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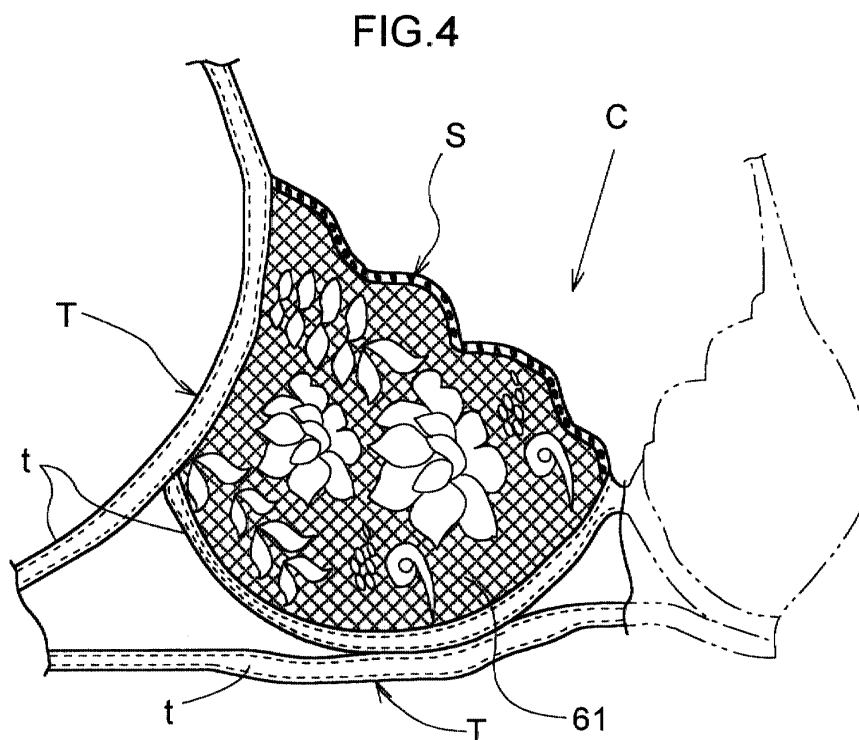
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(54) **Cup product for use in brassiere and brassiere using the cup product**

(57) A cup product for use in a brassier and a brassier or like product using the cup product are disclosed. The cup product has a cup for covering a breast, a scallop portion provided at a peripheral edge of the cup, and an ornamental lace portion provided over a surface of

the cup. The scallop portion and the ornamental lace portion are provided as one continuous lace fabric, and this lace fabric is formed into a three-dimensional shape by means of molding with the scallop portion being placed at an end of the three-dimensional shape.



Description

[0001] The present invention relates to a cup product for use in a brassier having a scallop portion provided at an edge of a cup for covering a breast and an ornamental lace portion provided on a surface of the cup. The invention relates also to a brassier using such product.

BACKGROUND OF THE INVENTION

[0002] A cup product C for use in such a brassier, as shown in Fig. 8, often includes a lace 61 on its surface. In recent years, there is preference among consumers for a cup product C having a so-called scallop S at an upper edge thereof which comprises a continuous wave-like ornamental portion.

[0003] Referring to a specific example of such component, as shown in an exploded view in Fig. 7, the cup product includes a three-dimensionally formed urethane cup Ca, pre-determined cloths 62, 63 attached respectively to the front and back sides of the cup Ca, and a scallop lace cloth S attached to the upper edge of the cup product C as a continuous wave-like ornamental portion.

[0004] For manufacturing such cup product C as above, first, the three-dimensionally molded cup Ca is prepared and also a wide lace material prepared as a planar knitted fabric is three-dimensionally formed (specifically, molded) into a shape required by the end product. Thereafter, as illustrated in Fig. 9 (portions to be three-dimensionally formed are denoted by mark M and cutting lines are denoted by broken lines), the lace material is formed into the predetermined shape to obtain the cloth 62 as the front-side lace member. Similarly, the back-side cloth 63 is formed three-dimensionally.

[0005] Then, according to the convention, for providing the scallop lace cloth S, there is separately prepared a scallop lace material Sa, as illustrated in Fig. 7.

