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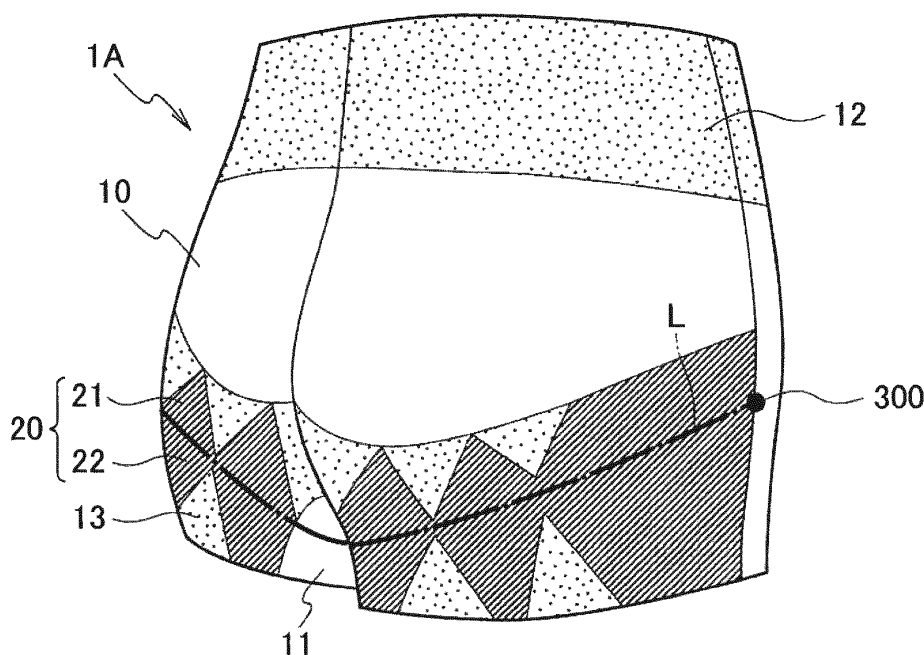
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(54) **GARMENT WITH CROTCH**

(57) This invention is a garment with a crotch, comprising: a tubular main portion (10) for covering an area around an abdomen and buttocks; and a tightening portion (20) having a desired area and having a tightening force stronger than that of the main portion (10), the tight-

ening portion being disposed to vertically span a virtual reference line (L) extending from left and right greater trochanters (300) to an under-crotch position of a wearer by a shortest path along skin of buttocks.

FIG. 1



Description

Technical Field

[0001] The present invention relates to a garment with a crotch.

Background Art

[0002] As for garments which fit human bodies, such as panty girdles, a sense of stability during wearing is important. For example, wear comfort of a garment is reduced if slippage such as ride-up occurs during wearing. Moreover, in the case of a garment having a shaping function, the occurrence of slippage during wearing may disable the garment from fulfilling the shaping function.

[0003] In bottom garments, examples of areas in which slippage is prone to occur during wearing include areas around gluteal folds. In particular, in the case of a panty girdle, the occurrence of slippage in an area around a gluteal fold worsens wear comfort, and makes it difficult to realize buttock lifting, which is one of the aims of a panty girdle. Accordingly, there have heretofore been devised various ways to prevent slippage and improve wear comfort in a gluteal fold portion of a bottom garment by modifying the shape and material of a tightening portion in the gluteal fold portion (e.g., see Patent Literature 1).

Citation List

Patent Literature

[0004] Patent Literature 1: Japanese Utility Model Registration No. 3014319

Summary of the Invention

Problems to be Solved by the Invention

[0005] However, even in the case where the shape, material, tightening force, and the like are modified in the gluteal fold portion as heretofore, it has been difficult to sufficiently prevent slippage and improve wear comfort in the gluteal fold portion.

[0006] In view of the above-described technical problem, the present invention proposes a garment with a crotch in which slippage prevention and wear comfort improvement during wearing are achieved.

Means for Solving the Problems

[0007] The present invention is a garment with a crotch which includes a tubular main portion for covering an area around an abdomen and buttocks; and a tightening portion having a desired area and having a tightening force stronger than that of the main portion, the tightening portion being disposed to vertically span a virtual reference line extending from left and right greater trochanters

to an under-crotch position of a wearer by a shortest path along skin of buttocks.

Effects of the Invention

[0008] The present invention can prevent slippage and improve wear comfort during the wearing of a garment with a crotch.

Brief Description of the Drawings

[0009]

[Fig. 1] Fig. 1 is a view for explaining a garment with a crotch according to an embodiment of the present invention.

[Fig. 2] Fig. 2 is a view for explaining the garment with a crotch of Fig. 1 and portions of the lower part of a human body.

[Fig. 3] Figs. 3 (a) to 3 (d) are views for explaining the relationship between a gluteal fold and a motion of the lower part of a human body.

[Fig. 4] Figs. 4 (a) to 4(d) are views for explaining the relationship between a reference line of a garment with a crotch of Fig. 1 and a motion of the lower part of a human body.

[Fig. 5] Figs. 5 (a) to 5(e) are views for comparing states before and after motion in garments with crotches of an example and a comparative example.

[Fig. 6] Fig. 6 (a) to 6 (c) are contour maps corresponding to the wearing states of Fig. 5 (a), 5(d), and 5(e).

[Fig. 7] Figs. 7 (a) to 7 (f) are views for comparing an example and comparative examples at the time of wearing.

[Fig. 8] Fig. 8 is a view for explaining a garment with a crotch according to a first modification.

[Fig. 9] Fig. 9 is a view for explaining a garment with a crotch according to a second modification.

[Fig. 10] Fig. 10 is a view for explaining a garment with a crotch according to a third modification.

Modes for Carrying Out the Invention

[0010] Hereinafter, a garment with a crotch according to an embodiment of the present invention will be described with reference to the drawings. The garment with a crotch described in the embodiment of the present invention is a garment with a crotch portion (crotch portion), such as a panty girdle. An explanation is made using a women's panty girdle here. The present invention can be applied to not only a panty girdle but also any garment with a crotch which is formed to cover buttocks and in which ride-up in buttock portions needs to be prevented, such as panties (in particular, panties with a shaping function), panty stocking, tights, leggings, swimwear, leotard, bodysuit, athletic tights, men's bottom garment, or stretch trousers (pants).

[0011] Fig. 1 shows a rear perspective view of a panty girdle 1A as a garment with a crotch according to the embodiment. It should be noted that Fig. 1 shows the shape of the panty girdle 1A as worn by a human. Moreover, Fig. 2 shows a rear view of the panty girdle 1A according to the embodiment of the present invention and the positional relationship thereof with portions of a human body. Specifically, Fig. 2 shows the positions of greater trochanters 300, an under-crotch position 301, and gluteal folds 302. It should be noted that a position for determining an "inseam length" is regarded as the under-crotch position 301 here. Moreover, the term "inseam length" means the distance from a floor surface to a lowest point of the crotch portion in a standing position.

[0012] As shown in Fig. 1, the panty girdle 1A includes a tubular main portion 10 for covering an area around an abdomen and buttocks, and has the property of fitting the buttocks and the abdomen of a wearer. As shown in Fig. 2, a hip tightening portion 20 having a tightening force stronger than that of the main portion 10 and having a desired area is provided in the panty girdle 1A. The hip tightening portion 20 is provided to vertically span a reference line L which is located above the gluteal folds 302 of the wearer and which is a virtual line extending from the left and right greater trochanters 300 to the under-crotch position 301 of the wearer by a shortest path along the skin of the buttocks. The hip tightening portion 20 includes, for example, an upper tightening portion 21 above the reference line L and a lower tightening portion 22 below the reference line L. Moreover, the panty girdle 1A includes a crotch portion 11 provided on a crotch portion of the wearer, a waist support portion 12 provided on a waist portion of the wearer, and a supplemental tightening portion 13 provided between the main portion 10 and the hip tightening portion 20.

[0013] Here, a portion of the panty girdle 1A except for the crotch portion 11, the waist support portion 12, the supplemental tightening portion 13, and the hip tightening portion 20 is referred to as the main portion 10. The main portion 10 is formed of a stretch material to fit the wearer. For example, the main portion 10 is formed of two-way raschel, two-way tricot, power net, satin net, triconet, stretch jersey, or knitted fabric using stretch lace.

[0014] The crotch portion 11 is formed of, for example, the same material as the main portion 10. Alternatively, the crotch portion 11 may be part of the main portion 10 or the hip tightening portion 20.

[0015] The waist support portion 12 is provided on a waist portion of the wearer. For example, the waist support portion 12 is formed of the same material as the main portion 10. Moreover, the waist support portion 12 is formed to have a tightening force stronger than that of the main portion 10 by using fabric knitting, a patch, resin print (resin finish), opal finish (chemical print), or the like. The panty girdle 1A reduces the bulging of excess fat in the abdomen of the wearer by the tightening force of the waist support portion 12 to support the waist portion, and can create a beautiful silhouette.

[0016] The waist support portion 12 is, for example, formed in the shape of a belt extending from the front portion (front body) to the back portion (back body) of the wearer through both side portions. The width of the waist support portion 12 from the front portion to the back portion is not limited to a constant width. It should be noted that the shape of the waist support portion 12 is not limited as long as the waist support portion 12 can support the waist portion of the wearer. Moreover, the waist support portion 12 does not need to have a constant tightening force over the entire area from the front portion to the back portion, and may support the waist portion by a plurality of different tightening forces in steps.

