm, the lateral diameter is 305 mm, and the thickness is 202 mm.

[0036] As described above, in the girdle 1 of the present embodiment the yarn Y3 and the yarn Y4 for reinforcing the tightening force are knitted continuously into the common ground structures in the belt-like tightening portions 32a, 32b, and the strong tightening portions 321a, 321b are formed mainly by the looping structures, while the weak tightening portions 322a, 322b are formed mainly by the insertion structures. Therefore, the strong tightening portions 321a, 321b are formed into a desired shape in an appropriate position of the knitted fabric, and a sufficient difference in the tightening force between the strong tightening portions 321a, 321b and the fabric main body portion 31 except the strong tightening portion and also between the strong tightening portions 321a, 321b and the weak tightening portions 322a, 322b can be obtained.

[0037] Furthermore, when the structures of the yarns for reinforcing the tightening force of the strong tightening portions 321a, 321b are based on the chain structure, the chain structure is strongly apt to prevent the extension (reduce the degree of elongation) in the warp direction of the fabric. Therefore, combined with the fact that the fabrics are formed densely, the strong tightening portions 321a, 321b can generate a strong tightening force. Moreover, the strong tightening portions 321a, 321b are formed into the shape of an X having the part inclined in the longitudinal directions of the weak tightening portions 322a, 322b. Therefore, compared to a case where the strong tightening portions 321a, 321b are in the form of strait lines extending in the same circumference, the two strong tightening portions 321a, 321b concentrate on the central parts of the thighs of the wearer without compressing the thighs in the form of a ring, and thereby a

tightening force can be dispersed in horizontal and vertical directions. In addition, the tightening force can be set to a predetermined amount by changing the structures of the yarns Y3 and Y4 for reinforcing the tightening force of the strong tightening portions 321a, 321b, which are based on the chain structure, to the other structure or by combining the structures of the yarns Y3 and Y4 with the insertion structures. Similarly, regarding the structures of the yarns Y3 and Y4 for reinforcing the tightening force of the weak tightening portions 322a, 322b, the tightening force can be set to a predetermined amount by increasing the swing width in the horizontal direction from the insertion structures of "1, 1/0, 0// " or by combining the structures of the yarns Y3 and Y4 with the insertion structures. Moreover, the tightening force of the strong tightening portions 322a, 322b can be changed in a multistage manner in the knitting direction and, similarly, the tightening force of the weak tightening portions 321a, 321b can be changed in a multistage manner in the knitting direction, by changing the knit structures formed by the yarns Y3 and Y4 for reinforcing the tightening force of the tightening portions 32a, 32b.

[0038] The garment of the present invention that is attached tightly to a body is not limited to the one described above. For example, the belt-like tightening portions 32a, 32b may be formed into various shapes by the strong tightening portions 321a, 321b and weak tightening portions 322a, 322b shown in (A) through (H) of Fig. 10. As shown in (F), when the strong tightening portions 321a, 321b are formed linearly along with the weak tightening portions 322a, 322b, a thigh can be tightened strongly in the form of a ring. Conversely, when avoiding a ring-like tightness, the strong tightening portions 321a, 321b are formed into an appropriate shape so as to have the parts inclined in the longitudinal directions of the weak tightening portions 322a, 322b as shown in the diagrams other than (F) of Fig. 10, so that desired direction and position of the tightening force of the strong tightening portions 321a, 321b can be obtained. Furthermore, a single belt-like tightening portion 32a may be obtained without combining the two belt-like tightening portions 32a, 32b, as shown in an example in (H).

[0039] Also, the place for forming the tightening portions 32a, 32b is not limited to the front thigh of the girdle 1. Fig. 11 is a perspective view showing an example in which the present invention is applied to other section of the girdle 1, wherein the girdle 1 is viewed from the front. One tightening portion 32a is formed in the abdominal cloth 4. Especially by forming the strong tightening portion 321a in the center of the abdomen, a tightening force can be added to the abdomen of the wearer so as to prevent the abdomen from bulging. Fig. 12 is a perspective view showing another example of application of the present invention, wherein the girdle 1 is viewed from behind. The hip of the wearer can be lifted up by forming the strong tightening portions 321a, 321b of the tightening portions 32a, 32b in a section between the lower part of the bulge of the hip of the wearer and a side part of

the hip, whereby the body shape of the wearer can be compensated. Fig. 13 is a perspective view showing yet another example of application of the present invention, wherein a short girdle 5 is viewed from behind. The tightening portion is formed by one belt-like tightening portion 32a. The strong tightening portion 321a is formed in a section corresponding to the lower part of the bulge of the hip of the wearer, whereby the hip of the wearer can be lifted up to compensate the body shape of the wearer. Fig. 14 is a perspective view similarly showing the back of the short girdle 5. The strong tightening portion 321a is similarly formed in the section corresponding to the lower part of the bulge of the hip of the wearer, but the strong tightening portion 321a and the weak tightening portion 322a are formed alternately in a multistage manner, and the length in a belt direction of the strong tightening portion 321a is increased at a lower part of the center of the hip to adjust the strength of the tightening force in the belt direction in a multistage manner. Accordingly, the tightening force can be applied gradually from the section requiring a strong tightening force toward a section that does not require a strong tightening force. Furthermore, although not shown, the strong tightening portion can be formed in a section between a side portion and a back portion of a brassiere, or a side portion and a rear portion of a body suit.

[0040] Moreover, in the garments shown in Fig. 11 through Fig. 14 and a brassiere or a body suit that is not shown, the shapes of the tightening portions are not limited, hence the belt-like weak tightening portions and strong tightening portions may be formed in various shapes as shown in the modifications shown in Fig. 10.

[0041] The above has described the case where the ground structures of the fabric main body portion 31 are identical to each other, but the ground structures configuring the fabric main body portion 31 may vary depending on the places thereof in the fabric main body portion 31. Examples of application of such ground structures are described with reference to Fig. 15 through Fig. 17. Fig. 15 is a view in which the girdle 1 is viewed edge-on. The fabric main body portion 31 forming the body 2 is sectioned into knitted fabric parts that are formed respectively by two types of ground structures having different tightening forces. A knitted fabric part 31a positioned in the center with respect to the horizontal direction is knitted by a ground structure having a relatively strong tightening force, and knitted fabric parts 31b positioned on both sides of the knitted fabric part 31a are knitted respectively by weak ground structures having a relatively weak tightening force. The weak tightening portion 322a of the single belt-like tightening portion 32a are formed at substantially right angles to borderlines 35 of the knitted fabric parts 31a, 31b. The weak tightening portions 322a are formed on two sides, the right and left sides, with a step formed therein so as to overlap with the knitted fabric part 31b having a relatively weak tightening force, and the strong tightening portion 321a is formed between the weak tightening portions 322a so as to overlap with

the knitted fabric part 31 a having a relatively strong tightening force. The strong tightening portion 321a is inclined such that the front side thereof is positioned upward.

[0042] Here, each of the weak tightening portions 322a and the respective borderlines 35 are formed at substantially right angles to each other, but may form a different crossing angle, hence the belt-like tightening portion 32a constituted by the strong tightening portion 321a and the weak tightening portions 322a may intersect with the borderlines 35. Moreover, the position of the knitted fabric part 31b with a relatively weak tightening force overlaps with the positions of the weak tightening portions 322a, and the position of the knitted fabric part 31a with a relatively strong tightening force overlaps with the positions of the strong tightening portions 321a, but these positions may not be overlapped and the knitted fabric part 31a with a strong tightening force may overlap with at least a part of the strong tightening portion 321a. Then, the overlapped parts are provided with a stronger tightening force due to the strong tightening force of the ground structures of the knitted fabric and the overlapping strong tightening portion 321a of the tightening portion 32a.