[0006] In summary, for manufacturing a brassier by the above-described conventional method, there are prepared, as the major components thereof, the urethane cup Ca, the molded lace cloth 62, the molded back-side cloth 63 as well as the scallop lace material Sa. Then, these members are sewn together to form the cup product C having the scallop S at the predetermined edge thereof.

[0007] In manufacturing the lace cloth 62 molded in the manner described above, as a base material, there is prepared a wide lace material having a relatively large width. Then, the predetermined portions M of this material are molded.

[0008] On the other hand, the brassier includes a pair of cups for covering breasts, a central connecting portion for interconnecting the cups at the center therebetween and other members such as shoulder straps and a back strap. Accordingly, in order to obtain a brassier, it is necessary to prepare at least one pair of right and

left cups.

[0009] In recent years, there has been proposed a new brassier construction adapted for drawing the user's breasts closer to each other toward the center of chest when the brassier is worn by the user, in order to e.g. provide improved silhouette of the breasts (to increase the "depth" between the breasts when supported by the brassier).

[0010] Conventionally, for manufacturing a cup product for use in such "center-drawing" type brassier, a mold having a spherical end is employed to obtain a pair of semi-spherical molded members (the shape shown in Fig. 10 (b)) and then these members are sewn together with offsetting the maximum bulging portions of the members toward the center therebetween (represented by broken lines in Fig. 10(e)), thereby to obtain the major components of the brassier to be fitted over the pair of user's breasts.

[0011] Another conventional method involves appropriate three-dimensional cutting and three-dimensional sewing of the semi-spherical cup member to obtain a brassier cup having a desired shape.

[0012] The conventional methods described above have two problems concerning the appearance as follows.

1. Problem concerning the connecting portion between the ornamental lace portion and the scallop portion:

[0013] For manufacturing the cup product C such as shown in Fig. 8, it is necessary to prepare an urethane cup Ca, a front-side lace cloth 62, a back-side cloth 63 and a scallop lace cloth Sa and then to sew these members together. Hence, there is the problem of appearance due to the presence of numerous sewn portions T as shown in Fig. 8. Accordingly, this method is very troublesome. Moreover, as each of these sewn portions T is sewn together with a tape t applied thereto, the sewn portion gives a rough surface feel to the user.

2. Problem concerning the formation of desired worn silhouette

[0014] On the other hand, referring to the worn silhouette, the above-described conventional method for manufacturing the brassier using the semi-spherical molded cups with their maximum bulging portions (i.e. the apices of the semi-spheres) offset closer to each other (see Fig. 10(e)) requires high precision in the cutting and sewing steps. And, with this method, it is often difficult to obtain a desired uniform silhouette. Hence, in these respects, there exists room for improvement in this conventional method.

[0015] The other conventional method involving three-dimensional cutting and three-dimensional sewing is troublesome, thus inviting cost increase.

[0016] In view of the above-described state of the art,

the primary object of the present invention is to provide a cup product for use in a brassier and a brassier using such cup product, which use a lace fabric having a scallop portion, yet can provide improved appearance and silhouette without inviting cost increase.

SUMMARY OF THE INVENTION

[0017] For accomplishing the above-described object, according to claim 1 of the present invention, there is provided a cup product for use in a brassier, the cup having a cup for covering a breast, a scallop portion provided at a peripheral edge of the cup, and an ornamental lace portion provided over a surface of the cup;

wherein the scallop portion and the ornamental lace portion comprise one continuous lace fabric, and this lace fabric is formed into a three-dimensional shape by means of molding with the scallop portion being placed at an end of the three-dimensional shape.

[0018] According to the above-described cup product, the ornamental lace portion provided on the surface of the cup and the scallop portion comprise one continuous or seamless knitted lace fabric. Therefore, there is no need to provide a seam, a tape, etc. between the ornamental lace portion and the scallop portion. As a result, it becomes possible to obtain a brassier with much improved appearance.

[0019] Moreover, with the reduced number of steps involved in the method, the method allows production at lower costs.

[0020] In the construction described above, according to claim 2, the continuous knitted lace fabric is formed by means of the molding over the peripheral edge of the cup around a maximum bulging center thereof.