[0017] The supplemental tightening portion 13 is provided adjacent to the main portion 10 and the hip tightening portion 20 in a back body of the panty girdle 1A. For example, the supplemental tightening portion 13 is formed of the same material as the main portion 10. Moreover, the supplemental tightening portion 13 is formed to have a desired area and to have a tightening force stronger than that of the main portion 10 (so-called power switching) and be more relax than the hip tightening portion 20 by using knitting structure change (so-called knitting structure change), a patch, resin print (resin finish), opal finish (chemical print), or the like. In the example shown in Fig. 1, the supplemental tightening portion 13 is provided in gaps within the hip tightening portion 20 along the reference line L.

[0018] It should be noted that though the supplemental tightening portion 13 is provided in the panty girdle 1A in this example, a configuration without the supplemental tightening portion 13 may be employed depending on specifications of the panty girdle.

[0019] In Figs. 1 and 2, for simplicity of explanation, different tightening forces are hatched with different patterns. In one example of the panty girdle 1A described with reference to Figs. 1 and 2, the main portion 10 has a weakest tightening force, the waist support portion 12 and the supplemental tightening portion 13 has a tightening force stronger than that of the main portion 10, and the hip tightening portion 20 has a strongest tightening force in the panty girdle 1A. It should be noted that the combination of different tightening forces described with reference to Figs. 1 and 2 is one example, and the present invention is not limited to this.

[0020] Moreover, in Fig. 2, the shape of the hip tightening portion 20 is partially simplified to facilitate the understanding the positional relationship among the hip tightening portion 20, the reference line L, and surroundings thereof.

[0021] As described previously, the hip tightening portion 20 is provided to vertically span the reference line L extending by a shortest path along the skin of the buttocks from the left and right greater trochanters 300 to the under-crotch position 301 of the wearer. Since the reference line L is located above the gluteal folds 302, the hip tightening portion 20 is provided above the gluteal folds 302. It should be noted that though the hip tightening portion

20 covers part of the gluteal folds 302 from above in Fig. 2, part of the hip tightening portion 20 may be located on the gluteal folds 302 as shown in Fig. 2, or the hip tightening portion 20 may be completely out of the gluteal folds 302.

[0022] Moreover, for example, an angle α formed by a horizontal line passing through the greater trochanter 300 of the wearer and the reference line L on which the hip tightening portion 20 is provided is preferably determined by measuring the positional relationship between the greater trochanter 300 and the under-crotch position 301 for a plurality of test subjects. Specifically, the angle α is preferably in the range of 12 to 32 degrees, more preferably in the range of 17 to 28 degrees. Thus, the hip tightening portion 20 can be provided in an area covering the reference line L.

[0023] It should be noted that as test subjects on which measurement for determining one example of the above-described angle α is performed, a plurality of test subjects are selected for each of different sizes of panty girdles to wear, and therefore this angle can be applied to each size.

[0024] The hip tightening portion 20 has a shaping function for lifting buttocks by a strong tightening force. By boosting the volumes of upper portions of bulging portions of buttocks of the wearer, a beautiful shape of the hip can be created. For example, the hip tightening portion 20 is formed of the same material as the main portion 10. Moreover, the hip tightening portion 20 is formed to have a tightening force (low stretchability) stronger than those of the main portion 10 and the waist support portion 12 by using fabric knitting, a patch, resin print (resin finish), opal finish (chemical print), or the like. It should be noted that the hip tightening portion 20 does not need to have a constant tightening force over the entire area, and may shape buttocks in steps by a plurality of different tightening forces.

[0025] It should be noted that though in the above-described, an example in which the hip tightening portion 20 and the supplemental tightening portion 13 are formed integrally with the main portion 10 is described, the present invention is not limited to this. For example, the hip tightening portion 20 and the supplemental tightening portion 13 may be formed on another component different from the main portion to be attached to the main portion 10. In that case, it is conceivable that edge portions of the above-described another component except for an upper edge portion is attached to the main portion 10 by sewing, bonding, or the like. This does not produce a joint by sewing or the like in the upper edge portion, and is preferable from the viewpoint of appearance.

[0026] Moreover, the hip tightening portion 20 has the function of preventing slippage occurring near the gluteal fold 302 by being disposed to span the reference line L.

[0027] Humans make various motions in daily life such as walking motions, motions between standing position and seated position, and the like. When these motions are made, areas corresponding to the gluteal folds 302

are portions in which the change rate (stretch rate) of skin is large. A change of the gluteal fold 302 caused by a motion will be described with reference to Figs. 3 (a) to 3 (d). Figs. 3 (a) and 3 (b) show a line connecting the right greater trochanter 300 and the under-crotch position 301 of a human in stationary standing position through the gluteal fold 302. Specifically, Fig. 3 (a) is a rear perspective view of buttocks of a human, and Fig. 3(b) is a rear view of buttocks of the human.

[0028] Fig. 3 (b) shows the vertical change rate (stretch rate) of skin at the time of lifting the right leg (one leg lifting) with reference to stationary time. As shown in Fig. 3 (b), it can be seen that the change rate of an area corresponding to the gluteal fold 302 at the time of leg lifting is 1.5 or more times that of stationary time which is 1.0. Moreover, the change rate in an area lower than an area containing the gluteal fold 302 is lower than that of the gluteal fold 302, and the change rate in areas above the area containing the gluteal fold 302 gradually decreases to 1.2 to 1.0 times with increasing distance from the gluteal fold 302 toward above.

[0029] Moreover, Figs. 3 (c) and 3 (d) are perspective views of buttocks of a human. Fig. 3 (c) shows the position of the gluteal fold 302 of a human in stationary standing position. Moreover, Fig. 3 (d) shows a change from a gluteal fold position 302A before leg lifting at the time of leg lifting (one leg lifting). Comparison between Fig. 3 (c) and Fig. 3 (d) reveals that a large space S is produced between the gluteal fold position 302A before leg lifting and the skin of the human body at the time of leg lifting, and leg lifting causes the skin of the gluteal fold 302 to be stretched and causes the shape and dimensions thereof to be changed.

[0030] Accordingly, in the case where a tightening portion is provided in areas corresponding to the gluteal folds 302, the tightening portion moves with changes of the gluteal folds 302 in accordance with motions of the lower part of a human body such as walking and sitting, and the ride-up of a garment is prone to occur. Meanwhile, the reference line L extending from the greater trochanter 300 to the under-crotch position 301 of a wearer is an area in which the change rate of skin is small, compared to the gluteal fold 302.

[0031] Referring to Figs. 4 (a) to 4(d), a change in the reference line L extending by a shortest path along the skin of the buttocks from the greater trochanters 300 to the under-crotch position 301 caused by a motion will be described. Figs. 4 (a) and 4 (b) are views showing the reference line L extending by a shortest path along the skin from the right greater trochanter 300 to the under-crotch position 301 of a human in stationary standing position. Specifically, Fig. 4 (a) is a rear perspective view of buttocks of the human, and Fig. 4 (b) is a rear view of buttocks of the human. Similar to Fig. 3 (b), Fig. 4 (b) shows the change rate of skin at the time of lifting the right leg with reference to stationary time. As shown in Fig. 4 (b), the change rate of an area corresponding to the reference line L at the time of leg lifting is approxi-

mately 1.2 times that of stationary time which is 1.0, and the area corresponding to the reference line L has a smaller change rate than the area corresponding to the gluteal fold 302.

[0032] Moreover, Fig. 4 (c) is a perspective view showing the position of the reference line L at the time of stationary standing, and Fig. 4 (d) shows a change at the time of lifting the right leg from a reference line position LA before leg lifting. Comparison between Fig. 4 (c) and Fig. 4(d) reveals that a space S between the reference line position LA before leg lifting and the skin of the human body is small at the time of leg lifting, and a stretch of the skin in the area corresponding to the reference line L caused by leg lifting is small. This is also revealed by comparison between

[0033] Fig. 3 (d) and Fig. 4 (d), and it can be seen that a change in the skin in the area corresponding to the reference line L caused by leg lifting is smaller than that of the gluteal fold 302.

[0034] Accordingly, in the case where a tightening portion is provided in the area corresponding to the reference line L having a smaller change rate of skin than the gluteal folds 302, when a motion of the lower part of a human body such as walking or sitting is made, the movement of the tightening portion is less likely to occur, and the ride-up of the panty girdle 1A in areas corresponding to buttocks is also less likely to occur. In other words, in the panty girdle 1A, the hip tightening portion 20 is provided in an area containing an area having a lower stretch rate than an area in which the stretch rate of skin of buttocks is maximum, and ride-up in the hip tightening portion 20 and areas above and below the hip tightening portion 20 can thereby be prevented.

[0035] The hip tightening portion 20 can prevent slippage at the time of wearing by being disposed to span the reference line L above the position of the gluteal fold 302, even in the form of a simple belt. However, for example, the hip tightening portion 20 is preferably formed to have a zigzag ridge such as shown in Fig. 1 (it should be noted that the zigzag can also be expressed as an intermittently protruding shape). Specifically, the upper tightening portion 21 has a shape which tapers off upward with respect to the reference line L, and is disposed to include bottom portions continuous with each other on the reference line L. The ridge of the upper tightening portion 21 is formed to have a zigzag shape. Moreover, the lower tightening portion 22 has a shape which tapers off downward with respect to the reference line L, and is disposed to include bottom portions continuous with each other on the reference line L (on the lower side). The ridge of the lower tightening portion 22 is formed to have a zigzag shape.

