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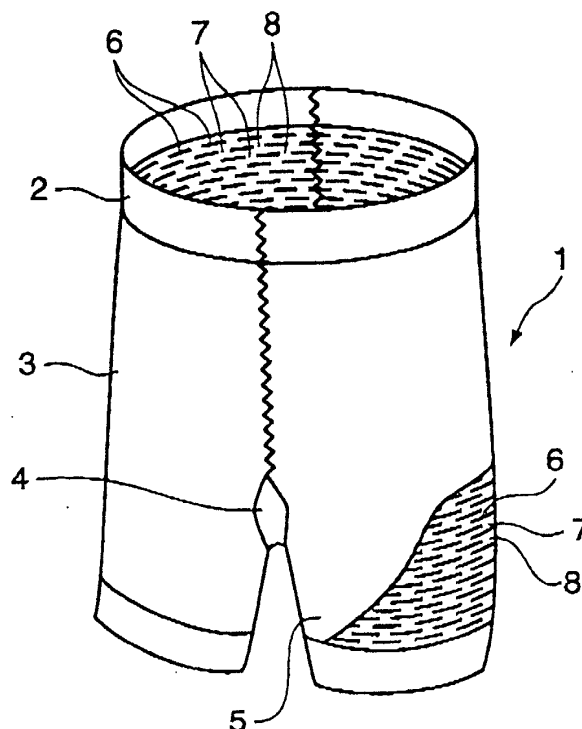
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(54) **Underwear**

(57) To stimulate the skin and produce a massage effect and also promote reduction of subcutaneous fat and/or superfluous flesh by means of protruding parts (6) and recessed parts (7,8) formed on the inner surface of inner wear by varying the knit structure. Protruding

parts and recessed parts having a different knit structure to one another are knitted alternately on the inner surface of the inner wear, with the recessed parts consisting of deep recessed parts (7) and shallow recessed parts (8) knitted alternately.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

[0001] This invention relates to an inner wear primarily for women, and more particularly to an inner wear that is worn to be fitted to the wearer's body, for example a tank top, a waist nipper, a bodysuit, underpants, a girdle, spats, panty hose, tights, a leotard, a swimsuit or the like, and comprises an elastic knitted fabric having an elegant external appearance.

[0002] As women get older, superfluous flesh or subcutaneous fat tends to be put on around the belly, the hips, the thighs and the like, the skin tends to become flabby, the body tends to lose its shape, and it becomes difficult to maintain attractive body lines. Some women thus adjust their body shape by wearing compensatory underwear.

[0003] For example, girdles, which are typical women's inner wear, are worn to make the shape of the wearer's body more attractive from the waist downwards, specifically around the hips, the belly, the buttocks, the thighs and the like. Girdles have a function of producing natural-looking curves by restraining and pulling in a protruding underbelly and at the same time lifting buttocks prone to sagging. Girdles produce attractive body lines and are thus worn by many women.

[0004] However, recently girdles have been proposed whose object is not purely to adjust the shape of the wearer's body, but rather are also pleasant to wear, producing a massage action when worn by stimulating the wearer's skin through wave-shaped protrusions provided on the inner surface of the girdle, and thus exhibiting a refreshing effect and/or a relaxing effect.

[0005] An example of such a girdle is that disclosed in Japanese Patent Application Laid-open No. H11-152607. Many lines of wave-shaped protrusions knitted using tuck stitches are provided on the inner surface of this girdle, and hence every time the wearer's body moves, these wave-shaped protrusions push against and stimulate the wearer's skin to a moderate degree, producing a massage action, resulting in the girdle exhibiting a refreshing effect and a relaxing effect.

[0006] With this girdle, as shown in Fig. 19, many lines of elastically deformable alternate wave-shaped protrusions W, W ... W are continuously knitted in rows using tuck stitches on the inner surface of the girdle G in portions that fit against the wearer's body. When the wearer moves her body during exercise or the like, these wave-shaped protrusions W, W ... W elastically deform, and by means of this action, apply a moderate pressure to the wearer's skin that is in contact with the protrusions, giving a massage effect, a refreshing effect and a relaxing effect.

[0007] However, in the case of the above-mentioned conventional example, as shown in the schematic view in Fig. 20, the many lines of elastically deformable wave-shaped protrusions W, W ... W comprising tuck stitches

are continuously provided in rows across the whole of the required places with no breaks, and hence when the wave-shaped protrusions W are stretched by the action of movement of the wearer's body, the protrusions W are extended excessively as shown in Fig. 21, and hence the height of the protrusions W drops dramatically during movement by the wearer, albeit only temporarily, resulting in a problem in which there are times at which the massage effect and refreshing effect due to the protrusions W, W ... W are not sufficiently exhibited.

SUMMARY OF THE INVENTION

[0008] It is an object of the present invention to provide an inner wear which is free from the above-mentioned problems.

[0009] It is another object of the present invention to provide an inner wear in which the skin is stimulated by protruding parts and recessed parts formed on the inner surface of the inner wear by altering different knit structures.

[0010] It is still another object of the present invention to provide an inner wear which has three areas having different depths to ensure smooth air circulation between the skin and the inner wear.

[0011] It is yet another object of the present invention to provide an inner wear which has a reinforcing structure in knitting structures making protrusions to keep the protrusions even when being excessively expanded.

[0012] According to an aspect of the invention, an inner wear comprises an elastic knitted fabric including protruding parts and recessed parts having different knit structures to one another with respect to the inner surface of the inner wear in required places of portions fitting against the wearer's body. The recessed parts may include deep recessed parts and shallow recessed parts knitted alternately.

[0013] Owing to the above-mentioned constitution, when the inner wear is worn, every time the wearer's body moves, the protruding parts and recessed parts on the inner surface of the inner wear stimulate the wearer's skin, producing a massage action, promoting metabolism, and improving blood flow. Moreover, superfluous flesh and/or subcutaneous fat is pinched by the protruding parts and the recessed parts, with this pinching action being repeated every time the wearer's body moves, resulting in an effect being exhibited in which superfluous flesh and/or subcutaneous fat is reduced naturally.

[0014] In a construction in which the recessed parts includes deep recessed parts and shallow recessed parts, in particular, the pinching force varies according to the difference in the depth between the deep recessed parts and the shallow recessed parts, resulting in an even greater effect of reducing subcutaneous fat. Moreover, when the inner wear is worn, superfluous flesh and/or subcutaneous fat pushed out by the protruding parts moves into the shallow recessed parts and

the deep recessed parts, but even if the shallow recessed parts are filled with superfluous flesh and/or subcutaneous fat, in the deep recessed parts, a state is secured in which a layer of air remains above the layer of superfluous flesh and/or subcutaneous fat, resulting in the inner wear having improved breathability and in a feeling of oppression being alleviated, and hence in a refreshing, favorable wearing sensation being obtained. In addition, air enters into the deep recessed parts and the shallow recessed parts to produce a thermal insulation effect, and hence the inner wear of the present invention can be used as inner wear for protecting against cold.

[0015] The inner wear may have a constitution in which the deep recessed parts are knitted with plain stitches, the shallow recessed parts have a knit structure in which plain stitch regions and float stitch regions are arranged in a matrix, the protruding parts have a knit structure in which plain stitch regions and float stitch regions are alternately arranged, and the number of rows of stitches is set to be greater in the float stitch regions of the protruding parts than in the float stitch regions of the shallow recessed parts.

[0016] The protruding parts may be constituted by float stitch regions and plain stitch regions, the float stitch regions being formed with a plurality of float stitches and at least one tuck stitch. Further, the float stitch region may be formed with a plurality of float stitches and a plurality of tuck stitches every a predetermined number of float stitches.

[0017] Moreover, the recessed parts or the shallow recessed parts may be constituted by an arrangement of plain stitch regions, float stitch regions, and tuck stitch regions.

[0018] Owing to these constitution, the protruding parts become such that the plain stitch regions bulge out on the reverse side by an amount due to being pulled by the float stitch regions that are alternately arranged, and the shallow recessed parts become such that the plain stitch regions bulge out on the reverse side by an amount owing to being pulled by the float stitch regions that are arranged in a matrix, but because the number of rows of stitches is set to be greater in the float stitch regions of the protruding parts than in the float stitch regions of the shallow recessed parts, the amount by which the protruding parts bulge out is greater than the amount by which the shallow recessed parts bulge out. Moreover, the deep recessed parts are knitted with plain stitches and thus remain flat. As a result, the knit structure on the reverse side (the inner surface) becomes such that the undulating shape of the protruding parts, the deep recessed parts and the shallow recessed parts is formed assuredly, with the relationship between the protruding parts, the deep recessed parts and the shallow recessed parts being maintained, and as a result the above-mentioned effects are produced assuredly.

[0019] In the construction where the float stitch regions of the protruding parts or the shallow recessed

parts are additionally provided with the tuck stitch or tuck stitch part, further, the tuck stitch will reinforce the formation of protrusions.

[0020] The extending yarn of the float stitch may have a strength stronger than yarns constituting the other stitches. This will reinforce and support the formation of protrusions.

[0021] The inner wear is knitted such that, when the inner wear is worn, the outer surface side of each of the deep recessed parts expands into an approximately elliptical shape, and the outer surface side of each of the shallow recessed parts expands into an approximately quadrangular shape. Accordingly, the elliptical shapes show prominently in the external appearance, and inner wear having an attractive, tasteful design not achieved with conventional inner wear may be obtained.

[0022] These and other objects, features, aspects, and advantages of the present invention will become more apparent from the following detailed description of the preferred embodiments/examples with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023]

Fig. 1 is a schematic perspective view showing a girdle according to a first embodiment of the invention;

Fig. 2 is a schematic perspective view showing long spats according to a second embodiment of the invention;

Fig. 3 is a schematic perspective view showing a tank top according to a third embodiment of the invention;

Fig. 4 is a schematic perspective view showing a swimsuit according to a fourth embodiment of the invention;

Fig. 5 is a schematic explanatory view showing the front side (outer surface) of the knitted fabric of the inner wear of the invention when unworn;

Fig. 6 is a schematic explanatory view showing the front side (outer surface) of the knitted fabric of the inner wear of the invention when worn;

Fig. 7 is a schematic explanatory view showing the recessed parts and protruding parts on the reverse side (inner surface) of the knitted fabric of the inner wear of the invention when unworn;

Fig. 8 is a sectional view showing a section along the line A-A in Fig. 7;

Fig. 9 is a schematic explanatory view showing the recessed parts and protruding parts on the reverse side (inner surface) of the knitted fabric of the inner wear of the invention when worn;

Fig. 10 is a plan view showing an example of the knit structure of the inner wear of the invention;

Fig. 11 is an enlarged plan view showing the front side (outer surface) of the knit structure of the inner

wear of the invention when unworn;

Fig. 12 is an enlarged plan view showing the reverse side (inner surface) of the knit structure of the inner wear of the invention when unworn;

Fig. 13 is an enlarged plan view showing the front side (outer surface) of the knit structure of the inner wear of the invention when worn;

Fig. 14 is an enlarged plan view showing the reverse side (inner surface) of the knit structure of the inner wear of the invention when worn;

Fig. 15 is a plan view showing an example of a first variation of the knit structure of the inner wear of the invention;

Fig. 16 is a plan view showing an example of a second variation of the knit structure of the inner wear of the invention;

Fig. 17 is a plan view showing an example of a third variation of the knit structure of the inner wear of the invention;

Fig. 18 is a plan view showing an example of a fourth variation of the knit structure of the inner wear of the invention;

Fig. 19 is a schematic perspective view showing a conventional girdle;

Fig. 20 is an explanatory view showing a portion of a conventional protruding part when not expanded; and

Fig. 21 is an explanatory view showing a portion of a conventional protruding part when expanded.