[0021] In a finished brassier cup product, the ornamental feature is most important at the peripheral edge of the cup bridging between the scallop portion and the ornamental lace portion. In addition to this, the ornamental feature at the maximum bulging center of the cup and the periphery of this center is also important. In particular, in the area above the maximum bulging center of the cup, the ornamental lace portion is usually provided. And, at this area, it is desired that the ornamental pattern be formed continuous.

[0022] For instance, if a three-dimensional cutting or sewing is done from the peripheral edge of the cup toward the maximum bulging center thereof, this will provide discontinuity in the ornamental pattern at this portion, resulting in deteriorated appearance.

[0023] On the other hand, if the continuity of the knitted lace fabric is maintained from the maximum bulging cup center to the entire cup peripheral edge (i.e. 360 degrees around the peripheral edge) as described above, the integrity of the ornamental pattern is maintained, and also the three-dimensional shape of the cup is well reserved. As a result, it becomes possible to obtain a brassier cup product having still higher aesthetic and commercial value.

[0024] Further, according to claim 3, the knitted lace fabric is an elastic lace fabric having elasticity in either a weft direction or warp direction of the fabric or elasticity in both these directions.

[0025] Conventionally, the lace fabric to be used in a brassier cup product is a rigid or non-elastic knitted fabric. However, if the fabric is to be formed into a relatively complicated three-dimensional shape as is the case with the present invention, with use of such elastic fabric having elasticity in the weft and/or warp directions thereof, the three-dimensional forming step may be carried out smoothly without inviting breakage in the lace fabric. As a result, the cup may be manufactured without such troubles as looseness or breakage.

[0026] For the purpose of providing improved silhouette, according to claim 4, a proximal portion of the cup close to the center of the brassier corresponding to the "valley" between the breasts has a greater bulging curvature than a distal portion of the cup distant from the center of the brassier.

[0027] With the above, the bulging curvature of the proximal cup portion is differentiated from that of the distal cup portion, with the former being greater than the latter. Accordingly, this cup has a greater bulging volume at the proximal portion adjacent the center of the brassier, so that the breasts supported in these cups will be drawn closer to each other toward the center therebetween.

[0028] More preferably, as set forth in claim 5, the maximum bulging center of the cup is located at the proximal cup portion adjacent the center of the brassier corresponding to the valley between the breasts.

[0029] Accordingly, this cup allows the positions of nipples or the entire breasts to be drawn closer to each other, so as to provide the desired effect.

[0030] In the above construction, more preferably, the cup is provided as a deformed cup having a proximal portion close to the center of the brassier corresponding to the "valley" between the breasts which portion has a greater bulging curvature than a distal portion of the cup distant from the center of the brassier, the deformed cup having a maximum bulging center at the proximal cup portion thereof close to the center of the brassier corresponding to the valley between the breasts.

[0031] Further and other objects and advantages of the invention will become apparent upon reading the following detailed description of preferred embodiments thereof with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032]

Fig. 1 is a schematic illustration showing a structure of a knitted lace fabric,

Fig. 2 is an illustration of a three-dimensional forming device,

Fig. 3 is an illustration of a three-dimensional lace

material joined with a polyurethane cup,
 Fig. 4 is a view showing a three-dimensional lace product,
 Fig. 5 is an illustration showing a further embodiment of the lace fabric,
 Fig. 6 is an illustration showing a still further embodiment of the present invention,
 Fig. 7 is an exploded view showing principal components employed by the conventional method,
 Fig. 8 is a view showing construction of a conventional cup product,
 Fig. 9 is an illustration showing three-dimensional forming portions according to the conventional method, and
 Fig. 10 is an illustration comparing three-dimensional shapes of a conventional cup and the cup of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0033] Preferred embodiments of the invention will be described next with reference to the accompanying drawings.

[0034] The present invention relates to a cup product for use in a brassier and a brassier using the cup product. The invention has some characterizing features also in the shape of a mold employed in the production of the cup product.

[0035] First, the structure of a planar lace fabric 1 to be manufactured will be described.

[0036] As shown in Fig. 1, a planar lace fabric 1 for forming a three-dimensional lace material relating to the invention includes an ornamental lace portion 2, a scallop portion 3 continuously adjacent the ornamental lace portion (portion adjacent the lace portion 2 in the weft direction normal to the knitting direction W of the fabric) and a waste-fabric portion 4 on the opposite side to the ornamental lace portion 2 across the scallop portion 3.