[0043] The tightening portion 32a is positioned on an outer periphery of an upper part of a thigh of the wearer, and the strong tightening portion 321a of the tightening portion 32a is positioned in each side portion of the hip. Therefore, the section between the upper part of the thigh and the lower part of the hip of the wearer is tightened, and particularly the strong tightening portion 321 a prevents the both sides of the hip from bulging, whereby the body shape is fixed. Moreover, because not only the strong tightening portion 321a of the side portion of the hip but also the knitted fabrics 31a positioned above and below the strong tightening portion 321a are formed to have a stronger tightening force compared to the other knitted fabric parts 31b, the entire side portion of the hip can be tightened. Also, because the strong tightening portion 321a is inclined upward or downward and has the part inclined in the longitudinal direction of the weak tightening portion 322a, the entire tightening portion 32a is prevented from being formed into a ring of the same circumference, and particularly the tightness generated by the strong tightening portion 321a can be alleviated.

[0044] Next, the fabric 3 configuring the body 2 of the girdle 1 is described with reference to Fig. 16. As with Fig. 2, Fig. 16 is a schematic diagram showing one unit of fabric 3 for creating the body 2 on the left side of the girdle 1. The fabric 3 is a warp knitted fabric knitted by yarns supplied in the direction shown by the arrow S, and has the one belt-like tightening portions 32a formed at a part of the fabric main body portion 31 configured by a ground structure. The tightening portion 32a is configured by the strong tightening portion 321a and the weak tightening portion 322a as described with reference to Fig. 15. Furthermore, the hems 33 for preventing raveling of the yarns are formed at upper and lower edges. As with the cases shown in Fig. 1 through Fig. 3, in order to produce the girdle 1, the left body 2 is cut from the fabric

shown in Fig. 16, similarly the right body 2 is cut from a fabric symmetric with the one shown in Fig. 16, and these bodies 2, an abdominal cloth 4 and a crotch are stitched together, and eight units of the fabric 3 are knitted integrally by the warp-knitting machine.

[0045] The major difference between Fig. 16 and each of Fig. 1 through Fig. 3 is that in Fig. 16 the ground structure of the range between the right end of the fabric 3 and the borderline 35 is knitted by a 1/2 tricot structure shown in, for example, the left side of Fig. 17, and that the subsequent range up to the left borderline 35 is knitted by a 1/3 tricot structure shown on the right side of Fig. 17. Compared to the 1/2 tricot structure, the 1/3 tricot structure has a larger amount of yarns used and a relatively stronger tightening force. Note that, as with the cases shown in Fig. 1 through Fig. 7, the yarns for reinforcing the tightening force are knitted into the fabric 3 so that the tightening portion 31 is formed along with the ground structures.

[0046] Moreover, as the ground structures with different tightening forces, not only such 1/2 tricot structure and 1/3 tricot structure but also appropriate structures can be adopted in which, for example, a net structure (mesh structure) having low-density stitches is formed as the weak knitted fabric part 31 b having a relatively weak tightening force, and various satin structures having denser stitches are formed as the strong knitted fabric part 31a having a relatively strong tightening force. Furthermore, there may be three or more types of such different ground structures, and each of the knitted fabric portions may be sectioned into four or more sections or two sections. In addition, the knitted structure of the tightening portion 32a may be configured in various ways as described with reference to Fig. 8 and Fig. 9, and various shapes as illustrated in Fig. 10 can be adopted as the shape of the tightening portion.

[0047] In addition, regarding Fig. 15, Fig. 16 and the modifications thereof, because all of the borderlines 35 of the knitted fabrics are formed so as to intersect with the belt-like tightening portion 32a, the tightening portion 32a configures the ground structure that is common in the knitted fabric parts 31a, 31 b of the fabric main body portion 31 that are adjacent to the tightening portion 32a and all adjacent portions. However, for example, the ground structure of the tightening portion 32a including the strong tightening portion 321a and the weak tightening portion 322a can be configured to be the same as the ground structure of the knitted fabric part 31a having a strong tightening force. In this case, of the tightening portion 32a, only a section adjacent to the knitted fabric part 31a with a strong tightening force is formed into the ground structure that is identical to the ground structure of the fabric main body portion 31, and the ground structures of the knitted fabric part 31b with a weak tightening force and a part adjacent thereto become different.

Claims

1. A garment attached tightly to a body, comprising a belt-like tightening portion that has a strong tightening portion, which is a part having a strong tightening force, and a weak tightening portion, which is a part having a weaker tightening force than the strong tightening portion, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction, wherein, in the tightening portion, a yarn for reinforcing the tightening force is continuously knitted into a ground structure throughout the strong tightening portion and the weak tightening portion, and a knit structure of the yarn for reinforcing the tightening force has a greater number of looping structures in the strong tightening portion than the weak tightening portion, and has a greater number of insertion structures in the weak tightening portion than the strong tightening portion.

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2. A garment attached tightly to a body, comprising a belt-like tightening portion, wherein the tightening portion and at least a part of a fabric main body portion that is adjacent to the tightening portion comprise a common ground structure, the tightening portion has a strong tightening portion, which is a part having a strong tightening force, and a weak tightening portion, which is a part having a weaker tightening force than the strong tightening portion, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction, in the tightening portion, a yarn for reinforcing the tightening force is continuously knitted into the ground structure throughout the strong tightening portion and the weak tightening portion, and a knit structure of the yarn for reinforcing the tightening force has a greater number of looping structures in the strong tightening portion than the weak tightening portion, and has a greater number of insertion structures in the weak tightening portion than the strong tightening portion.

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3. A garment attached tightly to a body, comprising a belt-like tightening portion, wherein a fabric main body portion comprises a plurality of knitted fabric parts that are formed respectively from ground structures having different tightening forces, and border lines of the plurality of knitted fabric parts intersect with the belt-like tightening portion, the tightening portion has a strong tightening portion, which is a part having a strong tightening force, and a weak tightening portion, which is a part having a weaker tightening force than the strong tightening portion, where the strong tightening portion and the weak tightening portion are switched in a belt-like longitudinal direction,

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4. The garment according to any of claims 1 through 3, wherein the strong tightening portion has a part inclined in a longitudinal direction of the weak tightening portion.