DETAILED DESCRIPTION OF THE EMBODIMENTS OF THE INVENTION

[0024] The following is a specific description of embodiments of the present invention with reference to the drawings. Fig. 1 shows a first embodiment of the invention. Reference numeral 1 indicates a girdle main body. The left and right of this girdle main body 1 are knitted separately by circular knitting, and are then joined together by sewing together the respective edges on the inside, thus making a single girdle.

[0025] According to this girdle, a broad elastic belt 2 having high elasticity is provided in a sidewise direction around the periphery of an upper opening of the girdle main body 1, and the girdle additionally includes an under panty cloth 3 that covers the wearer's hips and buttocks, a groin cloth 4 of an elastic knitted fabric that covers the wearer's groin, and a thigh cloth 5 that covers the wearer's thighs.

[0026] An elastic yarn of a polyamide, a polyurethane or the like and a cotton yarn or the like are used for the girdle main body 1. Protruding parts 6 and recessed parts 7 and 8 having a different knit structure to one another are knitted alternately as shown in Fig. 7 in a circumferential direction on the inner surface of the under panty cloth 3 and the thigh cloth 5 of the girdle main body 1 shown in Fig. 1, with the recessed parts comprising deep recessed parts 7 and shallow recessed parts 8

knitted alternately (see Fig. 8). Moreover, the front side (outer surface) of the knit structure has a form in which portions corresponding to a protruding part 6, a deep recessed part 7, a protruding part 6 and a shallow recessed part 8 are knitted alternately in this order as shown in Fig. 5.

[0027] More specifically, as shown in Fig. 10, each deep recessed part 7 is knitted with plain stitches, each protruding part 6 has a knit structure in which 1-line 20-row float stitch regions R1 (second float stitch regions) and 3-line 20-row plain stitch regions R2 are arranged in alternate lines, and each shallow recessed part 8 has a knit structure in which 2-line 2-row float stitch regions R3 (first float stitch regions) and 2-line 2-row plain stitch regions R4 are arranged in a matrix.

[0028] Note that in Fig. 10 the knit structure is shown spread out for explanatory purposes, but in actual fact, with regard to each of the protruding parts 6, each plain stitch region R2 bulges out on the reverse side by an amount corresponding to 20 rows being pulled into 1 row by a loop 61 of each 1-line 20-row float stitch region R1, and with regard to each of the shallow recessed parts 8, each plain stitch region R4 bulges out on the reverse side by an amount corresponding to 2 rows being pulled into 1 row by two loops 81 of each 2-line 2-row float stitch region R3. As a result, as shown in Fig. 12, the reverse side (inner surface) of the knit structure becomes such that a protruding part 6, a deep recessed part 7, a protruding part 6 and a shallow recessed part 8 are knitted alternately in this order, and, as shown in Fig. 11, the front side (outer surface) of the knit structure becomes such that portions corresponding to a protruding part 6, a deep recessed part 7, a protruding part 6 and a shallow recessed part 8 are knitted alternately in this order.

[0029] Moreover, when the girdle is worn, with regard to the front side (outer surface) of the knit structure, as shown in Fig. 6 and Fig. 13, the outer surface side of each of the protruding parts 6 does not change shape much, the outer surface side of each of the deep recessed parts 7 expands and changes shape into an approximately elliptical shape, and the outer surface side of each of the shallow recessed parts 8 expands and changes shape into an approximately quadrangular shape. Moreover, with regard to the reverse side (inner surface) of the knit structure, as shown in Fig. 9 and Fig. 14, the protruding parts 6 do not change shape much, the deep recessed parts 7 expand and change shape into an approximately elliptical shape, and the shallow recessed parts 8 expand and change shape into an approximately quadrangular shape.

[0030] Note that the reason that the deep recessed parts 7 change shape as described above is that, whereas the protruding parts 6 cannot expand since a state is maintained in which 20 rows are pulled into 1 row by the loop 61 of each 1-line 20-row float stitch region R1, the deep recessed parts 7 are knitted with plain stitches and hence can expand freely, and so the deep recessed parts 7, which are each surrounded on all four sides by

protruding parts 6, expand and change shape while being restrained by the protruding parts 6 which cannot expand, the result being that the shape of each of the deep recessed parts 7 becomes approximately elliptical.

[0031] Moreover, the reason that the shallow recessed parts 8 change shape as described above is that, whereas the protruding parts 6 cannot expand, the shallow recessed parts 8 each have a knit structure in which 2-line 2-row float stitch regions R3 and 2-line 2-row plain stitch regions R4 are arranged in a matrix and so expand and change shape with a quadrangular shape being maintained, and so the shallow recessed parts 8, which are each surrounded on all four sides by protruding parts 6, expand and change shape while being restrained by the protruding parts 6 which cannot expand, the result being that the shape of each of the shallow recessed parts 8 becomes approximately quadrangular.

[0032] When a girdle knitted in this way is worn, the protruding parts 6 formed on the inner surface between the belly and the buttocks and around the thighs fit closely against these parts of the wearer's body, producing a shiatsu(finger-pressure)-like action and stimulating the wearer's skin, and resulting in the flow of the blood and the lymph being promoted and in metabolism in the wearer's body as a whole being improved. There is thus a considerable contribution to improving health, and in addition the following excellent effects unique to the invention are exhibited.

[0033] When this girdle is worn, as shown in Fig. 6 and Fig. 13, on the outer surface of the girdle, the approximately quadrangular shape of the outer surface side of each of the deep recessed parts 7 greatly expands in a sidewise direction to become an approximately elliptical shape, coming out prominently in the external appearance, and resulting in a girdle that has an elegance and attractiveness not achieved with conventional girdles and that is thus suitable as women's inner wear.

[0034] On the inner surface of the girdle, on the other hand, superfluous flesh and/or subcutaneous fat is pinched by the protruding parts 6, the deep recessed parts 7 and the shallow recessed parts 8, which are long in a sidewise direction, with this pinching action being repeated every time the wearer's body moves, resulting in an effect being exhibited in which superfluous flesh and/or subcutaneous fat is reduced naturally.

[0035] In particular, the pinching force varies according to the difference in the depth between the deep recessed parts 7 and the shallow recessed parts 8, resulting in an even greater effect of reducing subcutaneous fat. Moreover, when the girdle is worn, superfluous flesh and/or subcutaneous fat pushed out by the protruding parts 6 moves into the shallow recessed parts 8 and the deep recessed parts 7, but even if the shallow recessed parts 8 are filled with superfluous flesh and/or subcutaneous fat, in the deep recessed parts 7, a state is se-

cured in which a layer of air remains above the layer of superfluous flesh and/or subcutaneous fat, resulting in the girdle having improved breathability and in a feeling of oppression being alleviated, and hence in a refreshing, favorable wearing sensation being obtained. In addition, air enters into the deep recessed parts 7 and the shallow recessed parts 8 to produce a thermal insulation effect, and hence the girdle can be used for protecting against cold.

[0036] Fig. 2 shows a second embodiment of the invention. The above-mentioned first embodiment related to a girdle that covers as far as the thighs, but the present embodiment relates to long spats 11 that cover from the thighs down as far as the ankles, being provided with recessed parts and protruding parts on the inner surface of both the front and the back from the waist to the ankles. Other than this, the basic knitting method - including the materials of the elastic yarns - are the same as with the first embodiment, and equivalent parts have been given the same reference numeral.

[0037] When the long spats 11 knitted in this way are worn, in addition to effects like those with the above-mentioned first embodiment, there is an attractiveness in that the elliptical shapes of the outer surface side of the deep recessed parts 7 appear diagonally as far as the ankles, and more over the massage action is also exhibited on the legs and thus swelling or fatigue of the legs can be relieved.

[0038] Fig. 3 shows a third embodiment of the invention. The above-mentioned first and second embodiments related to inner wear worn on the lower half of the body, but the present embodiment relates to an example in which the invention is applied to a tank top 21 worn on the upper half of the body. Recessed parts and protruding parts are provided on the inner surface of both the front and the back of the tank top 21.

[0039] When the tank top 21 knitted in this way is worn, in addition to effects like those with the above-mentioned first embodiment, there is an action of massaging the shoulders and the back, and thus stiffness in the shoulders can be relieved.

[0040] Fig. 4 shows a fourth embodiment of the invention. The above-mentioned first and second embodiments related to inner wear worn on the lower half of the body, and the third embodiment to inner wear worn on the upper half of the body, but the present embodiment relates to an example in which the invention is applied to a swimsuit 31 that covers both the upper half and the lower half of the body. Recessed parts and protruding parts are provided on the inner surface of both the front and the back of the swimsuit 31.

[0041] When the swimsuit 31 knitted in this way is worn, effects like those with the above-mentioned first embodiment and third embodiment are produced.

[0042] Next, a variety of patterns of the knit structure according to this invention are described with reference to Figs. 15 through 17.

[0043] A first variation is shown in Fig. 15. As shown

in Fig. 15, a protruding part 106 is formed in such a manner that 1-line 20-row float stitch regions R11 (second float stitch regions) and 3-line 20-row plain stitch regions R12 are arranged in alternate lines. In each second float stitch region R11, a tuck stitch 161 (162, 163, 164, or 165) is provided every 4 rows (tuck stitch group of 161 to 165). A shallow recessed part 108 is so formed that 2-line 2-row float stitch regions R13 (first float stitch regions), 2-line 2-row plain stitch regions R14, and 2-line 2-row tuck stitch regions R15 are arranged in a certain order. A deep recessed part 107 is formed by plain stitches.

[0044] Similar to the arrangement shown in Fig. 10, the knit structure of Fig. 15 is shown spread out for explanatory purpose, but in actual fact, a portion corresponding to the protruding part 106 comprises the plain stitch regions R12 and the float stitch regions R11 in alternate lines, and the reverse side (inner side) of the knit structure becomes such that each 3-line 20-row plain stitch region R12 bulges out by an amount corresponding to 20 rows being pulled into 1 row by a loop 166 provided in each 1-line 20-row float stitch region R11. Furthermore, each float stitch region R11 of the protruding part 106 is tucked each 4 rows by the tuck stitch group 161 to 165, thereby retaining the protruding part 106 at a desired height even if the knitted fabric is expanded.

[0045] Thus, constructing the protruding part 106 by alternately knitting 20-row float stitches and 20-row plain stitches with a combination of a tuck stitch provided each 4 rows (tuck stitch group) in each float stitch region R11 enables to retain the protruding part 106 at a sufficient height. The formation of tuck stitches is free from a burden due to needle operation of a circular knitting machine during knitting because a smaller number of tuck stitches are formed each 4 rows.

[0046] The shallow recessed part 108 is so constructed that the reverse side (inner side) of the knit structure corresponding to each plain stitch region R14 bulges by an amount corresponding to 2 rows being pulled into 1 row by two loops 81 provided in each 2-line 2-row float stitch region R13. The shallow recessed part 108 is so constructed that each 2-line 2-row tuck stitch region R15 adjoins the float stitch region R13 and the plain stitch region R14 in a certain direction in a certain order. Thereby, the shallow recessed part 108 securely retains its desired depth owing to the existence of tuck stitches 182 (tuck group) even if the knitted fabric is expanded.

[0047] The shallow recessed part 108 may be made by arranging 2-line 2-row plain stitch regions R14 and 2-line 2-row tuck stitch regions R15 in a matrix, or by arranging 2-line 2-row plain stitch regions R14 and 2-line 2-row float stitch regions R13 in a matrix. Both of these altered arrangements securely retain the shallow recessed part 108 at a desired depth even if the knitted fabric is expanded in a similar manner as the knit structure shown in Fig. 15 where the floated stitch regions R13, the plain stitch regions R14, and the tuck stitch regions R15 are adjoined one another in a certain order.