[0037] In this embodiment, the ground network of this planar lace fabric is not the more ordinary 4-course network, but a diamond-network which is well-balanced between the warp and course directions.

[0038] In the above, the ornamental lace portion 2 is a lace portion provided with a predetermined ornamental pattern. Specifically, in the case of a raschel lace for example, such lace portion may be produced by knitting onto the net, as its ground network, a number of pattern-forming yarns 2a according to a predetermined ornamental pattern.

[0039] On the other hand, the scallop portion, or simply called "scallop", is a portion formed continuous in the wave-like form along the knitting direction of the lace. Specifically, in the case of the raschel lace for example, this scallop portion is formed by knitting, on the net, a plurality of scallop-forming yarns 3a, a kind of pattern-forming yarn, into predetermined loops R to form an ornamental pattern, so that the number of loops R form

the continuous wave-form along the knitting direction of the lace. More particularly, a plurality of waves are formed one after another along the knitting direction W, as shown.

[0040] The waste-fabric portion 4 is basically a simple network without any pattern-forming yarns, and this portion of the fabric may be readily cut.

[0041] In this respect, it should be noted, however, that there will occur no inconvenience in the application of the present invention even if any pattern-forming yarn may be present in this waste-fabric portion or not or which the structure of this waste-fabric portion is similar to that of other ornamental pattern forming portion.

[0042] Further, as shown in Fig. 1, an end of the waste-fabric portion 4 (on the extreme opposite side to the scallop portion 3) is constructed as a fabric-fixing portion 40, and this portion 40 uses thicker yarns and has a more dense structure than the remaining portion 41 of the waste-fabric portion, the remaining portion 41 being adjacent the scallop portion 3.

[0043] Moreover, a portion of the ornamental lace portion 2 in the immediate vicinity of the scallop portion 3 is constructed as a scallop-reinforcing portion 20.

[0044] This scallop-reinforcing portion 20 too employs thicker yarns than the remaining ornamental lace portion 20a. So that, this portion 20 is provided with additional stiffness to effectively maintain the shape stability in the scallop portion 3. Specifically, while the remaining ornamental lace portion 20a employs polyurethane yarns of about 210 denier, the scallop-reinforcing portion 20 employs yarns of 420 denier, twice thickness.

[0045] Into the planar lace fabric 1 constructed as above, as well-known, elastic yarns (not shown) are inserted along the wales of the fabric so as to provide elasticity in the warp direction of the fabric and further elastic yarns (not shown) are employed as weft yarns (i.e. the weft yarns forming the ground network) so as to provide elasticity also in the weft direction of the fabric. In this manner, this lace fabric 1 is provided with "two-way" elasticity.

[0046] The above describes the steps for forming the planar lace fabric 1 as the preparatory steps for forming manufacturing the three-dimensional lace material 5 of the invention.

[0047] These complete a material-knitting step.

[0048] Next, there will be described a three-dimensional forming step, an eliminating step for eliminating the waste-fabric portion and a joining step for joining the fabric with an urethane cup Ca which is molded separately from the fabric.

Three-dimensional Forming Step

[0049] In this three-dimensional forming step, the planar lace fabric 1 obtained as above is formed (specifically, molded) into a predetermined three-dimensional shape. This three-dimensional step is carried out by using a three-dimensional forming device 24 which in-

cludes a mold 23 for molding the fabric portion 22 and the fabric-fixing portion 21 to which the fabric portion 22 is to be fixed.

[0050] According to the method of this invention, referring to Fig. 3 for example, the three-dimensional forming step is carried out with placing the scallop portion 3 at an end of the three-dimensional shape to be formed (i. e. in the case of Fig. 3, in order to align the end of the three-dimensional shape with the end of the cup Ca, an end or edge of the cup Ca denoted with a solid line corresponds to the end of the three-dimensional shape).

[0051] For this three-dimensional forming step, in fixing the planar lace fabric 1 to the three-dimensional forming device 24, the fabric-fixing portion 40 provided in the waste-fabric portion 4 is utilized. That is, as denoted with broken lines in Fig. 1, this fabric-fixing portion 40 is utilized for the purpose of this fixing and also the peripheral edge of the fabric across the scallop portion 3 is utilized for the fixing. And, the peripheral edge (the portion or area surrounded by the solid line and the broken line in Fig. 1) of the ornamental lace portion 4 on the opposite side to the scallop portion 3 is also utilized for the fixing.