Fig.1

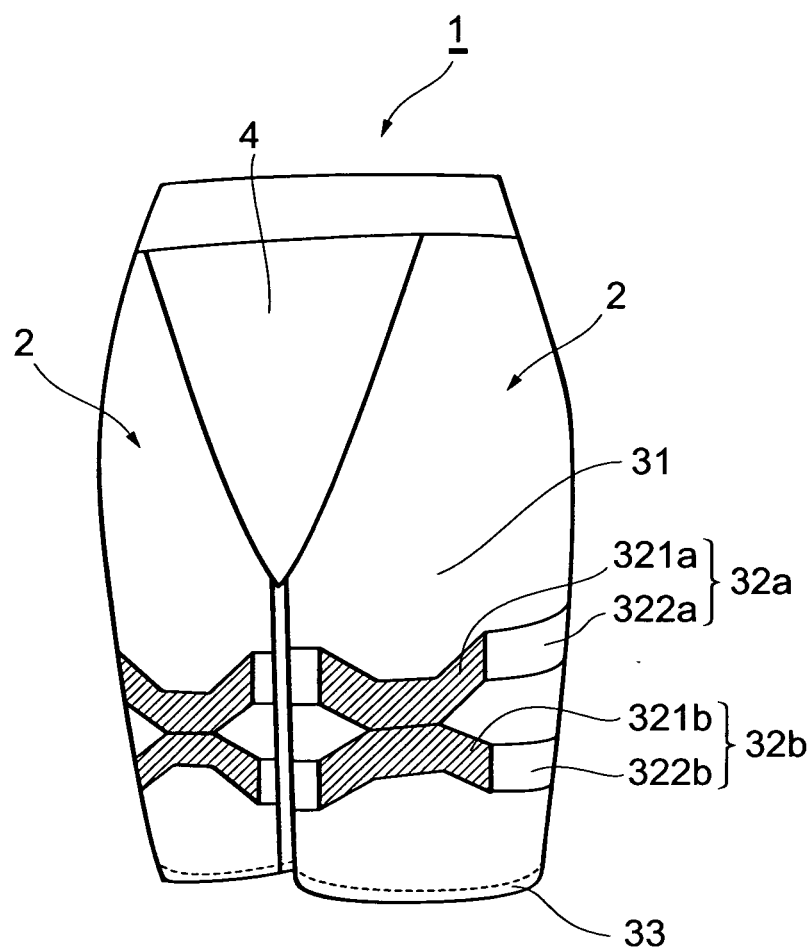


Fig.2

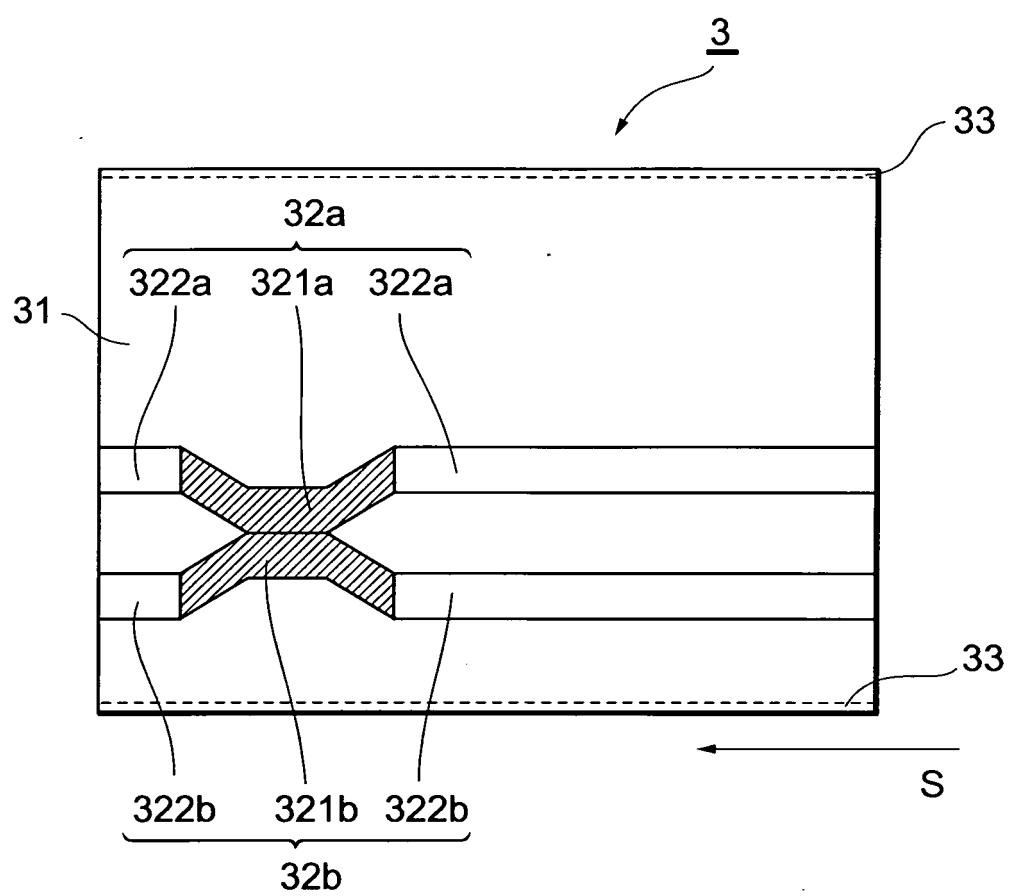


Fig.3

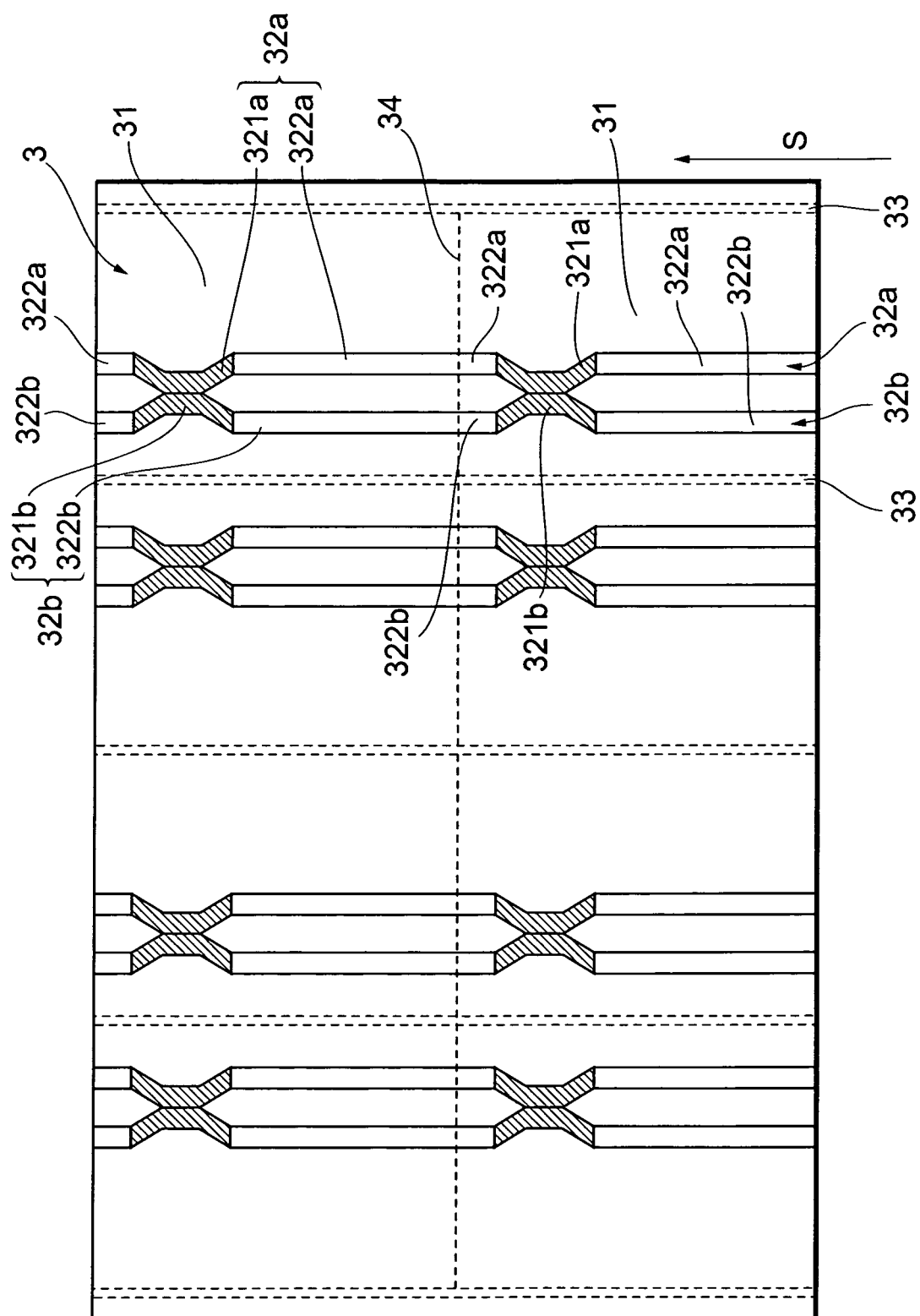


Fig.4

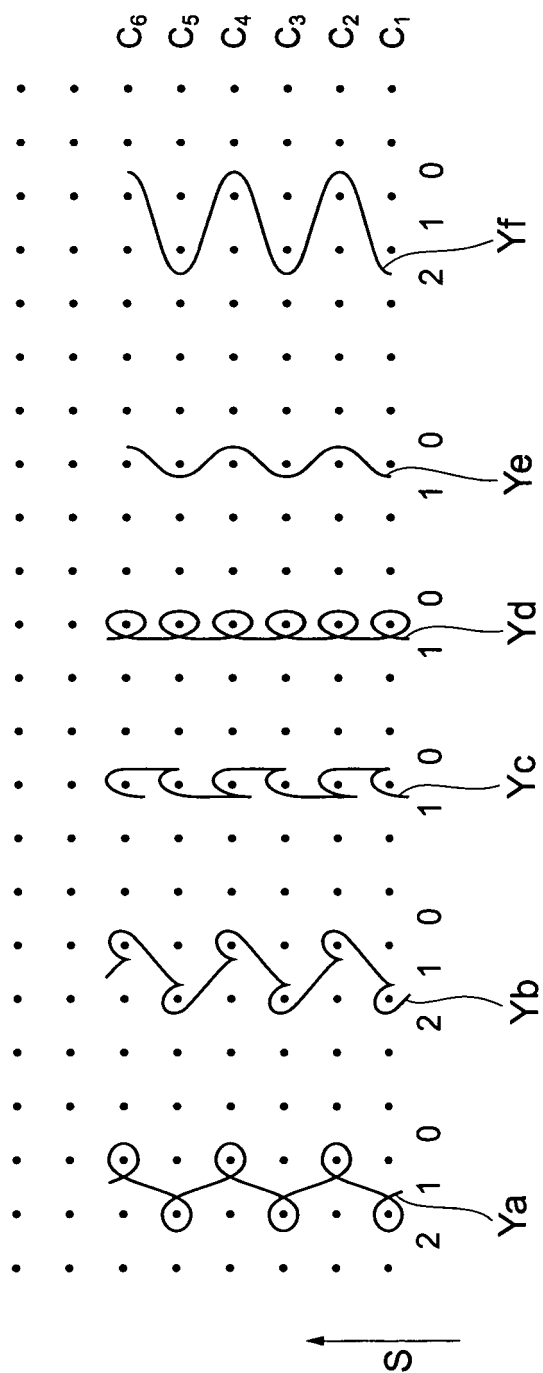


Fig.5

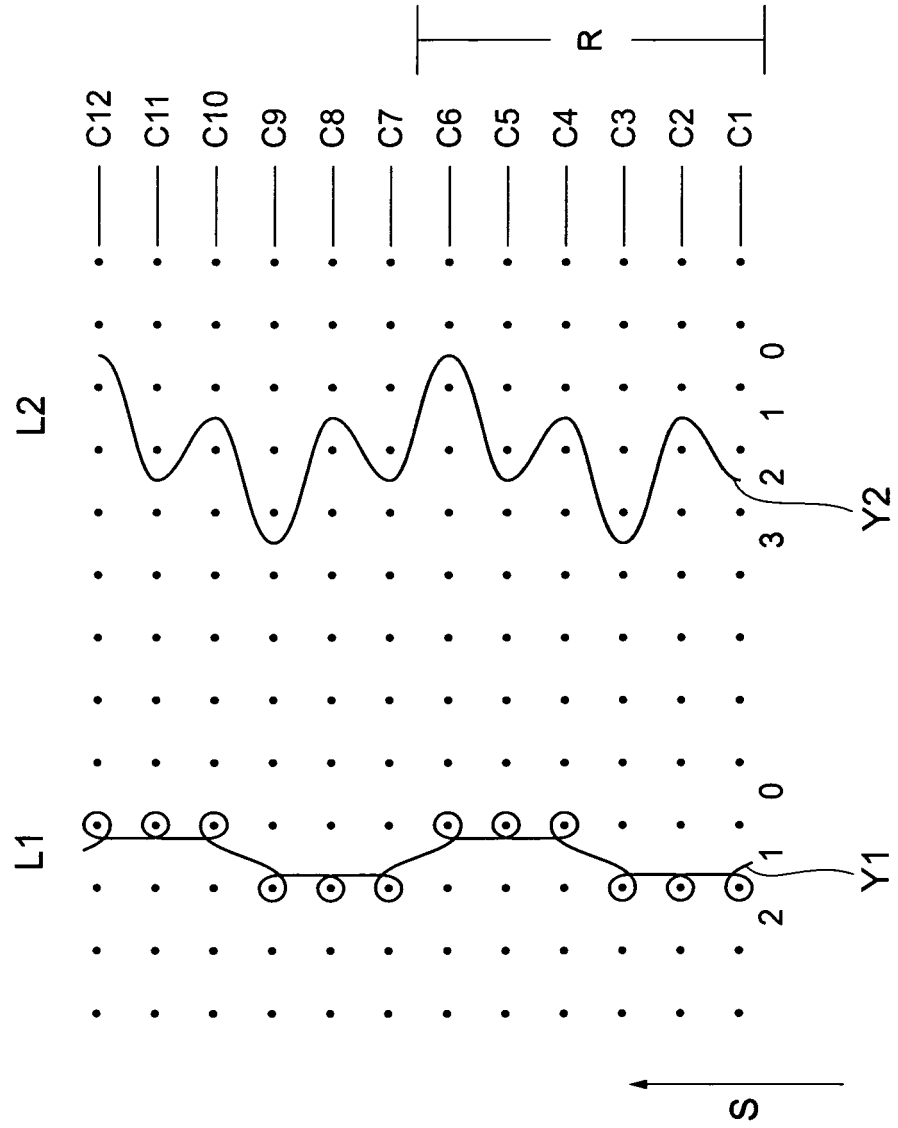


Fig.6

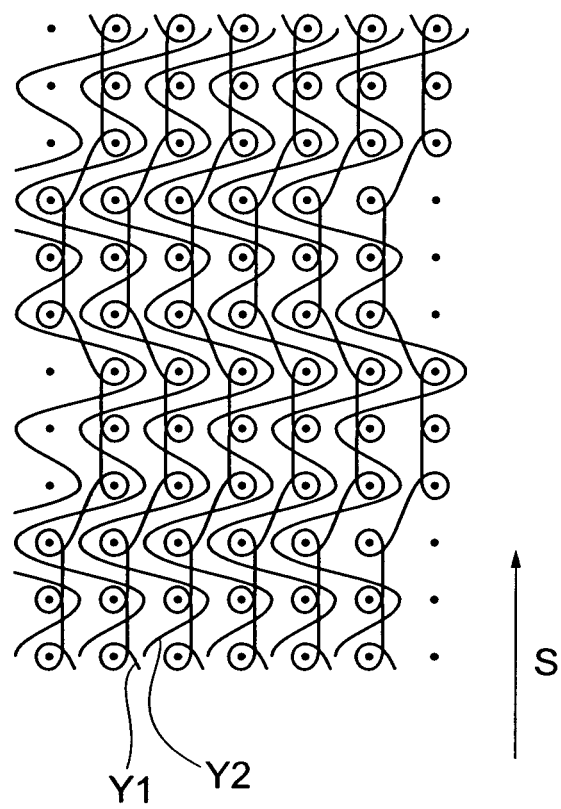


Fig.7