[0036] Specifically, as shown in Fig. 2, the upper tightening portion 21 has a shape in which the lengths of lines crossing the upper tightening portion 21 along a line L1 parallel to the reference line L decrease with increasing distance of the line L1 from the reference line L. It should be noted that though an example having a shape in which

the lengths of lines crossing the upper tightening portion 21 decrease with increasing distance of the line L1 from the reference line L is taken in this example, the present invention is not limited to this. For example, the upper tightening portion 21 may have a triangular shape, a spindle shape, a wavy shape, or the like such that an upper-half portion has a smaller area than a lower-half portion when the entire length of the upper tightening portion 21 in the vertical direction (i.e., direction intersecting the reference line L) is virtually divided into the two half portions.

[0037] Moreover, as shown in Fig. 2, the lower tightening portion 22 has a shape in which the lengths of lines crossing the lower tightening portion 22 along a line L2 parallel to the reference line L decrease with increasing distance of the line L2 from the reference line L. It should be noted that though an example having a shape in which the lengths of lines crossing the lower tightening portion 22 decrease with increasing distance of the line L2 from the reference line L is taken in this example, the present invention is not limited to this. For example, the lower tightening portion 22 may have a triangular shape, a spindle shape, a wavy shape, or the like such that a lower-half portion has a smaller area than an upper-half portion when the entire length of the lower tightening portion 22 in the vertical direction (i.e., direction intersecting the reference line L) is virtually divided into the two half portions. Alternatively, the upper tightening portion 21 and the lower tightening portion 22 have shapes in which unit areas cut along the lines L1 and L2 parallel to the reference line L decrease with increasing distance of the lines L1 and L2 from the reference line L.

[0038] In the example shown in Figs. 1 and 2, in the upper tightening portion 21, approximately triangular shapes having bases on the reference line L side are disposed near the left and the right of the under-crotch position 301, and approximately trapezoidal shapes having bases on the reference line L side are disposed near the left and right greater trochanters 300. Moreover, in the lower tightening portion 22, approximately triangular shapes (inverted triangular shape) having bases on the reference line L side are disposed near the left and the right of the under-crotch position 301, and approximately trapezoidal shapes (trapezoidal shape in which a lower base is shorter than an upper base) having bases on the reference line L side are disposed near the left and right greater trochanters 300. Accordingly, in the example shown in Figs. 1 and 2, the whole of the upper and lower tightening portions 21 and 22 is formed in an approximately diamond shape tapering off upward and downward near the left and the right of the under-crotch position 301, and includes approximately diamond shapes disposed along the reference line L. In other words, the hip tightening portion 20 is formed by a group of a plurality of independent regions.

[0039] In the example shown in Figs. 1 and 2, a portion corresponding to the base side of the upper tightening portion 21 forming a triangular shape and a portion corresponding to the upper base of the lower tightening por-

tion 22 forming a trapezoidal shape in which a lower base has a smaller width are integrally formed, and upper and lower portions form an approximately diamond shape. However, the present invention is not limited to this. For example, portions corresponding to upper sides of polygonal shapes constituting the upper tightening portion and portions corresponding to bases of polygonal shapes of the lower tightening portion may be formed to partially overlap with each other. Moreover, for example, if a tightening force becomes maximum in the vicinity of the reference line L, the upper tightening portion and the lower tightening portion may be formed to be separated from each other. In that case, effects similar to those of the panty girdle 1A according to the present embodiment can also be obtained.

[0040] It should be noted that though the hip tightening portion 20 is formed in an approximately diamond shape in the present embodiment, the inside area of the approximately diamond shape may be formed to have a dot pattern, a grid pattern, or a slit pattern by using, for example, resin print, knitting structure change, opal finish, or the like. In that case, effects similar to those of the panty girdle 1A according to the present embodiment can also be obtained.

[0041] Since the ridges of the upper tightening portion 21 and the lower tightening portion 22 are formed in zigzag shapes, the panty girdle 1A can smoothly move volumes of buttocks of a wearer, and can create a beautiful shape of a hip in buttock lifting. For example, in the case where the ridges of the upper tightening portion 21 and the lower tightening portion 22 are not zigzag but are simple straight lines, curved lines, or the like, a step is formed at a boundary between the main portion 10 and the hip tightening portion 20 in a hip portion of a wearer. Meanwhile, by forming the ridges of the upper tightening portion 21 and the lower tightening portion 22 in zigzag shapes, a step can be prevented from being formed in the hip portion. Moreover, since the ridges of the upper tightening portion 21 and the lower tightening portion 22 are formed in zigzag shapes, followability to a stretch of skin of buttocks caused by a motion of a wearer is excellent. Thus, not only a beautiful silhouette but also wear comfort can be obtained.

[0042] In the case where the supplemental tightening portion 13 is provided as shown in Fig. 1, the supplemental tightening portion 13 more relaxed than the upper tightening portion 21 and the lower tightening portion 22, together with the upper tightening portion 21 and the lower tightening portion 22, can create a beautiful shape of a hip while lifting the hip. The same is true in the case where the supplemental tightening portion 13 does not exist and the supplemental tightening portion 13 is integrated with the main portion 10.

[0043] Moreover, since the ridges of the upper tightening portion 21 and the lower tightening portion 22 are formed in zigzag shapes, the panty girdle 1A can shape a hip and prevent ride-up. Specifically, the reference line L connecting the greater trochanter 300 and the under-

crotch position 301 and serving as a reference position for the hip tightening portion 20 is provided above an area in which the change rate of the skin of the gluteal fold 302 and the like during a motion is maximum. Accordingly, an area corresponding to the reference line L is less prone to be affected in accordance with a stretch of skin caused by a motion compared to the gluteal fold 302, but is also stretched by a motion slightly (approximately 1.2 to 1.0 times). Accordingly, ride-up may occur. Thus, by forming the ridges of the upper tightening portion 21 and the lower tightening portion 22 in zigzag shapes, the panty girdle 1A stretches in accordance with motions of buttocks during a motion, and can prevent ride-up and obtain wear comfort. Moreover, with ride-up prevention, a shaping function of the panty girdle 1A is also maintained for a longer time.

[0044] In the case where the supplemental tightening portion 13 is provided as shown in Fig. 1, the supplemental tightening portion 13 more relaxed than the upper tightening portion 21 and the lower tightening portion 22, together with the upper tightening portion 21 and the lower tightening portion 22, can prevent ride-up. The same is true in the case where the supplemental tightening portion 13 does not exist and the supplemental tightening portion 13 is integrated with the main portion 10.

[0045] In the hip tightening portion 20, the upper tightening portion 21 particularly greatly exerts the function of shaping a hip. Moreover, the lower tightening portion 22 particularly greatly exerts the function of preventing ride-up.

[0046] It should be noted that though the length of the panty girdle 1A has not been mentioned in the above description, the function of preventing ride-up can be exerted in panty girdles in a wide range of lengths from a short length to a long length. Heretofore, there has been a problem that ride-up is prone to occur particularly in panty girdles having short lengths. Accordingly, a great effect is exerted particularly in panty girdles having short lengths. Moreover, though the panty girdle 1A having a shaping function has been described as an example here, the hip tightening portion 20 can be provided to prevent ride-up even in a garment with a crotch without a shaping function (buttock lifting function).

[Example]

[0047] Referring to Figs. 5 (a) to 7(f), an evaluation of an example in which the panty girdle 1A according to the embodiment is worn will be described. A panty girdle (panty girdle having a short length) having a length of approximately 5 cm from the under-crotch position 301 is used as the panty girdle 1A.

[0048] Fig. 5 (a) shows a near nude state in which T-back shorts are worn. Moreover, Fig. 5 (b) shows a state before motion in which a panty girdle having a short length (length from the under-crotch position is approximately 5 cm) as a conventional garment with a crotch is worn. Further, Fig. 5 (c) shows a state before motion in

which the panty girdle 1A according to the embodiment is worn. Furthermore, Fig. 5 (d) shows a state shot after motion (mainly motion of the lower part of a human body) is made in the panty girdle having a short length worn in Fig. 5 (b). Moreover, Fig. 5(e) shows one example of a state after motion is made in the panty girdle 1A worn in Fig. 5 (c) under the same conditions as in Fig. 5 (d). It should be noted that wearers in Figs. 5 (a) to 5(e) are the same person, and Figs. 5 (a) to 5(e) faithfully show images obtained by taking pictures of buttocks.

[0049] When the state (Fig. 5 (b)) of wearing the conventional panty girdle having a short length and the state (Fig. 5 (c)) of wearing the panty girdle 1A before motion are compared, there are no significant differences between the states of wearing the panty girdles. In the state (Fig. 5 (d)) of wearing the conventional panty girdle having a short length, it can be seen that motion causes bottom edge portions of the panty girdle to ride up, and causes a deformed wearing condition in which the bottom edge portions of the panty girdle dig into excess fat of the buttocks and in which the excess fat protrudes from the bottom edge portions of the panty girdle. Meanwhile, in the state (Fig. 5 (e)) of wearing the panty girdle 1A, it can be seen that motion does not cause ride-up.