[0048] With the first variation of patterns, as shown in Fig. 12, the reverse side (inner side) of the knit structure becomes such that portions corresponding to the protruding part 106, the deep recessed part 107, the protruding part 106, and the shallow recessed part 108 are knitted alternately in this order. Further, as shown in Fig. 11, the front side (outer side) of the knit structure becomes such that portions corresponding to the protruding part 106, the deep recessed part 107, the protruding part 106, and the shallow recessed part 108 are knitted alternately in this order.

[0049] When a girdle knitted in the way of the first variation is worn, as shown in Fig. 6 and Fig. 13, the outer surface of the girdle is deformed in such a manner that the outer surface side of each of the deep recessed parts 107 is expanded into an approximately quadrangular shape and the outer surface side of each of the shallow recessed parts 108 is expanded into an approximately elliptical shape while retaining the outer surface side of each of the protruding parts 106 generally unchanged.

[0050] The reverse side (inner side) of the knit structure of the girdle is deformed, as shown in Figs. 9 and 14, in such a manner that the inner surface side of each of the deep recessed parts 107 is expanded into an approximately elliptical shape and the inner surface side of each of the shallow recessed parts 108 is expanded into an approximately quadrangular shape while retaining the inner surface side of each of the protruding parts 106 generally unchanged.

[0051] Note that the reason that the deep recessed parts 107 change shape as described above is that, whereas the protruding parts 106 cannot expand since a state is maintained in which 20 rows are pulled into 1 row by the loop 166 of each 1-line 20-row float stitch region R11 with a combination that the float stitch region R11 is tucked by the tuck stitch group of 161 to 165. On the other hand, the deep recessed parts 107 are knitted with plain stitches and hence can expand freely, and so the deep recessed parts 107, which are each surrounded on all four sides by protruding parts 106, expand and change shape while being restrained by the protruding parts 106 which cannot expand, the result being that the shape of each of the deep recessed parts 107 becomes approximately elliptical.

[0052] Moreover, the reason that the shallow recessed parts 108 change shape as described above is that, whereas the protruding parts 106 cannot expand, the shallow recessed parts 108 each have a knit structure in which 2-line 2-row float stitch regions R13, 2-line 2-row plain stitch regions R14, and 2-line 2-row tuck stitch regions R15 are arranged in an adjoined manner and so expand and change shape with a quadrangular shape being maintained, and so the shallow recessed parts 108, which are each surrounded on all four sides by protruding parts 106, expand and change shape while being restrained by the protruding parts 106 which cannot expand, the result being that the shape of each

of the shallow recessed parts 108 becomes approximately quadrangular.

[0053] When the girdle knitted in the way of the first variation is worn, the protruding parts 106 formed on the inner surface between the belly and the buttocks and around the thighs fit closely against these parts of the wearer's body, producing a shiatsu (finger-pressure)-like action and stimulating the wearer's skin, and resulting in the flow of the blood and the lymph being promoted and in metabolism in the wearer's body as a whole being improved. There is thus a considerable contribution to improving health, and in addition the following excellent effects unique to the invention are exhibited.

[0054] When this girdle is worn, as shown in Fig. 6 and Fig. 13, on the outer surface of the girdle, the approximately quadrangular shape of the outer surface side of each of the deep recessed parts 107 greatly expands in a sidewise direction to become an approximately elliptical shape, coming out prominently in the external appearance, and resulting in a girdle that has an elegance and attractiveness not achieved with conventional girdles and that is thus suitable as women's inner wear.

[0055] On the inner surface of the girdle, on the other hand, superfluous flesh and/or subcutaneous fat is pinched by the protruding parts 106, the deep recessed parts 107 and the shallow recessed parts 108, which are long in a sidewise direction, with this pinching action being repeated every time the wearer's body moves, resulting in an effect being exhibited in which superfluous flesh and/or subcutaneous fat is reduced naturally.

[0056] In particular, the pinching force varies according to the difference in the depth between the deep recessed parts 107 and the shallow recessed parts 108, resulting in an even greater effect of reducing subcutaneous fat. Moreover, when the girdle is worn, superfluous flesh and/or subcutaneous fat pushed out by the protruding parts 106 moves into the shallow recessed parts 108 and the deep recessed parts 107, but even if the shallow recessed parts 108 are filled with superfluous flesh and/or subcutaneous fat, in the deep recessed parts 107, a state is secured in which a layer of air remains above the layer of superfluous flesh and/or subcutaneous fat, resulting in the girdle having improved breathability and in a feeling of oppression being alleviated, and hence in a refreshing, favorable wearing sensation being obtained. In addition, air enters into the deep recessed parts 107 and the shallow recessed parts 108 to produce a thermal insulation effect, and hence the girdle can be used for protecting against cold.

[0057] In the first variation of the knit structure, protrusions and recesses formed in the inner side of the knitted fabric of the clothing are such that the protruding part 106 and the recessed part having different knit structures to each other are formed alternately and that each recessed part comprises the deep recessed part 107 and the shallow recessed part 108 which are formed

alternately with the protruding part 106 interposing therebetween. However, the variation of the knit structure is not limited to the above.

[0058] More specifically, as shown in Fig. 16 depicting a second variation, protruding parts 206B aligned in line direction may be formed in the inner surface of a knitted fabric of clothing in such a manner that a plain stitch region 203 and the protruding part 206B are formed alternately.

[0059] Similar to the arrangements shown in Figs. 10 and 15, the knit structure of Fig. 16 is shown spread out for explanatory purpose. Each protruding part 206B includes a float stitch region R21 and a plain stitch region R22. More specifically, knit segments R20 each having 4-lines and 16-rows as a unit of knit structure which includes 1-line 16-row float stitch region R21 and 3-line 16-row plain stitch region R22 are aligned side by side in line direction. In other words, the series of knit segments R20 are arrayed straightforwardly in line direction (sidewise direction).

[0060] The reverse side (inner side) of the knit structure becomes such that each plain stitch region R22 bulges out by an amount corresponding to 16 rows being pulled into 1 row by a loop 245 of each 1-line 16-row float stitch region R21. Thus, the protruding parts 206B are aligned straightforwardly in line direction with each rib thereof retaining its desired height and with the plain stitch region 203 interposed between the adjacent ones of the protruding parts 206B. A tuck stitch is formed each 4 rows (namely, tuck stitch group of 241 to 244) in the float stitch region R21 of the protruding part 206B.

[0061] In this way, forming each protruding part 206B by 16-row float stitch and 16-row plain stitch with a combination of tuck stitch formed each 4 row in each float stitch region R21 enables to retain the protruding part 206B at a sufficient height because the protruding part 206B is free from a burden due to needle operation of a circular knitting machine during knitting.

[0062] Clothing made of the knitted fabric having the second variation of knit structure has the following effect. A tension exerted to each protruding part 206B is lessened because the plain stitch region 203 which is interposed between the adjacent ones of the protruding parts 206B is expanded every time a wearer moves her body. With this construction, the knitted fabric is expanded with each protruding part 206B securely retaining its desirable height.

[0063] Thus, a series of protruding parts 206B and recessed parts corresponding to the plain stitch regions 203 securely produce a massage action and result in prominent embossed-like patterns formed by the series of protruding parts and recessed parts in its external appearance, thus providing the clothing of an attractive and tasteful design.

[0064] Next, a third variation of the knit structure is described with reference to Fig. 17. As shown in Fig. 17, protruding parts 206C aligned in an undulating or sinusoidal manner in line direction may be formed in the in-

ner surface of a knitted fabric of clothing. The protruding parts 206C are displaced from one another in row direction by a certain number of rows in such a manner that the protruding parts 206C are arrayed in line direction in an undulating manner with a plain stitch region 203' interposed between the adjacent ones of the protruding parts 206C.

[0065] Similar to the arrangements shown in Figs. 10, 15, and 16, the knit structure of Fig. 17 is shown spread out for explanatory purpose. A portion corresponding to each protruding part 206C includes a float stitch region R21' and a plain stitch region R22'. More specifically, knit segments R20' each having 4-lines and 16-rows as a unit of knit structure which includes 1-line 16-row float stitch region R21' and 3-line 16-row plain stitch region R22' are arranged side by side in line direction in such a manner that the knit segments R20' are displaced from one another in row direction by a certain number of rows. In other words, the series of knit segments R20' are arrayed in an undulating manner in line direction (sidewise direction).

[0066] The reverse side (inner side) of the knit structure becomes such that each plain stitch region R22' bulges out by an amount corresponding to 16 rows being pulled into 1 row by a loop 245' of each 1-line 16-row float stitch region R21'. Thus, the protruding parts 206C are aligned in an undulating manner in line direction with each rib thereof retaining its desired height and with the plain stitch region 203' interposed between the adjacent ones of the protruding parts 206C. A tuck stitch is formed each 4 rows (namely, tuck stitch group of 241' to 244') in the float stitch region R21' of the protruding part 206C.

[0067] Thus, similar to the knit structure as shown in Fig. 16, a series of protruding parts 206C and recessed parts corresponding to the plain stitch regions 203' securely produce a massage action and result in prominent embossed-like patterns formed by the series of protruding parts and recessed parts in its external appearance, thus providing the clothing of an attractive and tasteful design.

[0068] Next, a fourth variation of the knit structure is described with reference to Fig. 18. Protruding parts 206d aligned in line direction may be formed in the inner surface of a knitted fabric of clothing in such a manner that plain stitches 203" and the protruding parts 206D are formed alternately.

[0069] Similar to the arrangements shown in Figs. 10, 15, 16, and 17, the knit structure of Fig. 18 is shown spread out for explanatory purpose. A portion corresponding to each protruding part 206D includes a float stitch region R21" and a plain stitch region R22". More specifically, knit segments R20" each having 4-lines and 16-rows as a unit of knit structure which includes 1-line 16-row float stitch region R21" and 3-line 16-row plain stitch region R22" are arranged side by side in line direction in such a manner that the knit segments R20" are displaced from one another in row direction by a certain number of rows. In other words, the series of knit

segments R20" are arrayed straightforwardly in line direction (sidewise direction).

[0070] The reverse side (inner side) of the knit structure becomes such that each plain stitch region R22" bulges out by an amount corresponding to 16 rows being pulled into 1 row by a loop 245" of each 1-line 16-row float stitch region R21". Thus, the protruding parts 206D are aligned straightforwardly in line direction with each rib thereof retaining its desired height and with the plain stitch region 203" interposed between the adjacent ones of the protruding parts 206D.

[0071] In this variation, however, one tuck stitch 241" is formed in the float stitch region R21" of the protruding part 206D. In the fourth variation, the tuck stitch 241" is formed by the yarn on the row immediately following the row on which the yarn resides to form the loop 245". However, it may be appreciated to form a tuck stitch by the yarn on an intermediate row or upper row in the float stitch region R21".

[0072] The series of protruding parts 206D and recessed parts corresponding to the plain stitch regions 203" securely produce a massage action and result in prominent embossed-like patterns formed by the series of protruding parts and recessed parts in its external appearance, thus providing the clothing of an attractive and tasteful design.

[0073] In the aforementioned embodiments, the entirety of the knitted fabric is knitted with the same knitting material. The invention is not limited thereto. For instance, a knitting material for the loop 166 in the float stitch region R11 in the first variation of the knit structure may have a greater strength than the one used for the other parts in order to increase the tension force exerted from the loop 166 in the float stitch region R11. For the loop 61 (166, 245, 245', and 245"), alternatively, double yarns may be provided in place of the single yarn.