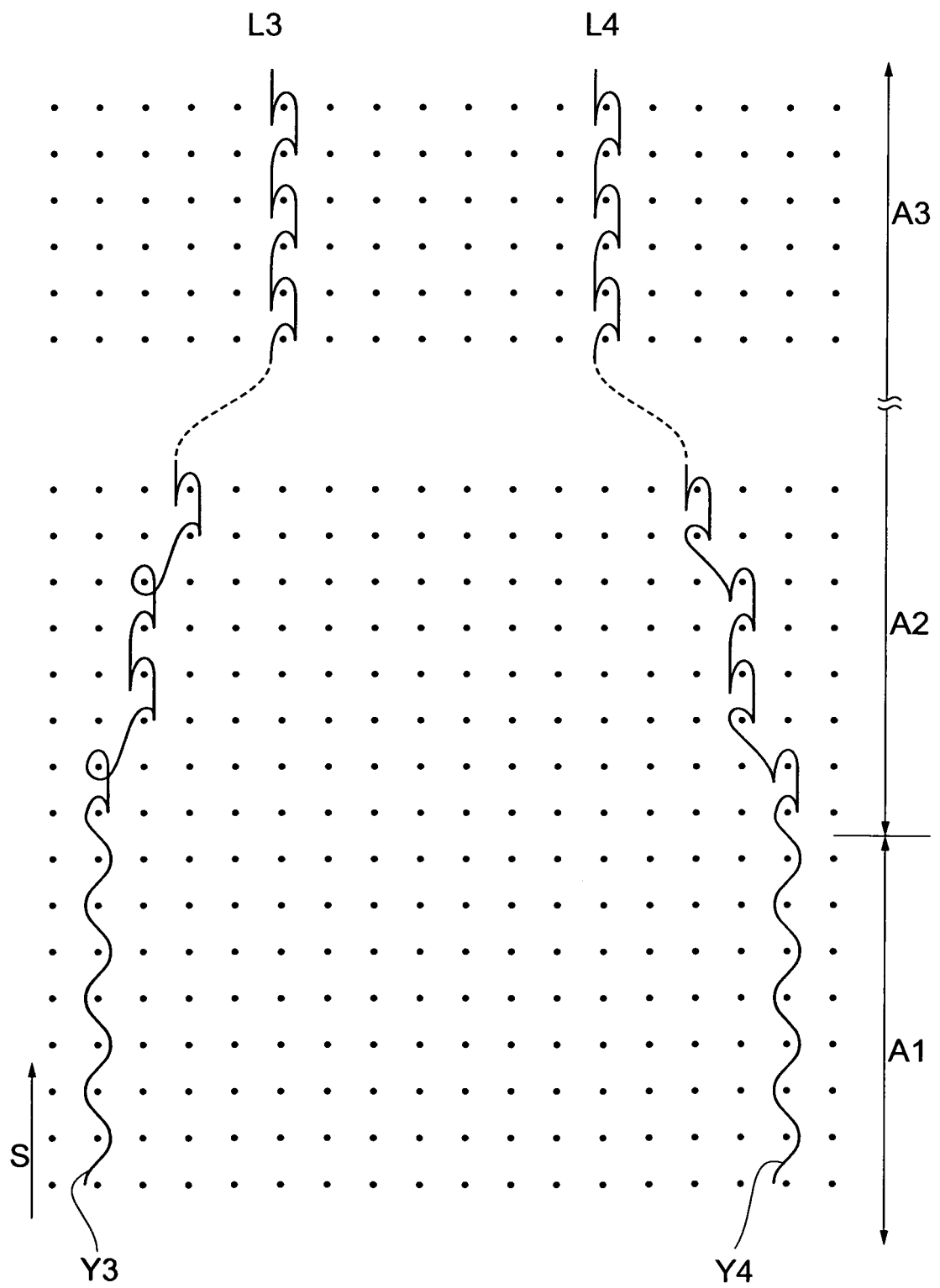


Fig. 8

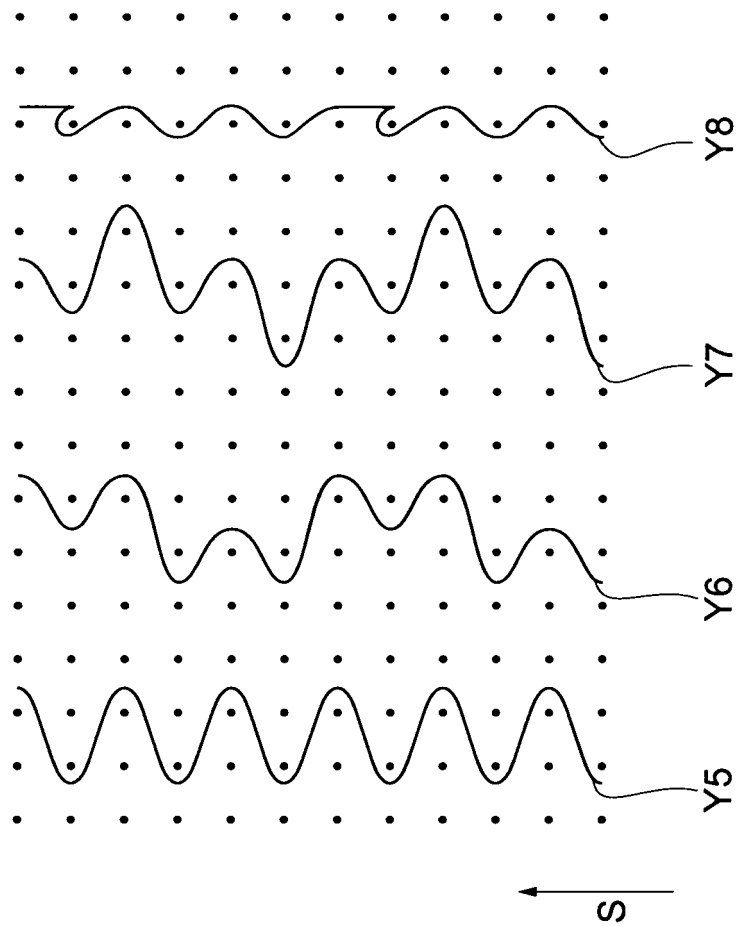


Fig. 9

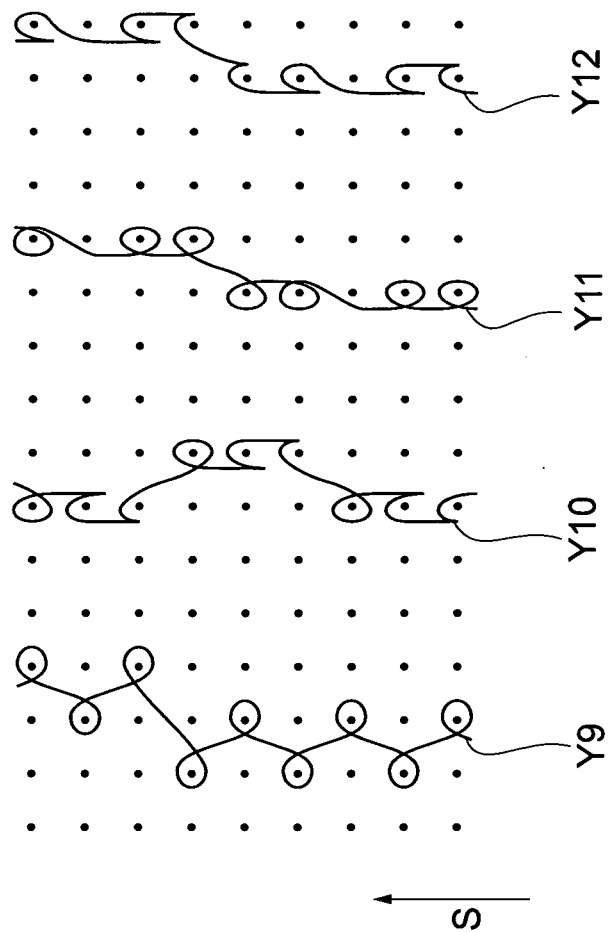


Fig. 10

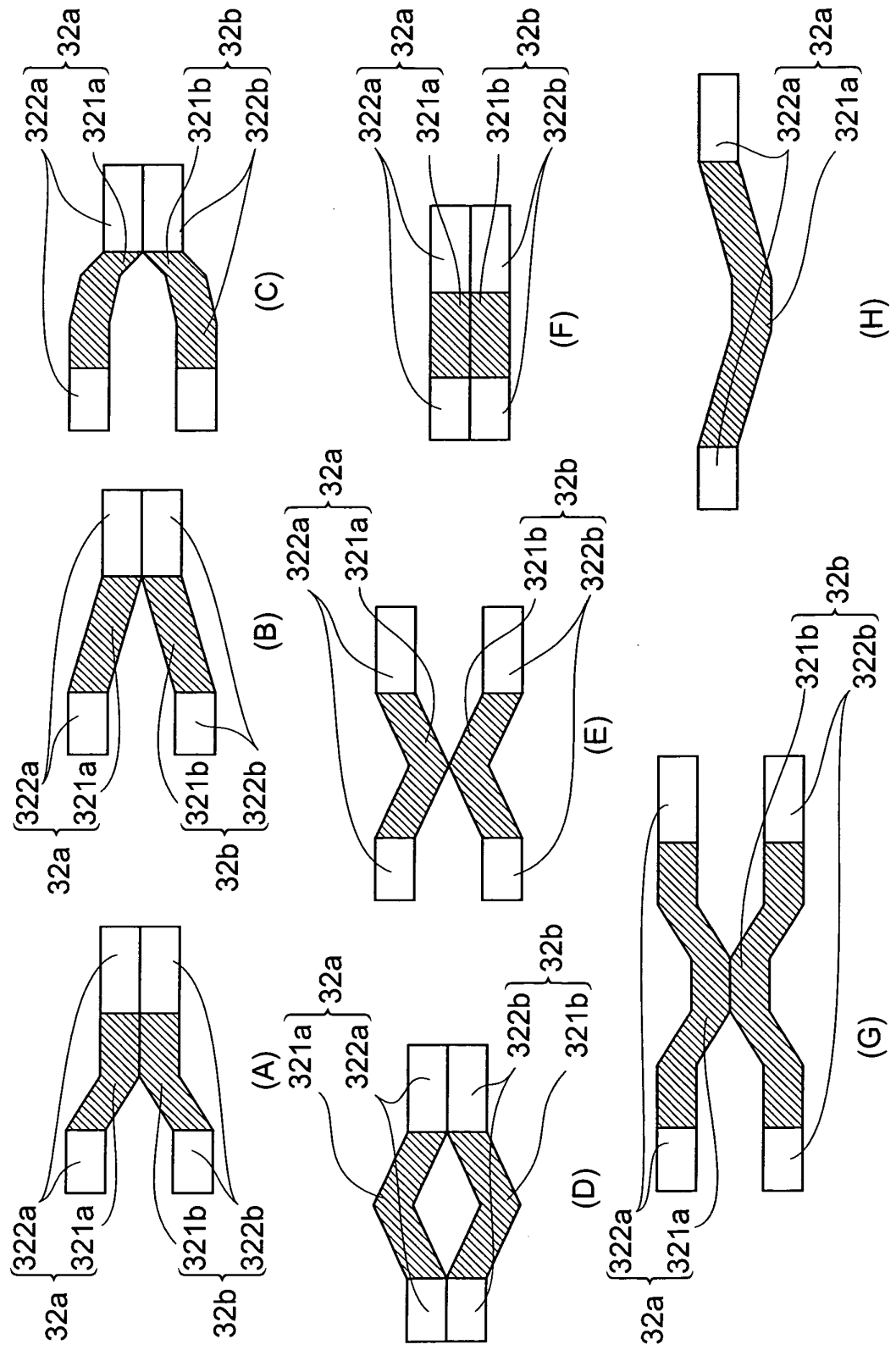


Fig.11

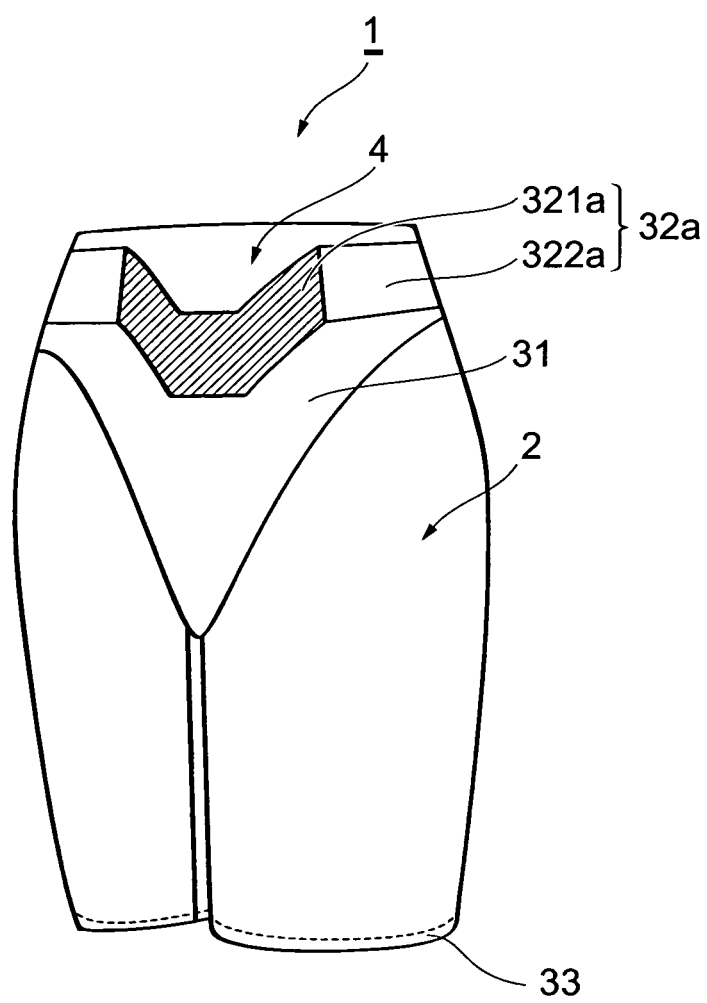


Fig.12

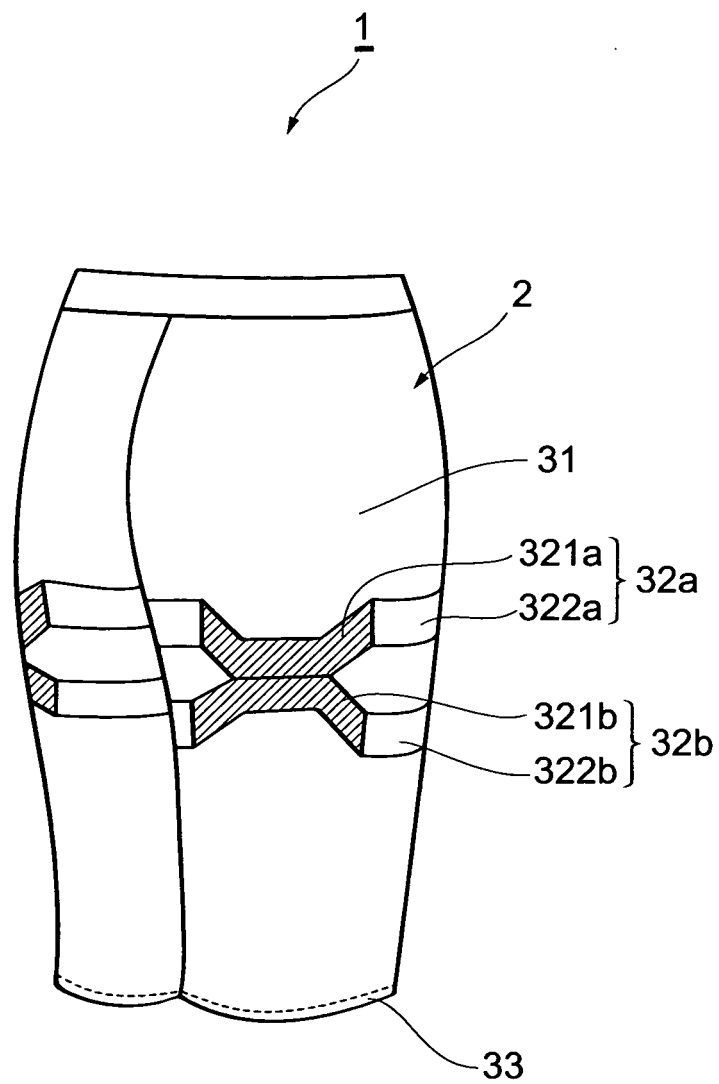


Fig.13

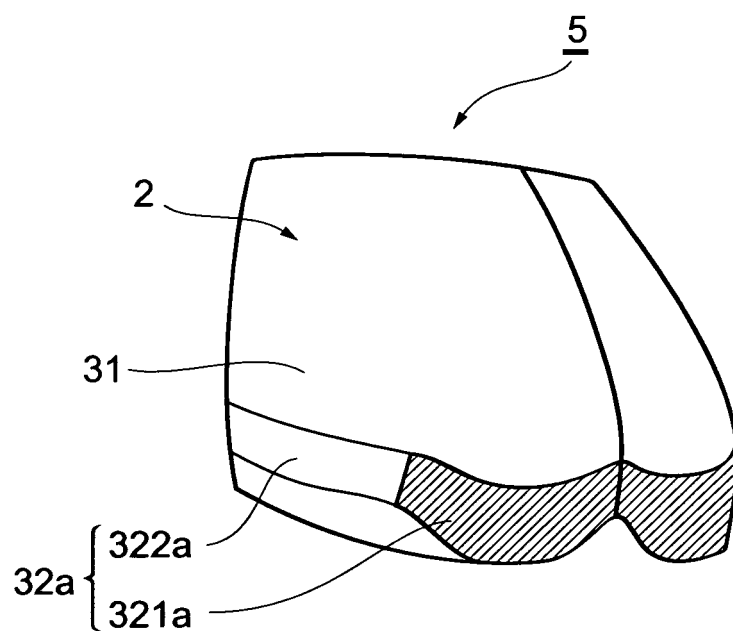