[0050] Figs. 6 (a) to 6(c) are views showing contour lines recorded corresponding to Figs. 5 (a), 5(d), and 5 (e), respectively. Comparison between the state (Fig. 6 (a)) in which buttocks are in a near nude state and the state of Fig. 6 (b) in which the conventional panty girdle having a short length is worn reveals that in the case of Fig. 6 (b) where the conventional panty girdle having a short length is worn, the positions of hip tops after motion are lower, and the silhouette of the hip becomes worse. Moreover, comparison among Figs. 6 (a) to 6(c) reveals that when the panty girdle 1A is worn, the positions of hip tops are highest, slippage caused by motion is less prone to occur, and a beautiful shape of the hip can be created even after motion.

[0051] Figs. 7 (a) to 7(c) are side views showing buttocks of a test subject, and faithfully show images obtained by taking pictures of the buttocks. Specifically, Fig. 7 (a) shows a state in which T-back shorts are worn and in which the buttocks are in a near nude state. Moreover, Fig. 7 (b) shows a state in which a panty girdle having a long length as a conventional garment with a crotch is worn. The panty girdle having a long length means a panty girdle having a length of approximately 15 to 20 cm from the under-crotch position. Further, Fig. 7 (c) shows a state in which the panty girdle 1A according to the embodiment is worn. These figures, Figs. 7 (b) and 7(c), show states shot after the same test subject wears each garment with a crotch and then makes motion under the same conditions as in Figs. 5 (d) and 5 (e).

[0052] As shown in Fig. 7 (b), in the state of wearing the conventional panty girdle having a long length, it can be seen that motion causes the panty girdle to ride-up, and causes a deformed wearing condition in which the gluteal fold portions of the panty girdle dig into excess

fat of the buttocks of the test subject. Moreover, as shown in Fig. 7 (c), in the state of wearing the panty girdle 1A, it can be seen that motion does not cause ride-up and the like.

[0053] Figs. 7 (d) to 7(f) are views showing contour lines recorded corresponding to Figs. 7 (a) to 7(c), respectively. Comparison between the near nude state of Fig. 7 (d) and the state of Fig. 7 (e) in which the conventional panty girdle having a long length is worn reveals that the positions of hip tops are approximately the same, and a buttock lifting effect of a panty girdle cannot be obtained after motion in the conventional panty girdle. Moreover, comparison among Figs. 7 (d) to 7(f) reveals that the positions of hip tops are highest in the state of wearing the panty girdle 1A, and the panty girdle 1A can create a beautiful shape of the hip even after motion because slippage caused by motion is less prone to occur.

[0054] Moreover, fourteen test subjects were asked to fill in a questionnaire on comparison among the states of wearing the panty girdle 1A according to the embodiment and four types of conventional panty girdles at the same time.

[0055] In comparison with a conventional panty girdle (panty girdle X1, worn in Fig. 5 (b)) having a short length as a first target for comparison, as a "panty girdle in which bottom edge slippage is not felt," twelve test subjects selected the panty girdle 1A, one test subject selected the panty girdle X1, and one test subject selected no difference between the panty girdles 1A and X1. Moreover, as a "panty girdle in which hip support is felt," twelve test subjects selected the panty girdle 1A, one test subject selected the panty girdle X1, and one test subject selected no difference between the panty girdles 1A and X1. Further, as a "panty girdle in which buttock lifting is felt," thirteen test subjects selected the panty girdle 1A, and one test subject selected the panty girdle X1. Moreover, as a "good fitting and comfortable panty girdle," twelve test subjects selected the panty girdle 1A, one test subject selected the panty girdle X1, and one test subject selected no difference between the panty girdles 1A and X1.

[0056] Next, in comparison with a conventional panty girdle having a short length (panty girdle X2) as a second target for comparison, as a "panty girdle in which bottom edge slippage is not felt," one test subject selected the panty girdle 1A, two test subjects selected the panty girdle X2, and one test subject selected no difference between the panty girdles 1A and X2. Moreover, as a "panty girdle in which hip support is felt," thirteen test subjects selected the panty girdle 1A, and one test subject selected the panty girdle X2. Further, as a "panty girdle in which buttock lifting is felt," twelve test subjects selected the panty girdle 1A, and two test subjects selected the panty girdle X2. Moreover, as a "good fitting and comfortable panty girdle," thirteen test subjects selected the panty girdle 1A, and one test subject selected the panty girdle X2.

[0057] Subsequently, in comparison with a conven-

tional panty girdle having a short length (panty girdle X3) as a third target for comparison, as a "panty girdle in which bottom edge slippage is not felt," thirteen test subjects selected the panty girdle 1A, and one test subject selected the panty girdle X3. Moreover, as a "panty girdle in which hip support is felt," fourteen test subjects selected the panty girdle 1A. Further, as a "panty girdle in which buttock lifting is felt," thirteen test subjects selected the panty girdle 1A, and one test subject selected no difference between the panty girdles 1A and X3. Moreover, as a "good fitting and comfortable panty girdle," thirteen test subjects selected the panty girdle 1A, and one test subject selected the panty girdle X3.

[0058] Moreover, in comparison with a conventional panty girdle (panty girdle X4, worn in Fig. 7 (b)) having a long length as a fourth target for comparison, as a "panty girdle that trims gluteal folds," nine test subjects selected the panty girdle 1A, one test subject selected the panty girdle X4, and four test subjects selected no difference between the panty girdles 1A and X4. Moreover, as a "panty girdle in which hip support is felt," five test subjects selected the panty girdle 1A, two test subjects selected the panty girdle X4, and seven test subjects selected no difference between the panty girdles 1A and X4. Further, as a "panty girdle in which buttock lifting is felt," eight test subjects selected the panty girdle 1A, and six test subjects selected no difference between the panty girdles 1A and X1. Moreover, as a "good fitting and comfortable panty girdle," nine test subjects selected the panty girdle 1A, three test subjects selected the panty girdle X4, and two test subjects selected no difference between the panty girdles 1A and X1.

[0059] Further, with regard to the panty girdle 1A, test subjects made comments such as "I have never wear a panty girdle which is so resistant to slippage before," "this is a short-length panty girdle but I actually feel that it lifts my buttocks," "I thought only long-length panty girdles lift buttocks," "this is a rare short-length panty girdle that trims gluteal folds just like a long-length panty girdle."

[First Modification]

[0060] Referring to Fig. 8, an example of a panty girdle 1B according to a first modification of the embodiment will be described. Compared with the panty girdle 1A described above with reference to Fig. 1, in the panty girdle 1B, the hip tightening portion 20 is, of course, formed in the range from the left and right greater trochanters 300 to the under-crotch position 301, and the ridge of the hip tightening portion 20 of the panty girdle 1B is formed in a wavy shape. Specifically, the shape of each of regions constituting the upper tightening portion 21 and the lower tightening portion 22 of the panty girdle 1B is a shape surrounded by a curve tapering off in the vertical direction. In other words, the curve of the ridge of the upper tightening portion 21 has, for example, a wavy shape similar to a sine curve. Moreover, the curve of the ridge of the lower tightening portion 22 is a curve approximately

symmetrical to the curve of the upper tightening portion 21, and has a shape in which apexes (bottom portions) are cut by a straight line.

[0061] Accordingly, the upper tightening portion 21 of the panty girdle 1B according to the first modification is also formed such that an upper-half portion has a smaller area than a lower-half portion when the entire length of the upper tightening portion 21 in the vertical direction is virtually divided into the two half portions. Moreover, the lower tightening portion 22 of the panty girdle 1B is also formed such that a lower-half portion has a smaller area than an upper-half portion when the entire length of the lower tightening portion 22 in the vertical direction is virtually divided into the two half portions.

[0062] Thus, in the panty girdle 1B according to the first modification, the ridge of the hip tightening portion 20 is also formed in a zigzag shape. Accordingly, a beautiful shape of a hip can be created, and ride-up can be prevented.

[0063] It should be noted that though the supplemental tightening portion 13 is not shown in Fig. 8, the panty girdle 1B according to the first modification may also include the supplemental tightening portion 13 adjacent to the main portion 10 and the hip tightening portion 20.

[Second Modification]

[0064] Referring to Fig. 9, an example of a panty girdle 1C according to a second modification of the embodiment will be described. Compared with the panty girdle 1A described above with reference to Fig. 1, in the panty girdle 1C, the hip tightening portion 20 is, of course, formed in the range from the left and right greater trochanters 300 to the under-crotch position 301, and, in the upper tightening portion 21 and the lower tightening portion 22 of the hip tightening portion 20 of the panty girdle 1C, vertices P of adjacent polygonal shapes disposed on the reference line L are slightly separated from each other. Accordingly, the upper tightening portion 21 and the lower tightening portion 22 of the panty girdle 1C include a plurality of independent regions disposed to be separated from each other by a distance which does not cause adverse effects due to looseness between regions of the upper tightening portion 21 and regions of the lower tightening portion 22 disposed adjacent to each other along the reference line L.

[0065] It should be noted that in this example, as shown in Fig. 9, a ridge formed by a plurality of regions disposed to be separated from each other along the reference line L is also in a zigzag shape as a whole. Moreover, the regions are disposed to be separated from each other in Fig. 9, but may be formed such that points p of adjacent regions are connected.