[0074] Further, in the construction of the fourth variation, it may be appreciated to form the loop 245" by a soft yarn and form the tuck stitch 241" by a hard yarn. The soft yarn and the hard yarn are combined into a single yarn in the plain stitch regions.

[0075] The same alteration is applicable to a set of two loops 81 which are provided in each float stitch region R13. Likewise, the alteration is applicable to the tuck groups of 161 to 165, 241 to 244, 241' to 244', and 241" and 182, 182.

[0076] Above is a description of principal embodiments of the invention. However, the invention is not limited to the above-mentioned embodiments. For example, it is also possible to form the abdominal part of the front of the girdle or long spats in a V-shape so as to restrain the abdomen more strongly.

[0077] Moreover, in the above, examples were shown in which the whole of the knitted fabric is knitted using the same yarn materials, but the invention is not limited to this. It would be appreciated that an extending yarn forming the loops 61 (166, 245, 245', 245") of the float stitch regions R1 (R11, R21, R21', R21") is made to have

a higher strength yarn in order to reinforce the pulling strength of the loops 61 (166, 245, 245', 245'') than yarns constituting the other stitches. Moreover, it could be also possible to add other loops like the loops 61 (166, 245, 245', 245''), thus knitting double loops. This also applies to the two loops 81 (181) of each of the float stitch regions R3 (R13).

[0078] It goes without saying that various such design changes are possible so long as the object of the invention can be attained and the key points of the invention are not deviated from.

[0079] As described above, an inventive inner wear comprises an elastic knitted fabric including protruding parts and recessed parts having different knit structures alternately with respect to an inner surface of the inner wear in required places of portions fitting against a wearer's body. The recessed parts includes deep recessed parts and shallow recessed parts. The protruding part has a knit structure in which plain stitch regions and float stitch regions are alternately arranged.

[0080] When the inner wear is worn, every time the wearer's body moves the protruding parts and recessed parts on the inner surface of the inner wear stimulate the wearer's skin, producing a massage action, promoting metabolism, and improving blood flow. Moreover, superfluous flesh and/or subcutaneous fat is pinched by the protruding parts, the deep recessed parts and the shallow recessed parts, with this pinching action being repeated every time the wearer's body moves, resulting in an effect being exhibited in which superfluous flesh and/or subcutaneous fat is reduced naturally.

[0081] In particular, the pinching force varies according to the difference in the depth between the deep recessed parts and the shallow recessed parts, resulting in an even greater effect of reducing subcutaneous fat. Moreover, when the inner wear is worn, superfluous flesh and/or subcutaneous fat pushed out by the protruding parts moves into the shallow recessed parts and the deep recessed parts, but even if the shallow recessed parts are filled with superfluous flesh and/or subcutaneous fat, in the deep recessed parts a state is secured in which a layer of air remains above the layer of superfluous flesh and/or subcutaneous fat, resulting in the inner wear having improved breathability and in a feeling of oppression being alleviated, and hence in a refreshing, favorable wearing sensation being obtained. In addition, air enters into the deep recessed parts and the shallow recessed parts to produce a thermal insulation effect, and hence the inner wear of the invention can be used as inner wear for protecting against cold.

[0082] The deep recessed parts may be preferably knitted with plain stitches. Also, the shallow recessed parts may be preferably constituted with a knit structure in which plain stitch regions and float stitch regions are arranged in a matrix. Alternatively, the shallow recessed parts may be preferably constituted with a knit structure in which plain stitch regions, float stitch regions, and tuck stitch regions are arranged in a matrix. The protruding

parts may be preferably constituted with a knit structure in which plain stitch regions and second float stitch regions are alternately arranged, the number of rows of stitches being set to be greater in the float stitch regions of the protruding parts than in the float stitch regions of the shallow recessed parts.

[0083] Accordingly, the undulating shape of the protruding parts, the deep recessed parts and the shallow recessed parts is formed assuredly on the reverse side (the inner surface) of the knit structure, with the relationship between the protruding parts, the deep recessed parts and the shallow recessed parts being maintained, and as a result the above-mentioned effects are produced assuredly.

[0084] It would be appreciated to knit the inner wear such that, when the inner wear is worn, the outer surface side of each of the deep recessed parts expands into an approximately elliptical shape, and the outer surface side of each of the shallow recessed parts expands into an approximately quadrangular shape. Accordingly, when the inner wear is worn, the elliptical shapes show prominently in the external appearance, resulting in an attractive, tasteful design, which is ideal for women's inner wear in particular and is not achieved with conventional inner wear.

[0085] It would be preferable that the float stitch region of the protruding part includes a plurality of float stitches and at least one tuck stitch. Further, it would be preferable to form a plurality of tuck stitches, the tuck stitches being arranged every a predetermined number of float stitches. The tuck stitch will reinforce and support the formation of the protrusion by the combination of the float stitch and the plain stitches.

[0086] Also, it would be preferable that the extending yarn of the second float stitch has a strength stronger than yarns constituting the other stitches. This will reinforce and support the formation of the protrusion by the combination of the float stitch and the plain stitches.

[0087] This application is based on patent application Nos. 2001-60323, 2001-115763, and 2001-155544 filed in Japan, the contents of which are hereby incorporated by references.

Claims

1. An inner wear comprising an elastic knitted fabric including protruding parts and recessed parts having different knit structures alternately with respect to an inner surface of the inner wear in required places of portions fitting against a wearer's body, wherein the recessed parts includes deep recessed parts and shallow recessed parts.
2. An inner wear according to claim 1, wherein the deep recessed part is formed with plain stitches, the shallow recessed part has a knit structure in which plain stitch regions and first float stitch regions are

arranged in a matrix, the protruding part has a knit structure in which plain stitch regions and second float stitch regions are alternately arranged, and the number of rows of stitches is set to be greater in the second float stitch regions than in the first float stitch regions.

3. An inner wear according to claim 1, wherein the deep recessed part is formed with plain stitches, the shallow recessed part has a knit structure in which plain stitch regions, first float stitch regions, and tuck stitch regions are arranged in a matrix, the protruding part has a knit structure in which plain stitch regions and second float stitch regions are alternately arranged, and the number of rows of stitches is set to be greater in the second float stitch regions than in the first float stitch regions.
4. An inner wear according to one of claims 2 to 3, wherein the second float stitch region includes a plurality of float stitches and at least one tuck stitch.
5. An inner wear according to one of claims 2 to 4, wherein an extending yarn of the second float stitch has a strength stronger than yarns constituting the other stitches.
6. An inner wear according to one of claims 1 to 5, wherein the inner wear is knitted such that, when the inner wear is worn, the outer surface side of each of the deep recessed parts expands into an approximately elliptical shape, and the outer surface side of each of the shallow recessed parts expands into an approximately quadrangular shape.
7. An inner wear comprising an elastic knitted fabric including protruding parts and recessed parts having different knit structures alternately with respect to an inner surface of the inner wear in required places of portions fitting against a wearer's body, wherein the protruding part includes a knit structure in which plain stitch regions and float stitch regions are alternately arranged, and the float stitch region has a plurality of float stitches and at least one tuck stitch.
8. An inner wear according to claim 7, wherein the float stitch region has a plurality of tuck stitches every a predetermined number of float stitches.
9. An inner wear according to claim 7, wherein the recessed part is formed with plain stitches.
10. An inner wear according to claim 7, wherein the recessed parts includes deep recessed parts and shallow recessed parts.
11. An inner wear according to claim 10, wherein the

deep recessed part is formed with plain stitches, the shallow recessed part has a knit structure in which plain stitch regions and first float stitch regions are arranged in a matrix.

12. An inner wear according to claim 10, wherein the deep recessed part is formed with plain stitches, the shallow recessed part has a knit structure in which plain stitch regions, first float stitch regions, and tuck stitch regions are arranged in a matrix.