Fig.14

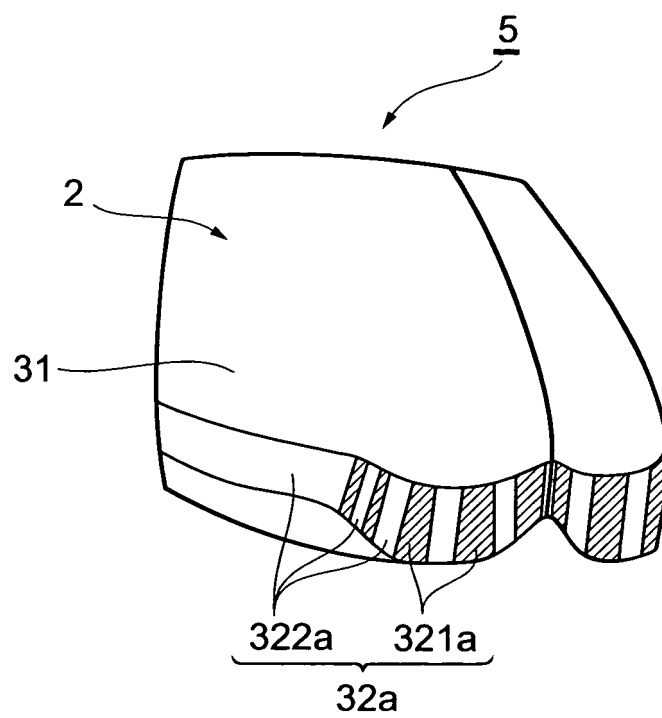


Fig.15

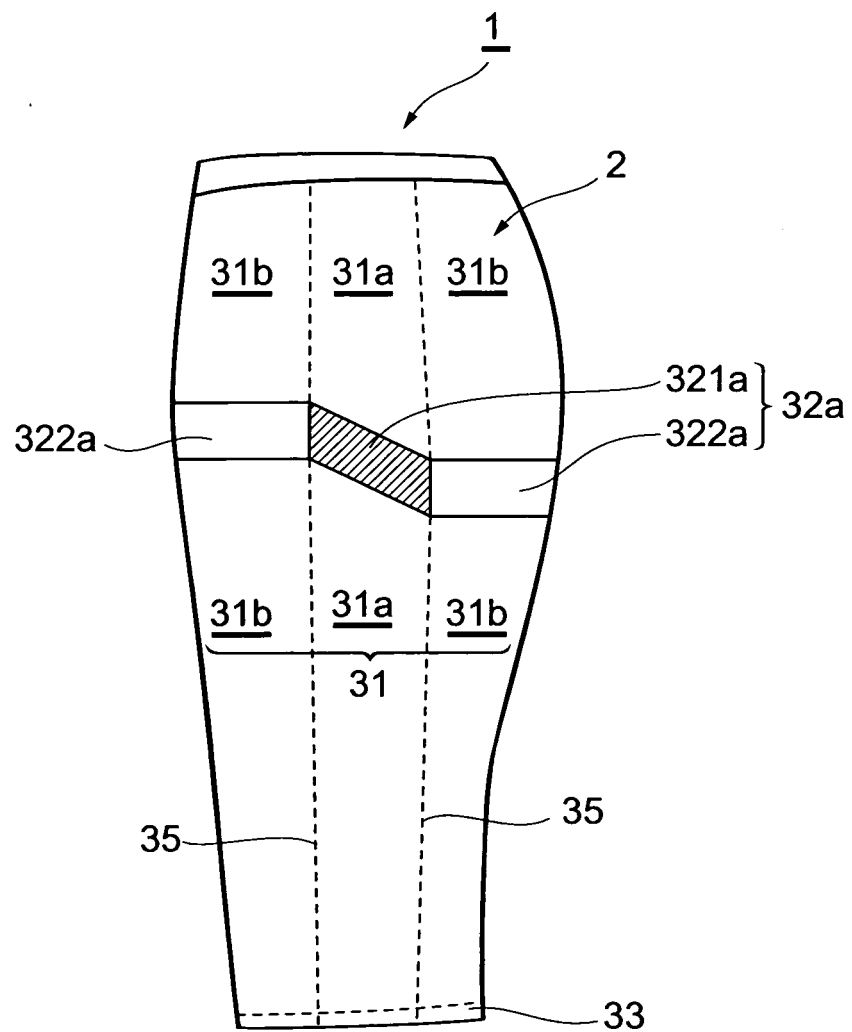


Fig.16

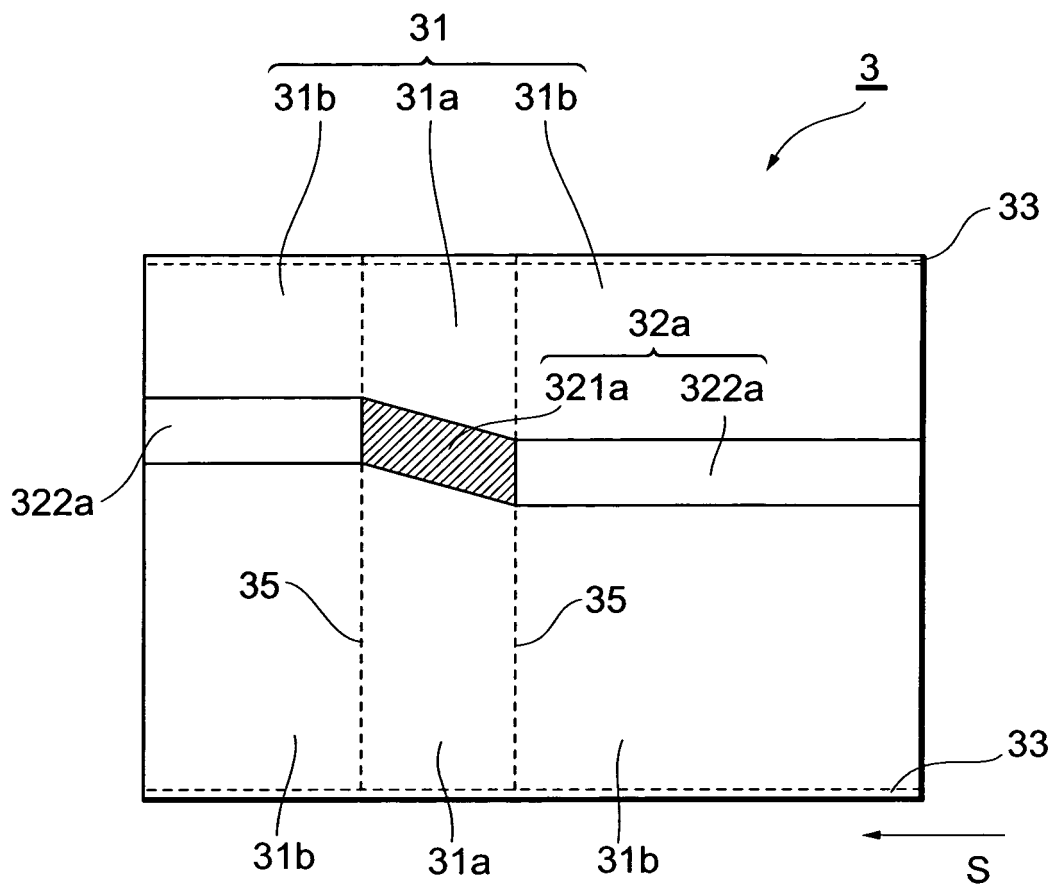
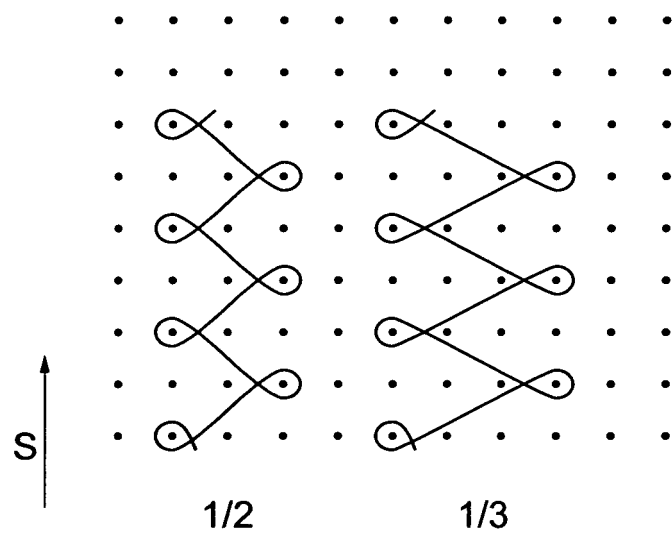


Fig.17



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/320455

A. CLASSIFICATION OF SUBJECT MATTER

A41C1/00(2006.01)i, A41C1/02(2006.01)i, A41C3/00(2006.01)i, D04B21/18
(2006.01)i, A41D7/00(2006.01)n

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, A41C1/02, A41C3/00, D04B21/18, A41D7/00

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	1996-2006
Kokai Jitsuyo Shinan Koho	1971-2006	Toroku Jitsuyo Shinan Koho	1994-2006

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.
A	JP 2004-339623 A (Wacoal Corp.), 02 December, 2004 (02.12.04), (Family: none)	1-4
A	JP 2002-324003 A (Wacoal Corp.), 18 November, 2004 (18.11.04), & WO 2004/093576 A1	1-4
A	JP 2001-49501 A (Triumph International (Japan), Ltd.), 20 February, 2001 (20.02.01), (Family: none)	1-4

☐ 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
19 December, 2006 (19.12.06)

Date of mailing of the international search report
26 December, 2006 (26.12.06)

Name and mailing address of the ISA/
Japanese Patent Office

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