[0066] Accordingly, the upper tightening portion 21 of the panty girdle 1C according to the second modification is also formed such that an upper-half portion has a smaller area than a lower-half portion when the entire length of the upper tightening portion 21 in the vertical direction

is virtually divided into the two half portions. Moreover, the lower tightening portion 22 of the panty girdle 1C is also formed such that a lower-half portion has a smaller area than an upper-half portion when the entire length of the lower tightening portion 22 in the vertical direction is virtually divided into the two half portions.

[0067] Thus, in the panty girdle 1C according to the second modification, the ridge of the hip tightening portion 20 is also formed in a zigzag shape. Accordingly, a beautiful shape of a hip can be created, and ride-up can be prevented.

[0068] It should be noted that though the supplemental tightening portion 13 is not shown in Fig. 9, the panty girdle 1C according to the second modification may also include the supplemental tightening portion 13 adjacent to the main portion 10 and the hip tightening portion 20.

[Third Modification]

[0069] Referring to Fig. 10, an example of the panty girdle 1D according to a third modification of the embodiment will be described. Compared with the panty girdle 1A described above with reference to Fig. 1, in the panty girdle 1D, the hip tightening portion 20 is, of course, formed in the range from the left and right greater trochanters 300 to the under-crotch position, and is formed over the range from side portions of an upper end of the panty girdle 1D through the greater trochanters 300 to the under-crotch position. Accordingly, the waist support portion 12 of the panty girdle 1D is divided into a front portion (front body) and a back portion (back body), instead of being formed in an annular shape in a waist portion.

[0070] Moreover, the ridge of the hip tightening portion 20 is formed in a zigzag shape in the vertical direction in the example shown in Fig. 10, but the present invention is not limited to a shape formed by a plurality of polygons such as shown in Fig. 10. A shape formed such that apex portions are curves may be employed.

[0071] In the case of the panty girdle 1D according to the third modification, again, the upper tightening portion 21 of the hip tightening portion 20 mainly creates a shape of a hip, and the lower tightening portion 22 mainly prevents ride-up during motion. Moreover, compared with the panty girdle 1A shown in Fig. 1, the panty girdle 1D shown in Fig. 10 can support the hip of a wearer over a wider area because the hip tightening portion 20 also exists near the waist of the wearer. Accordingly, compared with the panty girdle described above with reference to Fig. 1, the panty girdle 1D can easily provide support, and can create a more beautiful shape of a hip.

[0072] While the present invention has been described above in detail using an embodiment and modifications, the present invention is not limited to the embodiment described in the present description. The scope of the present invention is defined by descriptions in the claims and the scope of equivalents to the descriptions in the claims.

Explanation of Reference Numerals

[0073]

5	1A TO 1D	PANTY GIRDLE
10		MAIN PORTION
11		CROTCH PORTION
12		WAIST SUPPORT PORTION
13		SUPPLEMENTAL TIGHTENING PORTION
10		
20		HIP TIGHTENING PORTION
21		UPPER TIGHTENING PORTION
22		LOWER TIGHTENING PORTION
L		REFERENCE LINE (VIRTUAL REFERENCE LINE)
15		
300		GREATER TROCHANTER
301		UNDER-CROTCH POSITION
302		GLUTEAL FOLD

Claims

1. A garment with a crotch, comprising:

- 25 a tubular main portion for covering an area around an abdomen and buttocks; and
 30 a tightening portion having a desired area and having a tightening force stronger than that of the main portion, the tightening portion being disposed to vertically span a virtual reference line extending from left and right greater trochanters to an under-crotch position of a wearer by a shortest path along skin of buttocks .

35 2. A garment with a crotch, comprising:

- 40 a tubular main portion for covering an area around an abdomen and buttocks; and
 45 a tightening portion having a desired area and having a tightening force stronger than that of the main portion, the tightening portion being disposed to vertically span a virtual reference line passing through greater trochanters to extend in a direction of an under-crotch position, wherein the virtual reference line inclines with respect to a horizontal direction by 12 to 32 degrees.

50 3. The garment according to any one of claims 1 and 2, wherein

- 55 the tightening portion is formed along the virtual reference line to intermittently protrude upward, and the protruding portion is formed such that an upper-half portion has a smaller area than a lower-half portion when an entire length of the protruding portion in a protruding direction is virtually divided into the two upper-half and lower-half portions.

4. The garment according to any one of claims 1 to 3,
wherein
the tightening portion is formed along the virtual reference line to intermittently protrude downward, and
the protruding portion is formed such that a lower-half portion has a smaller area than an upper-half portion when an entire length of the protruding portion in a protruding direction is virtually divided into the two upper-half and lower-half portions.
5. The garment according to any one of claims 3 and 4, further comprising a supplemental tightening portion being adjacent to the main portion and the tightening portion, being more relax than the tightening portion while having a tightening force stronger than that of the main portion, and having a desired area, the supplemental tightening portion being disposed in a gap within the tightening portion along the virtual reference line.