FIG. 1

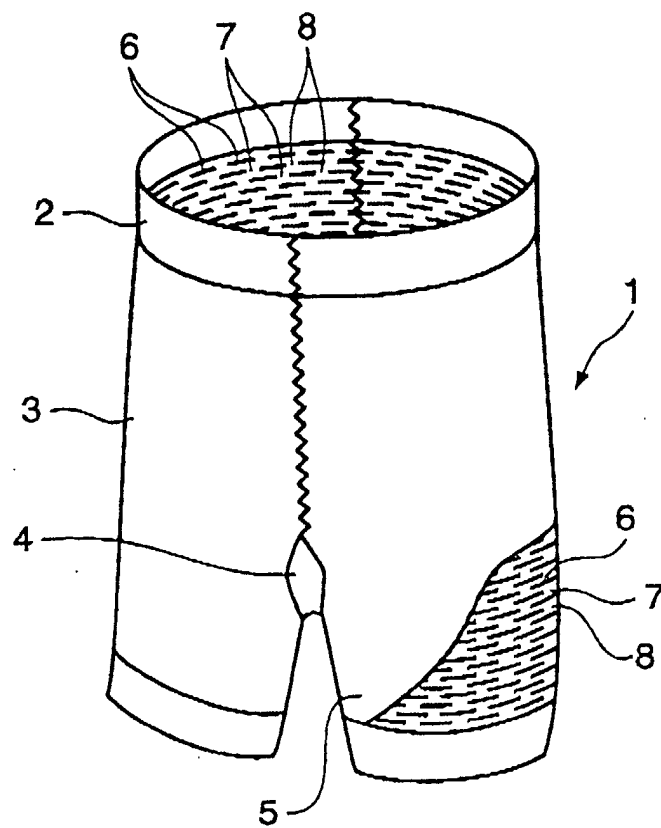


FIG. 2

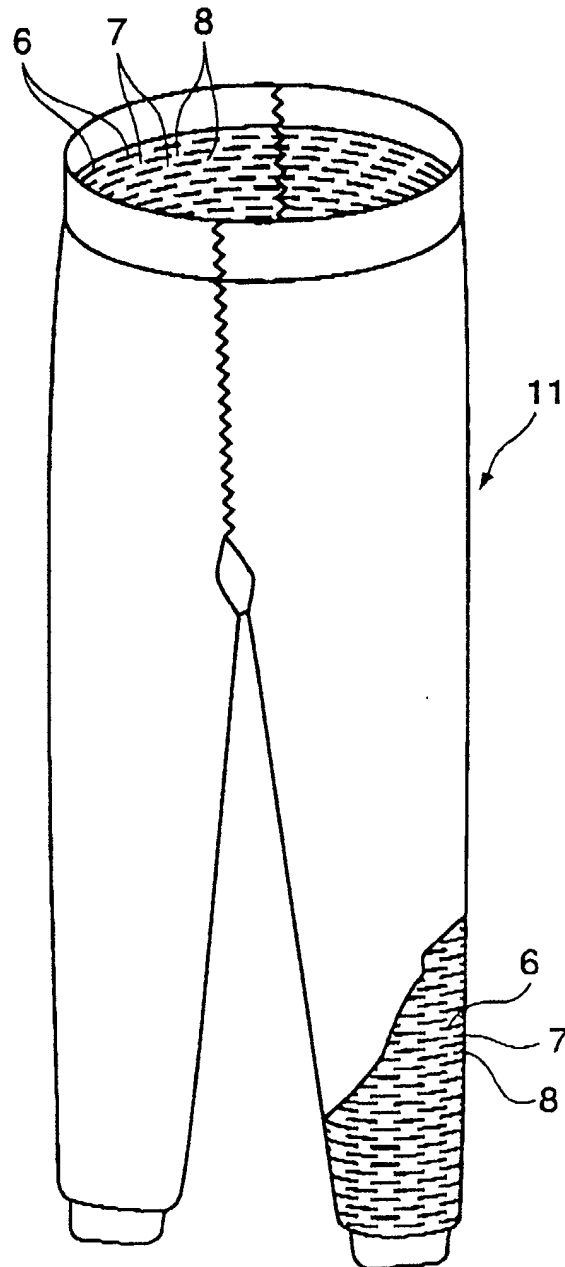


FIG. 3

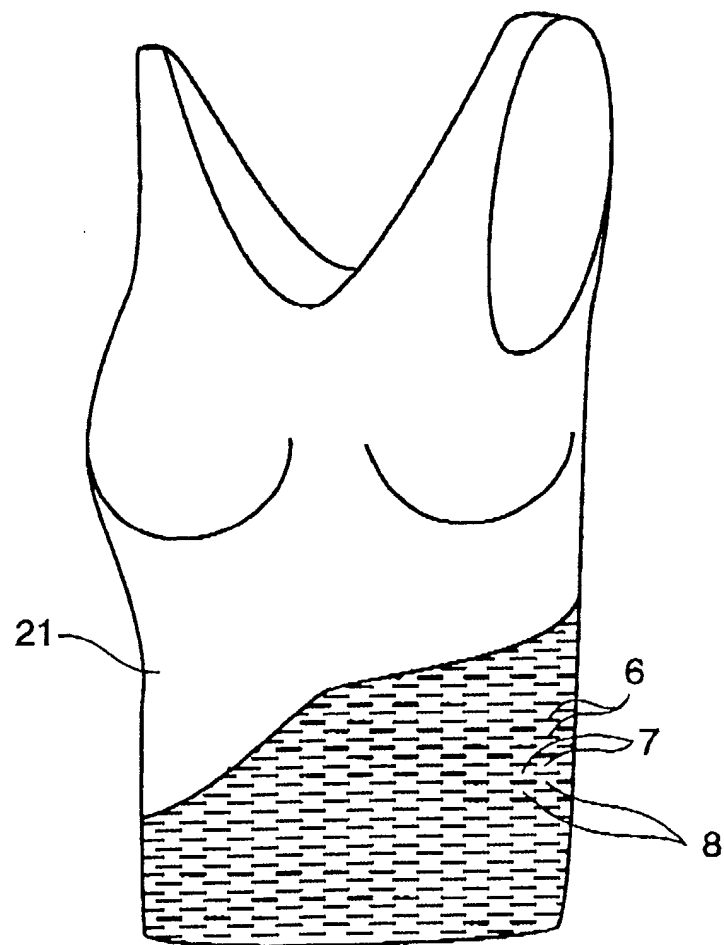


FIG. 4

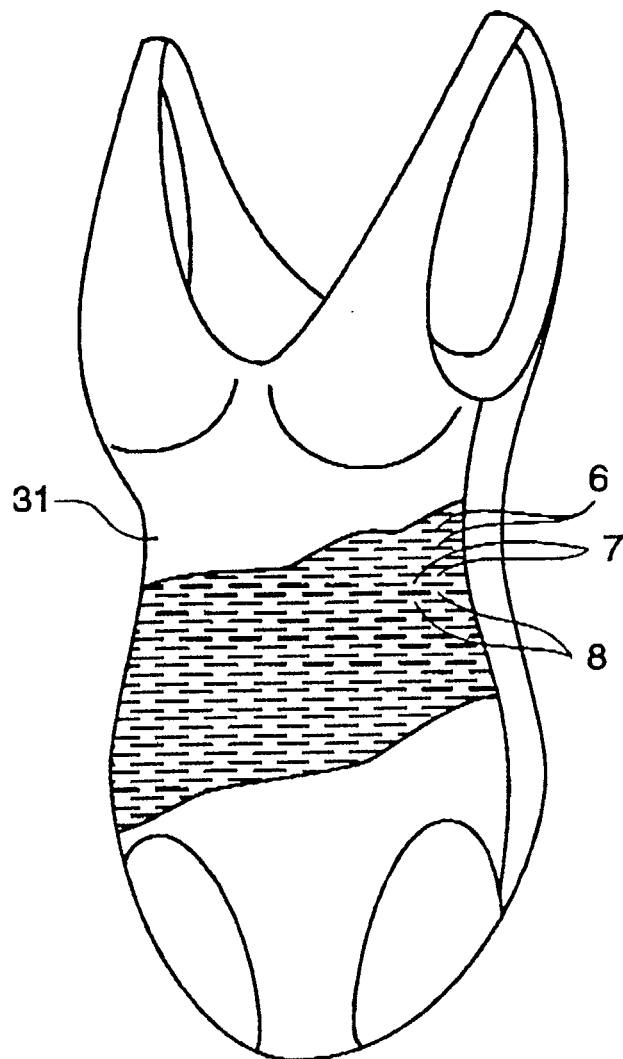


FIG. 5

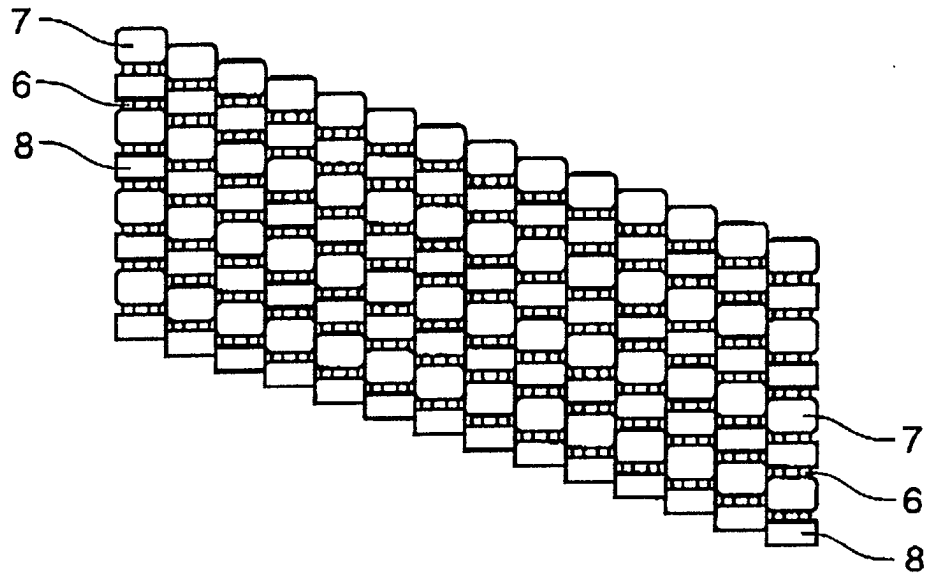


FIG. 6

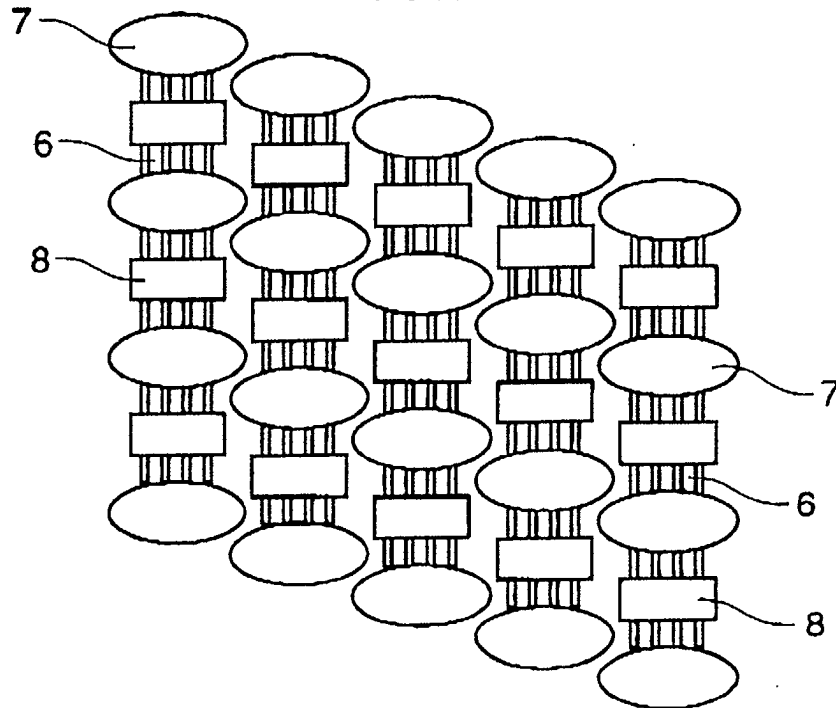