[0052] Further, as shown in Fig. 10(a), (c), a mold 23 of the three-dimensional forming device includes a proximal cup portion 23a close to the center of the brassier corresponding to the valley between the breasts and a distal cup portion 23b distant from the center of the brassier, the proximal cup portion 23a having a greater bulging curvature than the distal cup portion 23b and the proximal cup portion 23a having a maximum bulging center 23c so that the brassier cup molded by this mold may obtain a proximal cup portion 23a, close to the center of the brassier corresponding to the valley between the breasts, having a greater bulging curvature than the distal cup portion distant from the center of the brassier, the proximal cup portion having a maximum bulging center.

[0053] Further, as shown in Fig. 10(d), which is a section taken along an arrow in Fig. 10(c) (the upper portion of the cup), the bulging curvature is varied also in the vertical direction of the cup relative to the lateral direction of the cup extending to and away from the center of the brassier, in such a manner that an upper up portion 23e has a greater bulging curvature than a lower cup portion 23d.

[0054] With these arrangements, the mold is capable of forming the planar lace fabric into a cup having a predetermined deformed three-dimensional shape.

[0055] After the fixing of the planar lace fabric to the three-dimensional forming device 24 described above, the three-dimensional forming step of the fabric is effected by means of the mold 23 and the formed three-dimensional shape is stabilized thereafter.

[0056] In the case of the present embodiment, nylon yarns 6-6 are employed as the yarns forming the fabric. Therefore, the shape stabilizing step is completed by heat-setting the yarns.

[0057] Upon completion of the three-dimensional forming step above, the three-dimensional lace material 5 obtained still is in a band-like shape having a plurality of partial projections M (projecting on the back side) as shown in Fig. 3. It is to be noted, however, this Fig. 3 shows a condition after the fabric has been joined with the urethane cup Ca.

Joining Step

[0058] In this step the three-dimensional lace material 5 having number of partial projections M obtained as above is joined with separately molded polyurethane cups Ca, respectively.

[0059] This joining step is carried out generally by means of sewing. Instead, this step may be carried out by adhesive bonding, etc.

[0060] For this joining step, the scallop portion 3 of the lace material is placed at the edge of the cup product C. With this, there may be obtained a three-dimensional lace product including the lining member Ca and the three-dimensional lace material 5 joined together with the scallop portion 3 aligned with the end of the urethane cup Ca.

Eliminating Step

[0061] Next, the band-like three-dimensional lace material obtained above is subjected to an eliminating step for eliminating the waste-fabric portion 4 along the scallop portion 3. Further, if each cup product is to be obtained independently, the peripheral edge of the cup is eliminated by cutting. The cutting line for this cutting is denoted with a broken line in Fig. 3.

[0062] With these, there is obtained a cup product including the three-dimensional ornamental lace portion 2 and the scallop portion 3 at the end (in this case, it is noted that this cup product is a single cup comprising the three-dimensional lace material and the urethane cup Ca joined together).

[0063] Fig. 4 shows the appearance of the cup product C obtained by the method described above. Although this corresponds to the product shown in Figs. 7 and 8, the product of Fig. 4 presents a smarter appearance due to absence of tape at the upper end of the cup because the scallop portion S is provided integrally with the front-side cloth formed of the three-dimensional lace material.

Finishing Step

[0064] Thereafter, by using the individual cup products obtained by the above in an appropriate combination, the end product, e.g. a brassier, will be obtained. This step is effected by means of sewing.

[Other Embodiments]

[0065]

(a) In the foregoing embodiment, the cutting/eliminating step is carried out after the joining step of joining the band-like three-dimensional lace material (with partial projections) with the polyurethane cup Ca. Instead, it is also possible to cut the band-like three-dimensional lace material into a predetermined shape and then join it with each cup Ca. In this case, the assembly of each three-dimensionally formed lace fabric attached with the cup Ca will correspond to what is referred to herein as "a cup product for use in a brassier" and the each three-dimensionally formed lace fabric or material per se will correspond to the "cup product for use in a brassier".