FIG. 1

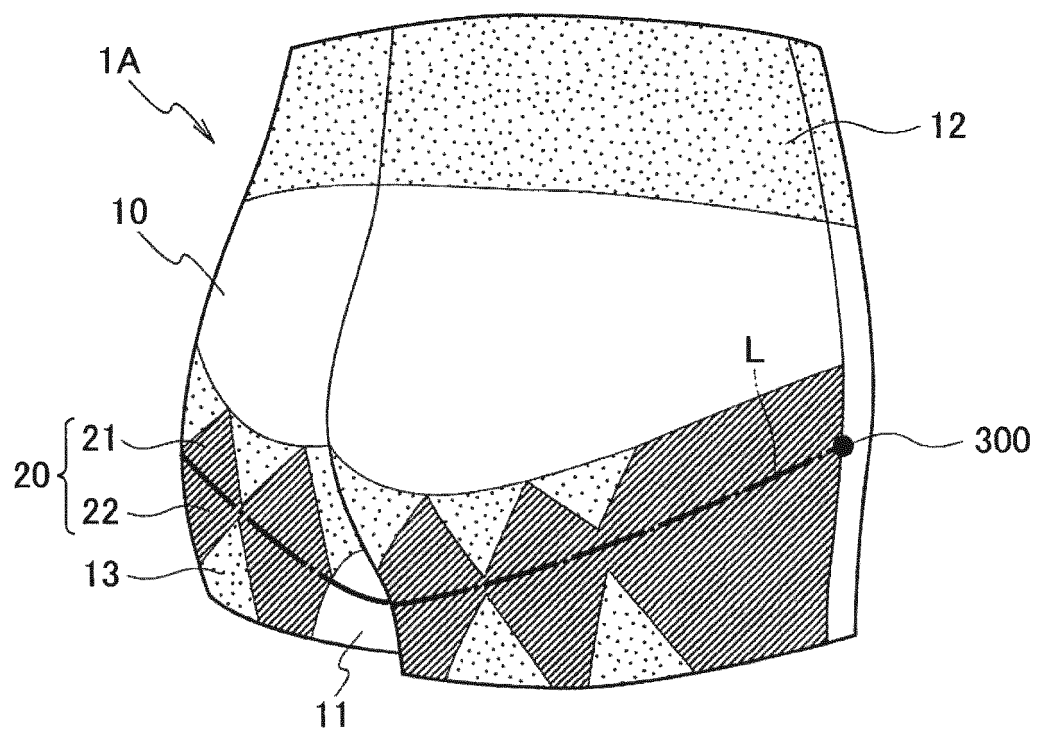


FIG. 2

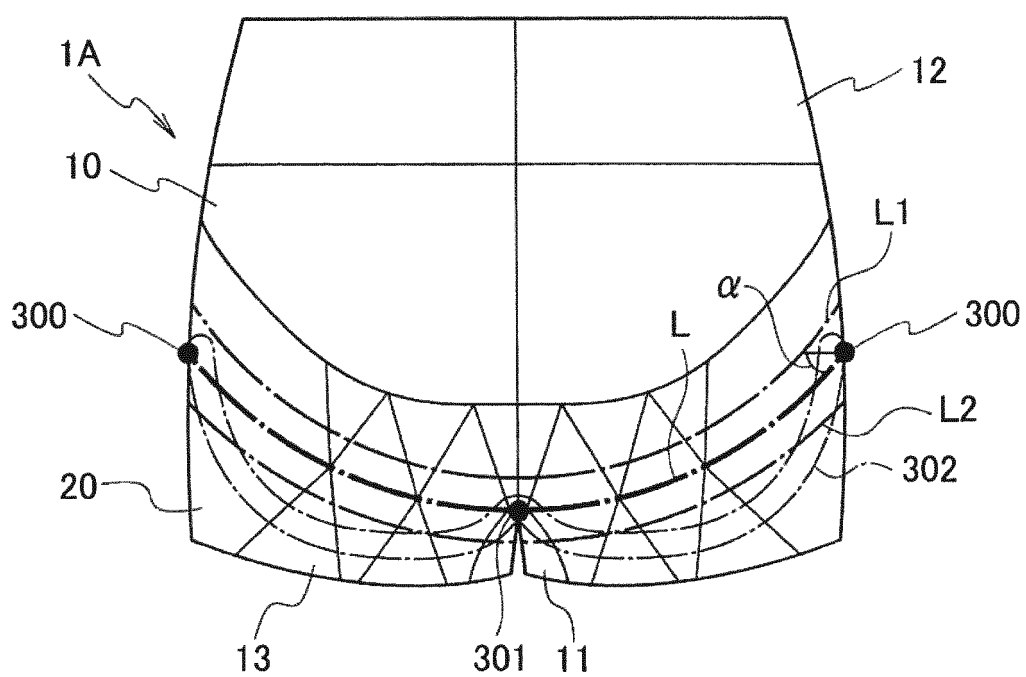


FIG. 3

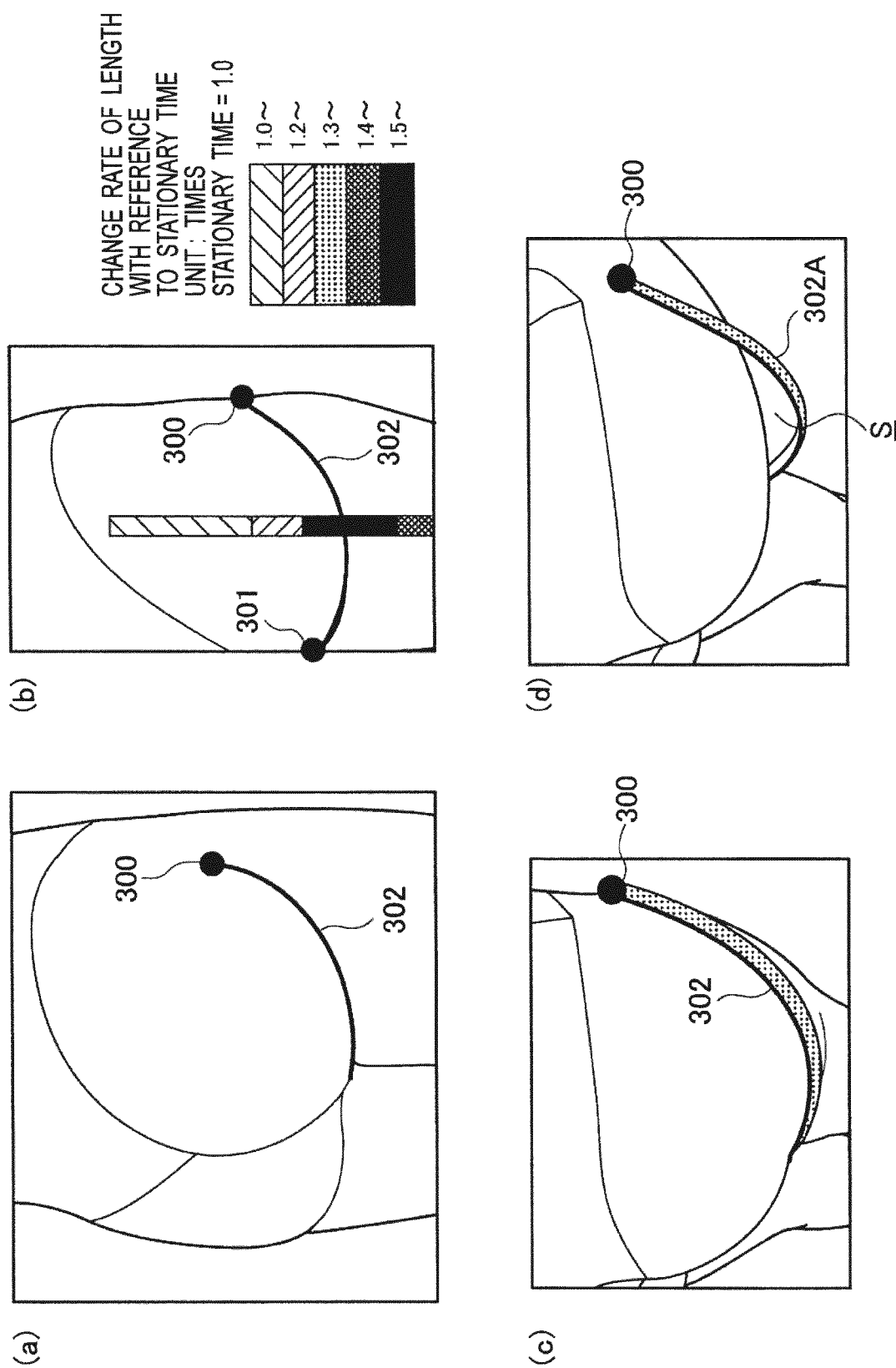


FIG. 4

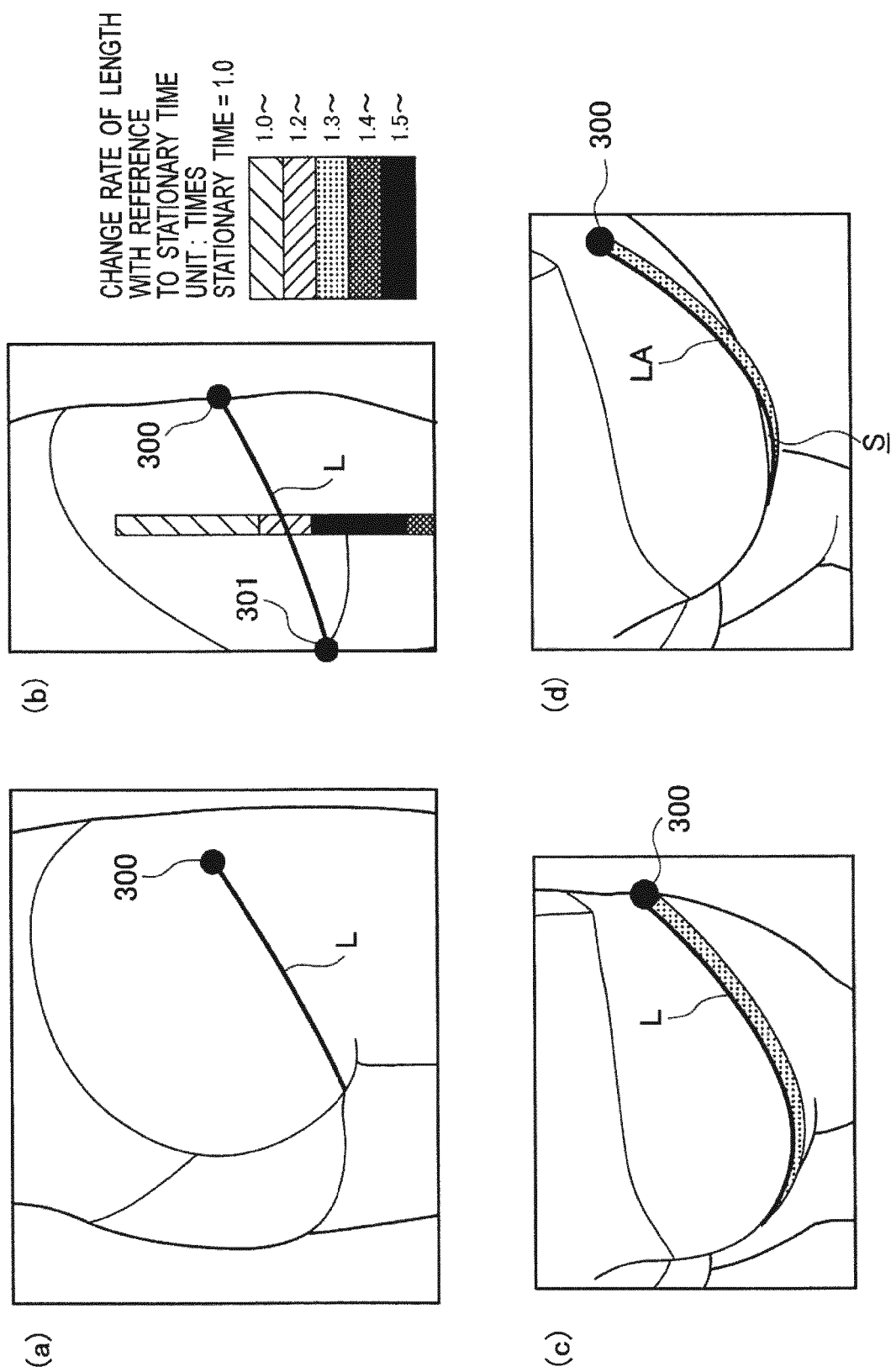


FIG. 5

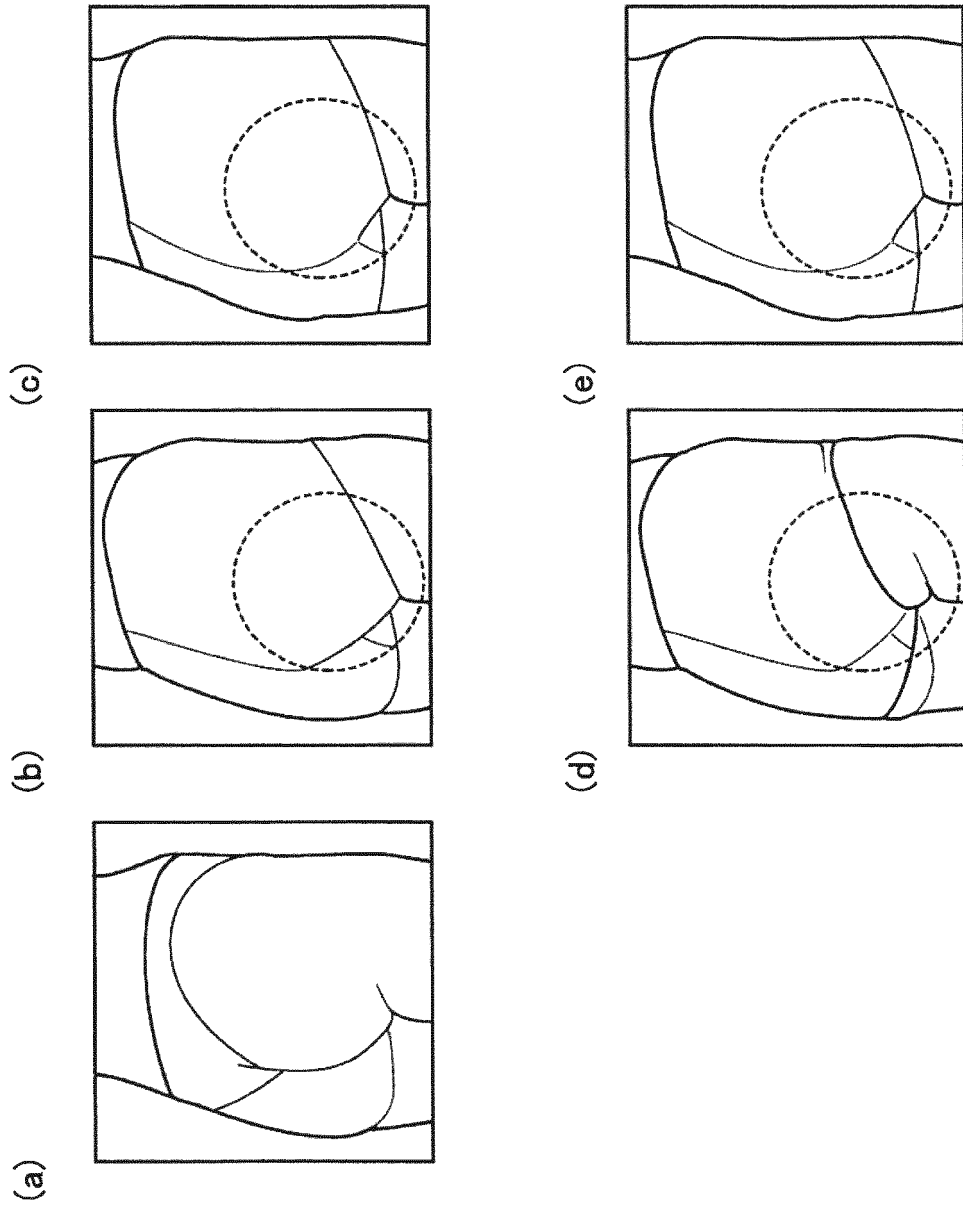


FIG. 6

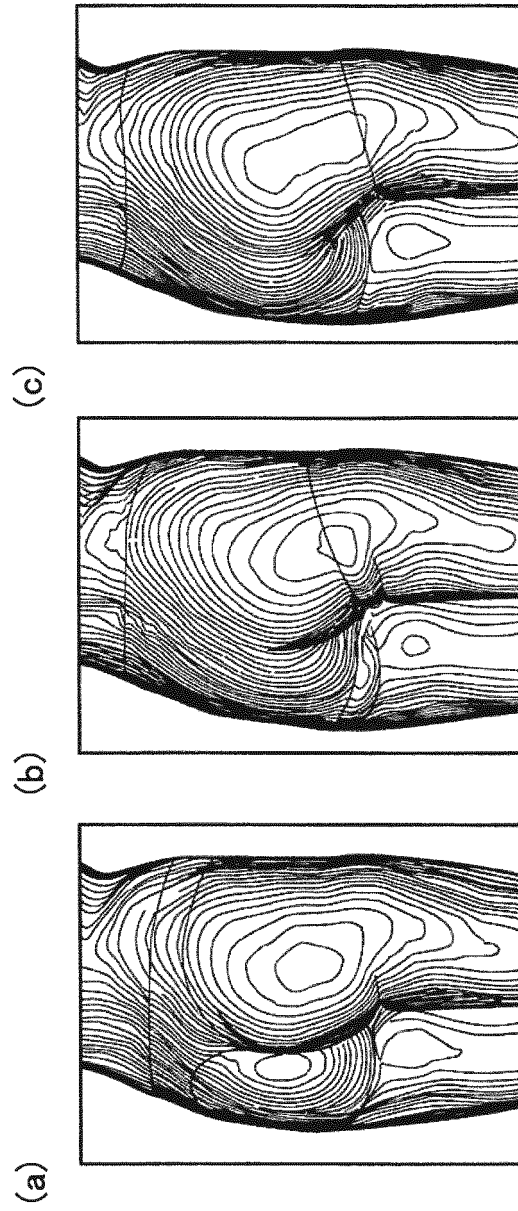


FIG. 7

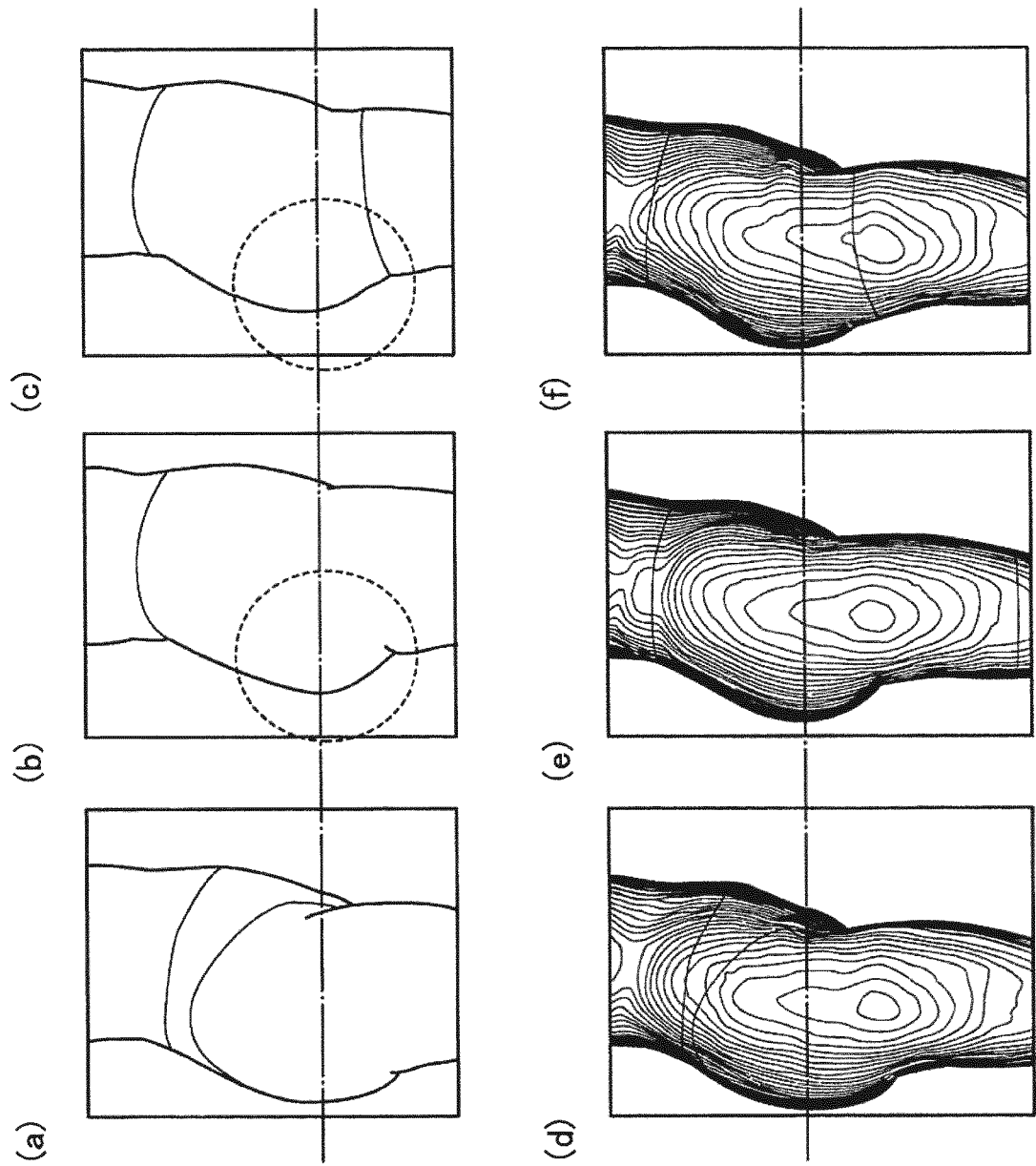


FIG. 8

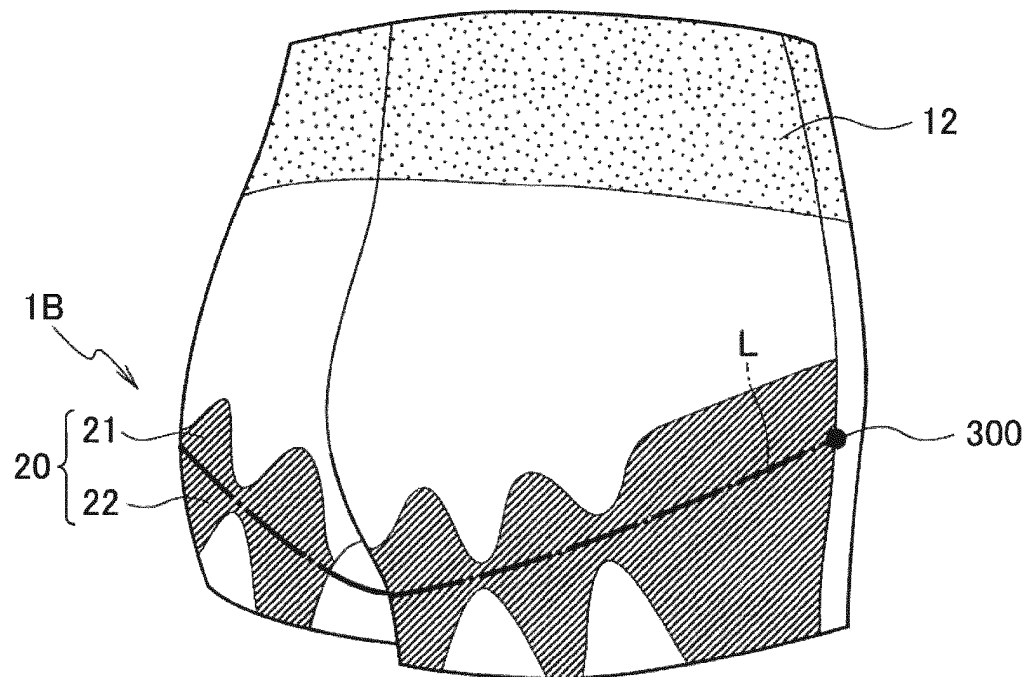


FIG. 9

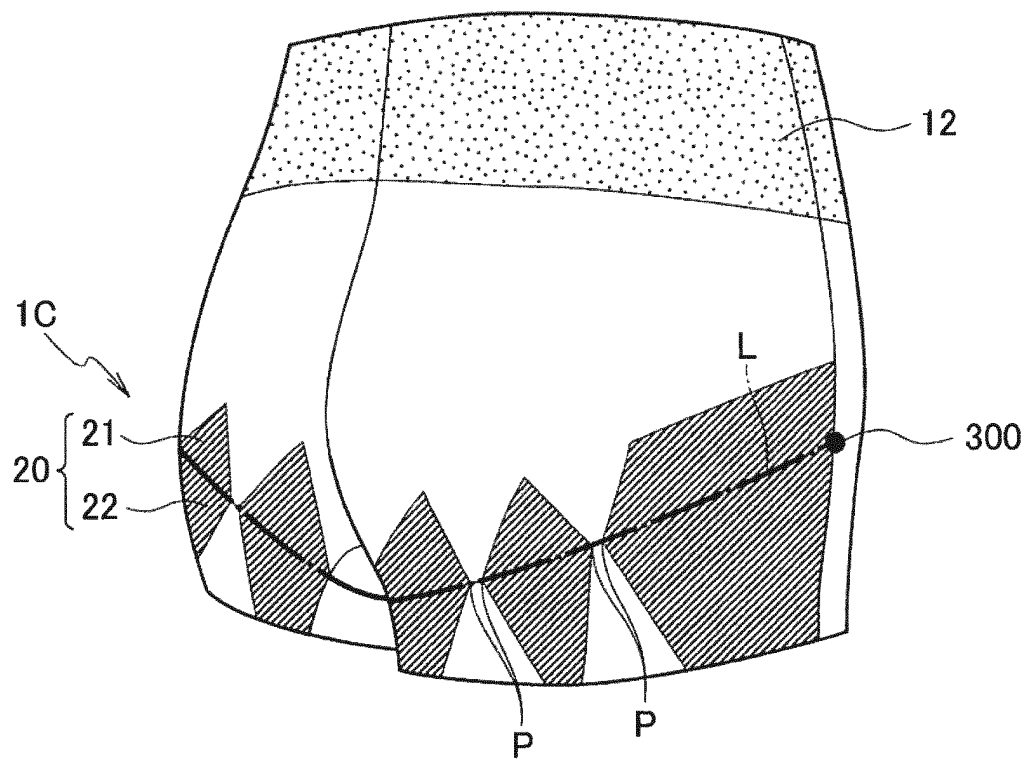
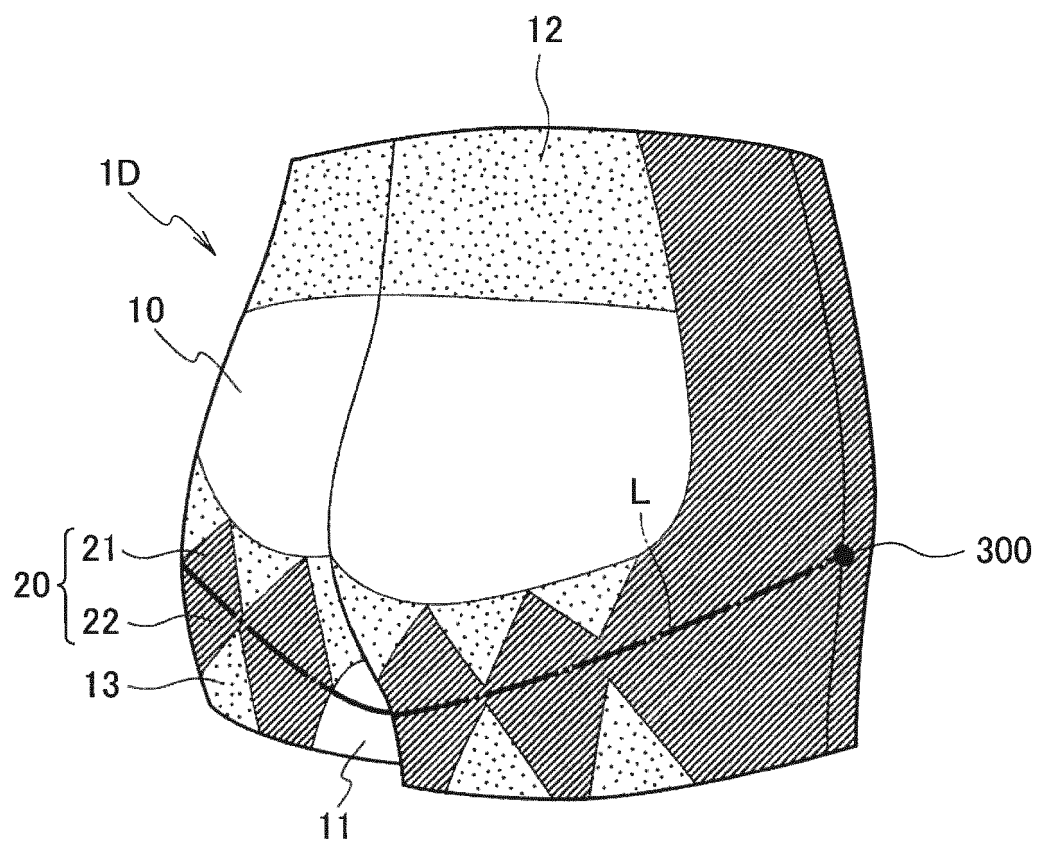


FIG. 10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2014/056500

A. CLASSIFICATION OF SUBJECT MATTER

A41C1/00(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)

A41C1/00

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 1996-2014
 Kokai Jitsuyo Shinan Koho 1971-2014 Toroku Jitsuyo Shinan Koho 1994-2014