FIG. 7

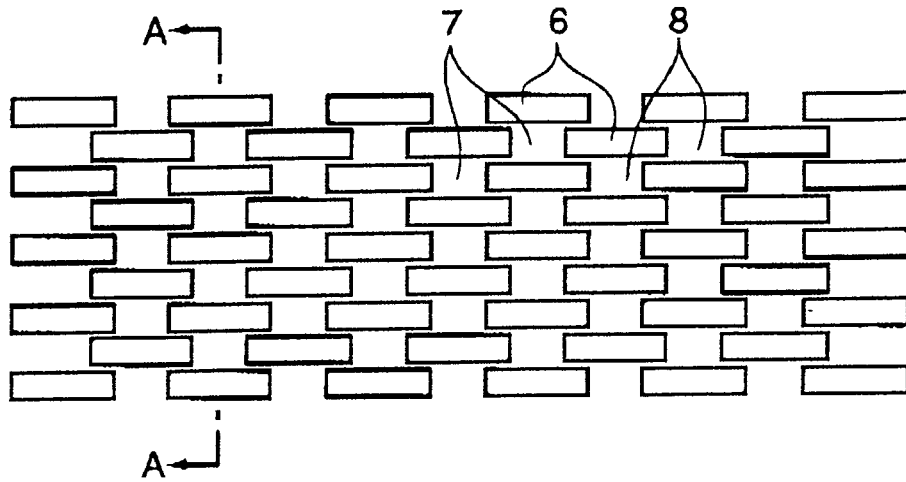


FIG. 8

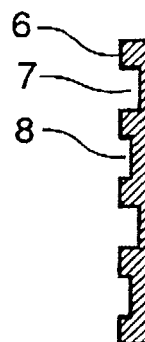


FIG. 9

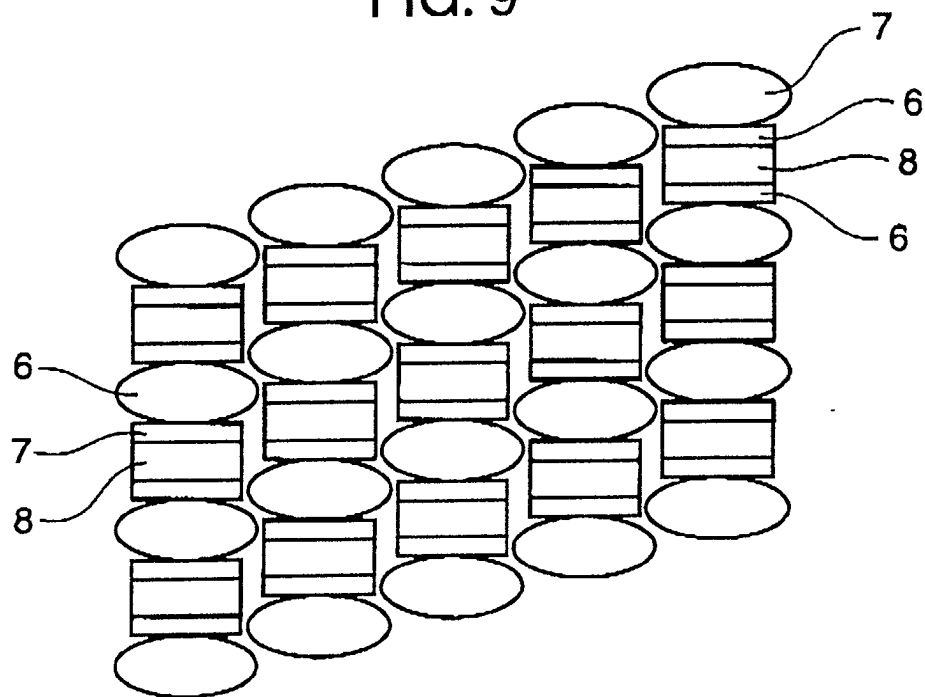


FIG. 10

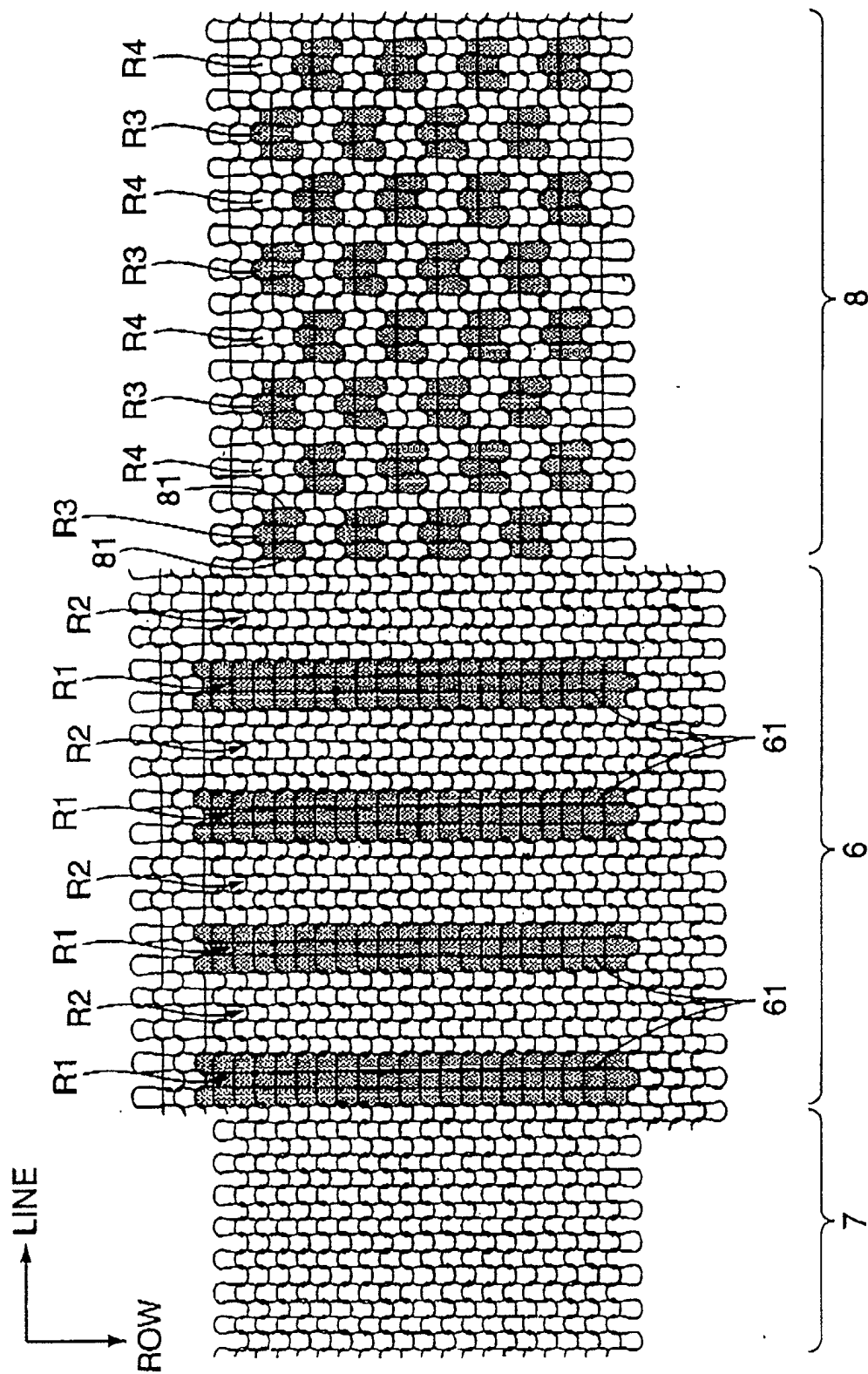


FIG. 11

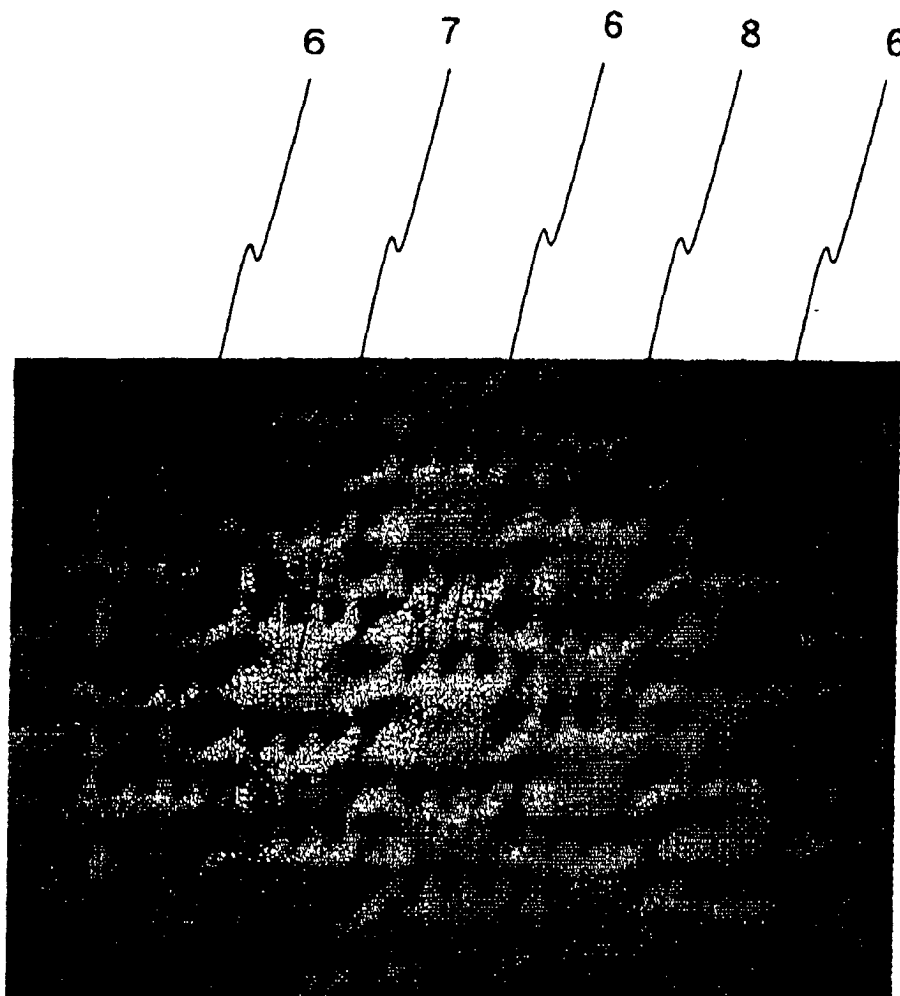


FIG. 12

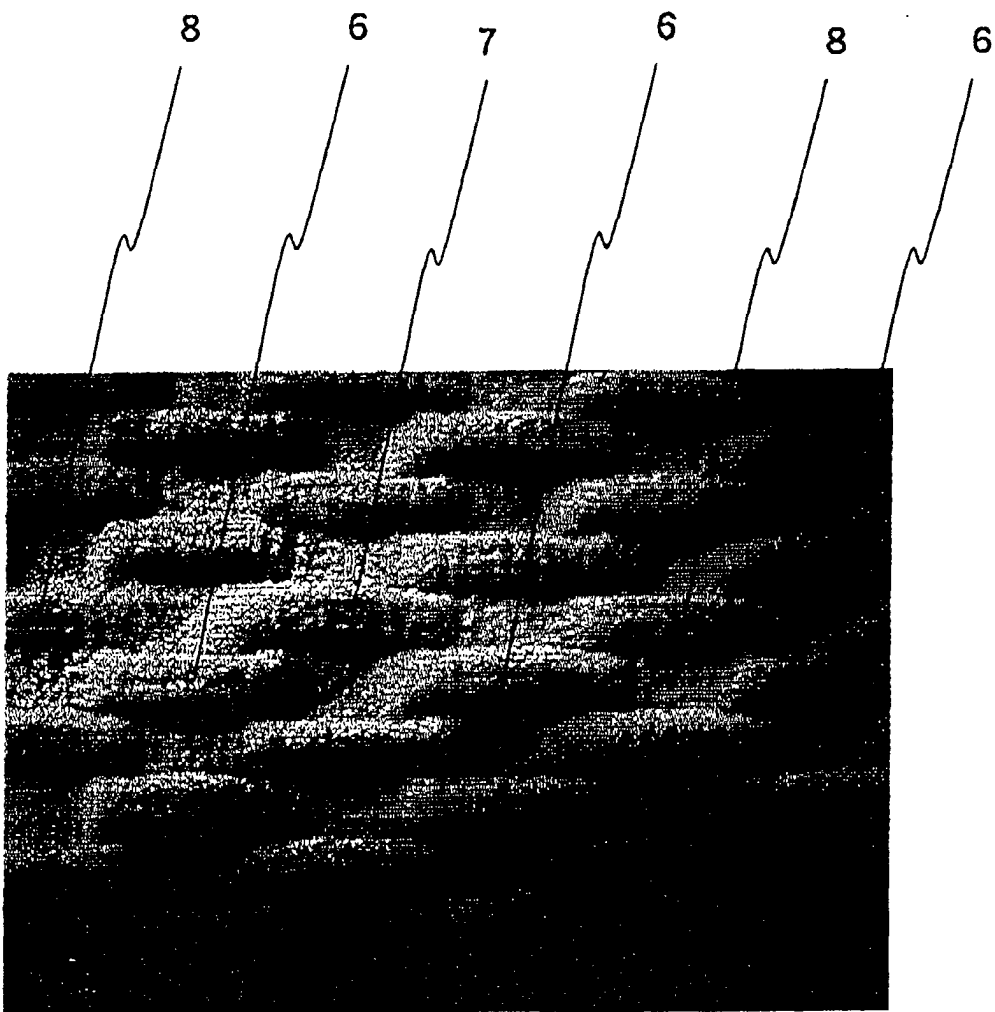


FIG. 13

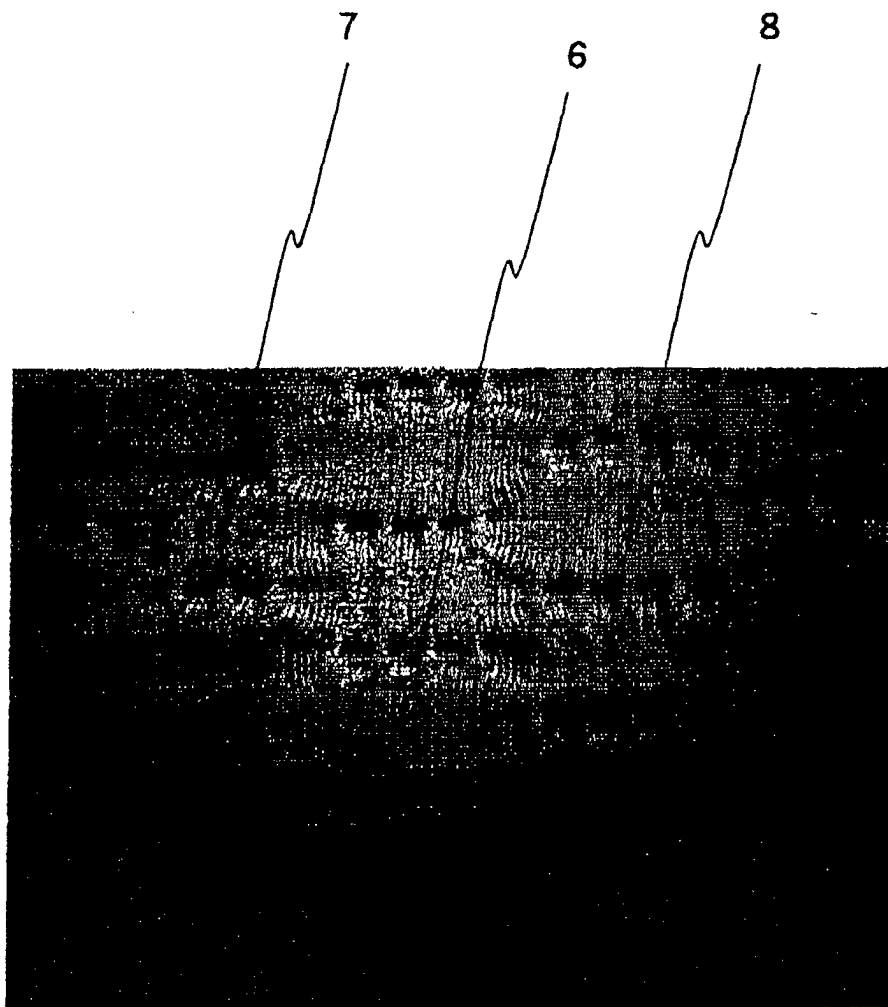


FIG. 14

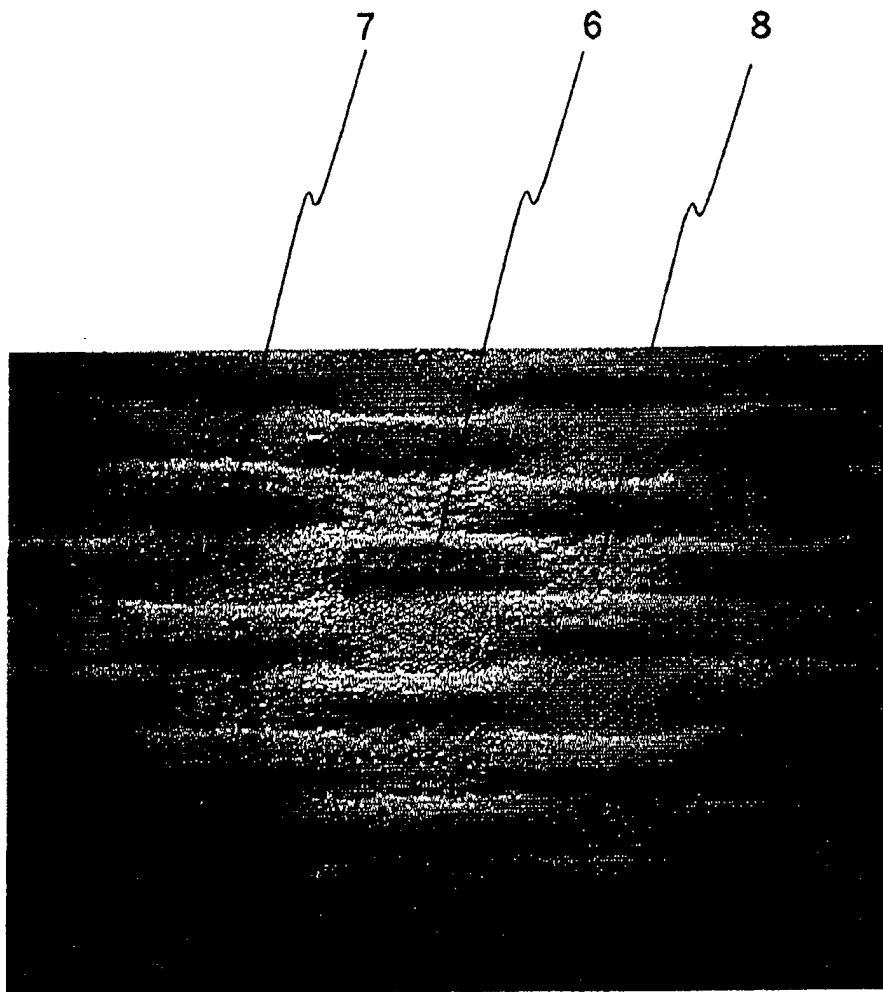


FIG. 15

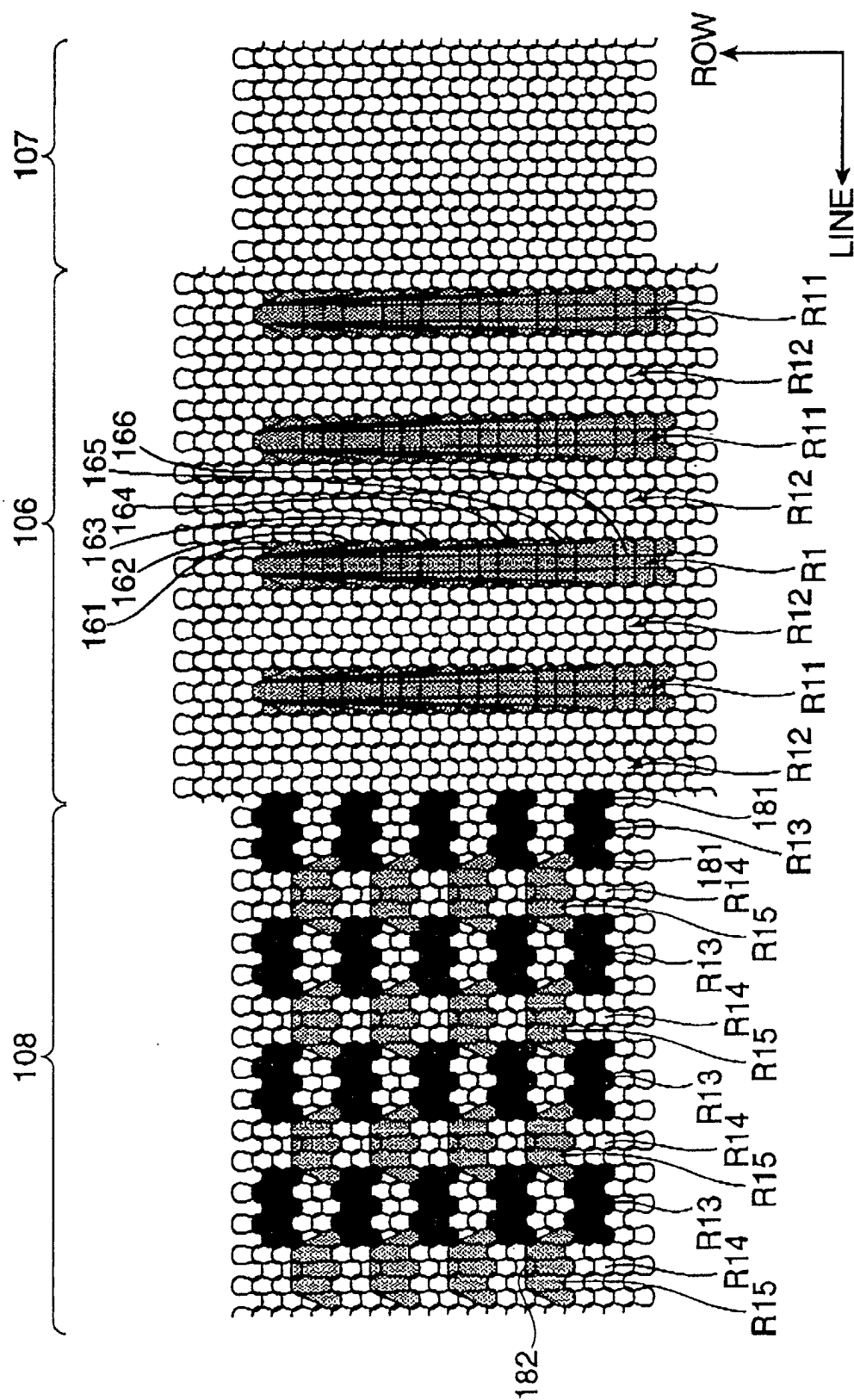


FIG. 16

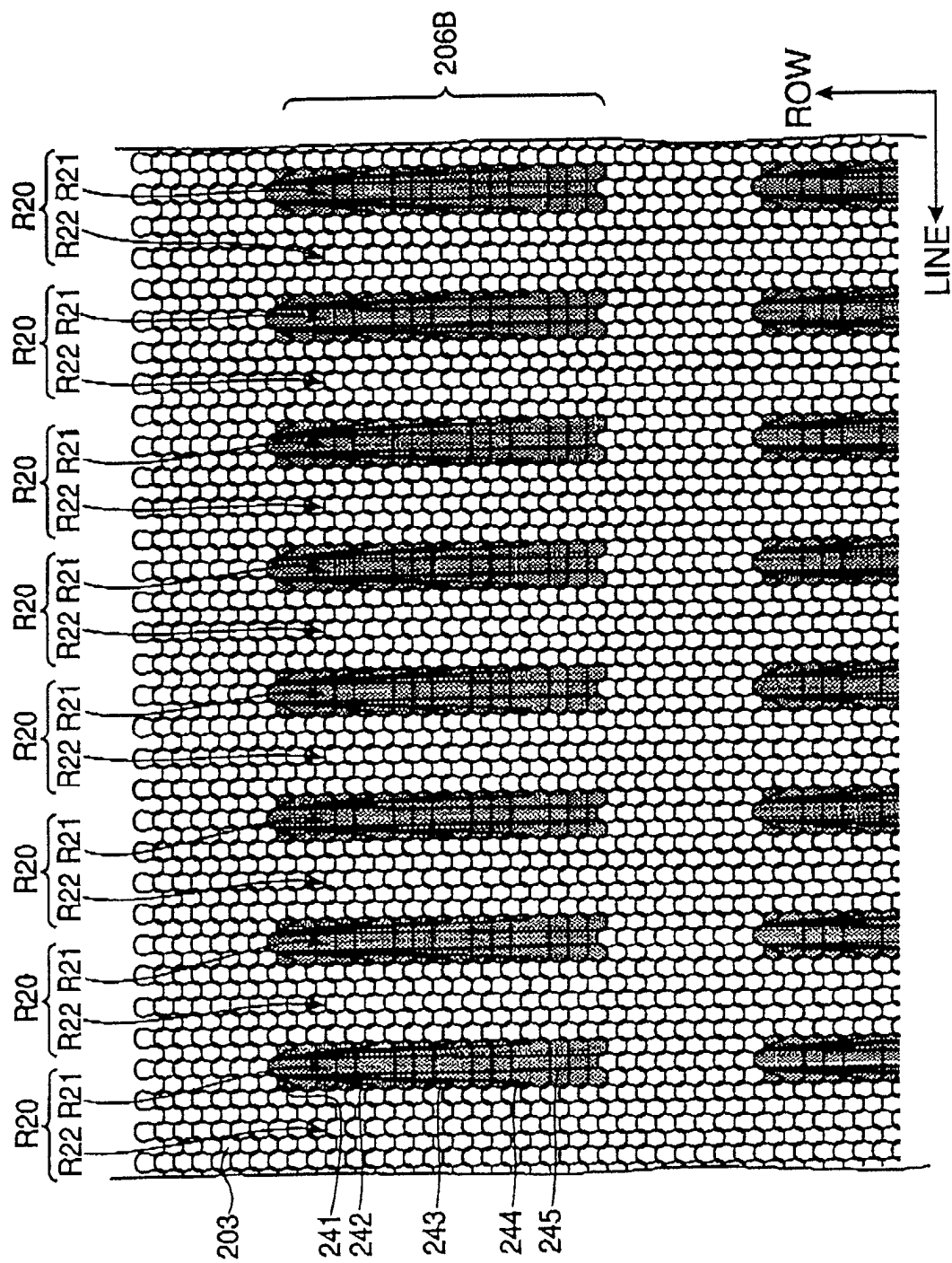


FIG. 17

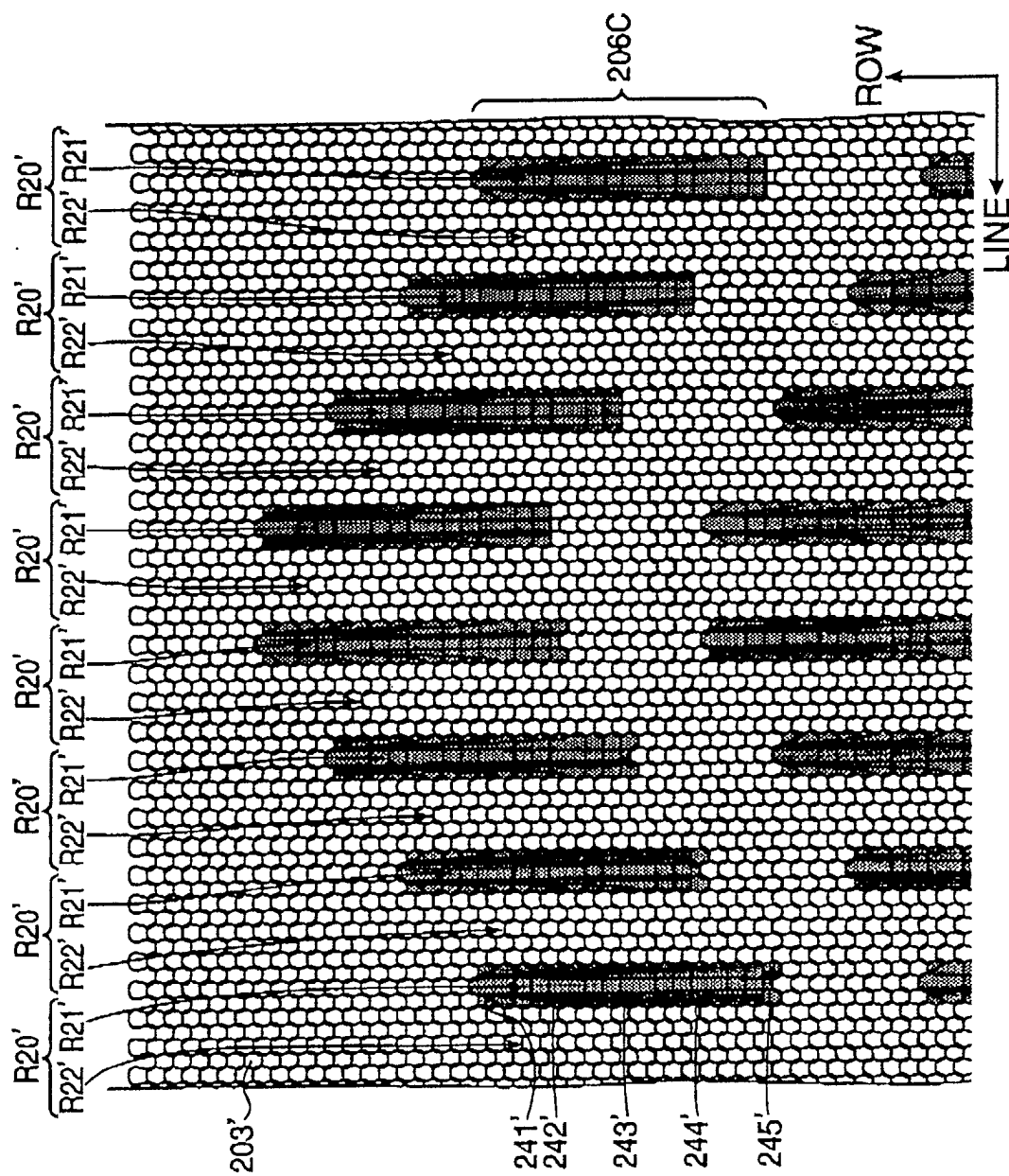


FIG. 18