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 A	JP 5081329 B1 (Yugen Kaisha Universal Life), 28 November 2012 (28.11.2012), paragraphs [0019] to [0028], [0034] to [0036]; fig. 1 to 4, 10 to 11 & JP 2013-253335 A	1-2 3 4-5
X Y A	WO 2002/047501 A1 (Wacoal Corp.), 20 June 2002 (20.06.2002), description, page 29, line 23 to page 31, line 2; fig. 44 to 48 & JP 2001-192903 A & US 2003/0028952 A1 & US 7074204 B2 & EP 1342423 A1 & EP 1342423 B1 & AU 1736201 A & HK 1060835 A1 & CN 1461190 A & CN 1268241 C & KR 20030060103 A & KR 10-0527561 B1 & DE 60033856 T2 & AT 355761 T	1-2 3 4-5

☒ Further documents are listed in the continuation of Box C.
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"&"

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Date of the actual completion of the international search

21 May, 2014 (21.05.14)

Date of mailing of the international search report

03 June, 2014 (03.06.14)

Name and mailing address of the ISA/
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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 3014319 U (Duchess Co., Ltd.), 08 August 1995 (08.08.1995), paragraphs [0008] to [0016]; fig. 1 to 6 (Family: none)	3 4-5
Y A	JP 2000-303209 A (Wacoal Corp.), 31 October 2000 (31.10.2000), paragraphs [0113] to [0114], [0118], [0123] to [0124]; fig. 19 to 20 & JP 3461316 B2 & JP 2003-301306 A & TW 452483 B & CN 1268592 A & CN 1175134 C	3 4-5
P,X	JP 3183358 U (Kabushiki Kaisha Shinwa), 16 May 2013 (16.05.2013), paragraphs [0032] to [0033], [0045] to [0046]; all drawings (Family: none)	1-2
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A	JP 2013-44054 A (Hokuriku STR Kyodo Kumiai), 04 March 2013 (04.03.2013), paragraph [0011]; fig. 1 to 2 & TW 201309218 A1	1-5

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REFERENCES CITED IN THE DESCRIPTION

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