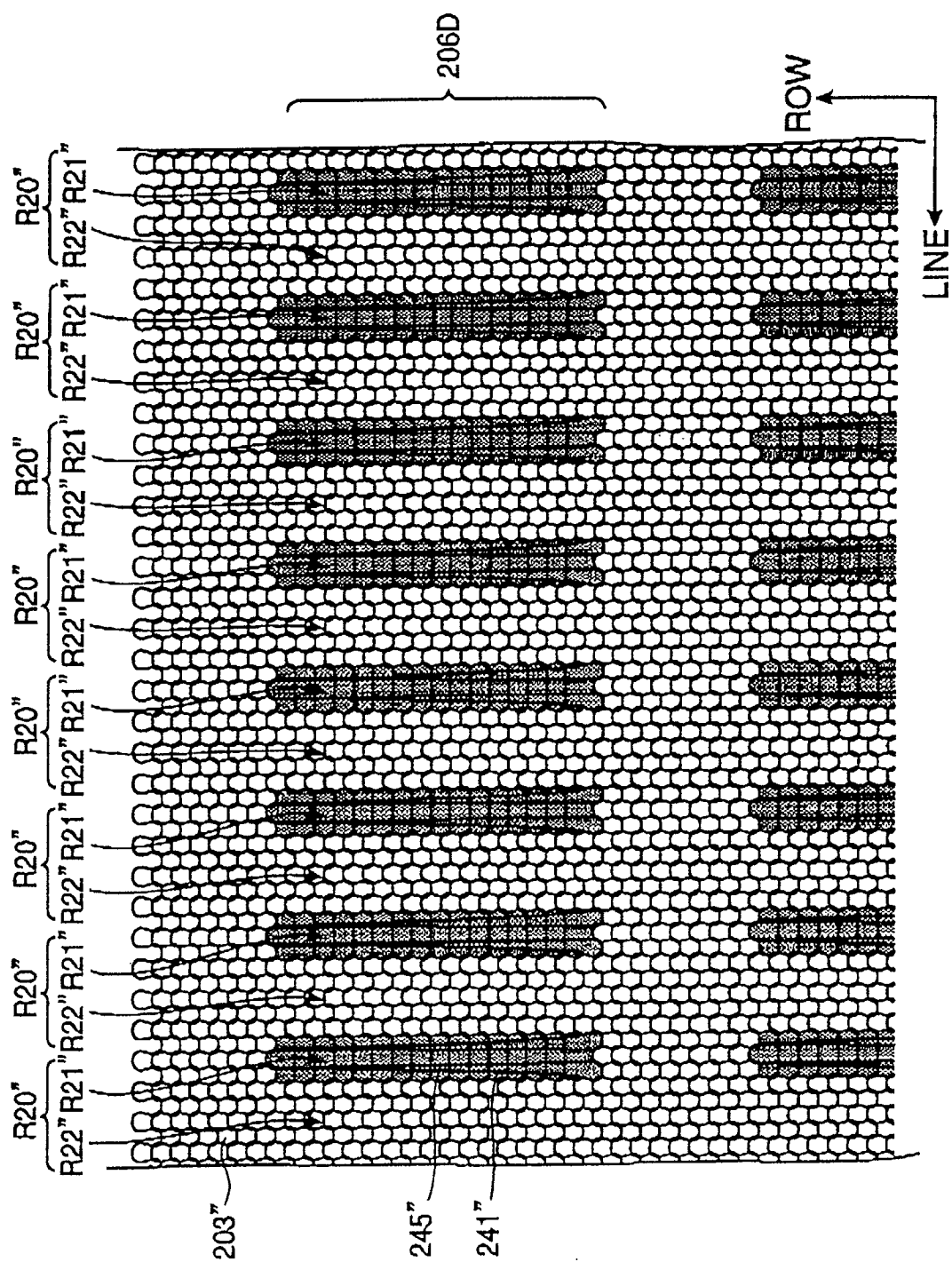


FIG. 19

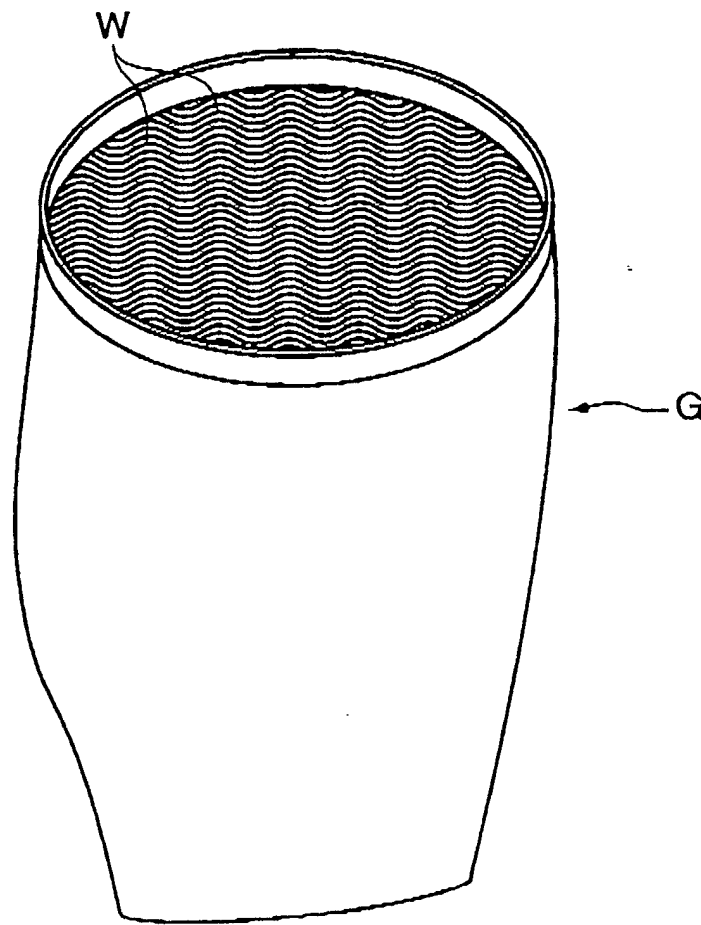


FIG. 20

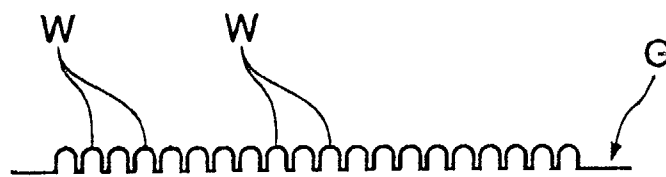


FIG. 21





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 February 2002	Van Gelder, P
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