(b) In the foregoing embodiment, the urethane cup Ca molded into a predetermined shape is employed as the lining member. Instead, this lining member may be a non-woven fabric formed or molded into a predetermined shape.

(c) In the foregoing embodiment, the fabric-fixing portion 40 is provided in the waste-fabric portion and the scallop-reinforcing portion 20 is provided at a portion of the ornamental lace portion. However, it is not necessary for the invention to provide both of these portions. Such modified construction is shown in Fig. 5 corresponding to Fig. 1.

In the absence of these portions too, the three-dimensional lace material of the invention may be obtained by appropriately selecting the types, thickness, etc. of the lace forming yarns to be employed therein.

(d) In the foregoing embodiment, in the three-dimensional forming step of the planar lace fabric, for producing the deformed cup, the planar lace fabric is formed into a cup having its proximal portion and distal portion differing from each other in the bulging curvatures thereof, with the proximal portion having the maximum bulging center. In addition to the lace fabric described above, such deformed or irregular three-dimensional forming process may be applied also to the polyurethane cup, non-woven fabric, lining fabric, etc.

(e) In the foregoing embodiment, there was no description about the specific type of the construction of the lace knitting machine for forming the lace material. This is because the method and material of the invention are applicable to any lace materials produced by any type of lace knitting machines. Typical examples include the raschel lace produced by the raschel knitting machine (including the fall-

ing-plate type, jacquard knitting machine), leaver lace produced by the leaver lace knitting machine, as well as embroidery lace produced by the embroidery lace knitting machine.

(f) In the foregoing embodiment, the method and material are applied for manufacture of a brassier. However, these method and material of the invention may be applied to any other garment articles such as a bra-slip, bra-camisole, body-suit, shorts, etc. Therefore, these products are generically referred to as "brassier products" herein.

(g) In the embodiment shown in Fig. 4, the entire cup for covering the breast is formed of a single continuous lace fabric. Although this is the most preferred mode of embodying the present invention, other constructions are also possible. For instance, as shown in Fig. 6(a), another lace cloth or patch having a different ornamental pattern may be joined by means of sewing etc., to the lower cup portion so as to present the different ornamental pattern from that of the upper cup portion. With such modified cup construction too, the intended object of the invention is achieved regarding the main body of the cup including the upper bulging center and its periphery.

[0066] Similarly, as shown in Fig. 6 (b), the cup may be provided with different ornamental laces between the right and left sides thereof. With this modified cup construction too, substantially same function/effect can be achieved with respect to the main body of the cup.

[0067] The present invention may be embodied in any other manner than described above. The embodiments disclosed above are therefore not to be taken as limiting the invention, but only illustrating the invention. It is understood that such modifications and variations will be apparent to those skilled in the art without departing the scope of the invention set forth in the appended claims.

Claims

1. A cup product for use in a brassier, the cup having a cup for covering a breast, a scallop portion provided at a peripheral edge of the cup, and an ornamental lace portion provided over a surface of the cup;

characterized in that the scallop portion and the ornamental lace portion comprise one continuous knitted lace fabric, and this lace fabric is formed into a three-dimensional shape by means of molding with the scallop portion being placed at an end of the three-dimensional shape.

2. The cup product for use in a brassier according to claim 1, **characterized in that** the continuous knit-

ted lace fabric is formed by means of the molding over the peripheral edge of the cup around a maximum bulging center thereof.

3. The cup product for use in a brassier according to claim 1 or 2, **characterized in that** the knitted lace fabric is an elastic lace fabric having elasticity in either a weft direction or warp direction of the fabric or elasticity in both these directions. 5
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4. The cup product for use in a brassier according to claim 1 or 2, **characterized in that** a proximal portion of the cup close to the center of the brassier corresponding to the "valley" between the breasts has a greater bulging curvature than a distal portion of the cup distant from the center of the brassier. 15
5. The cup product for use in a brassier according to claim 1 or 2, **characterized in that** the maximum bulging center of the cup is located at the proximal cup portion adjacent the center of the brassier corresponding to the valley between the breasts. 20
6. A brassier product using the cup product according to any one of claims 1-5. 25

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FIG.1

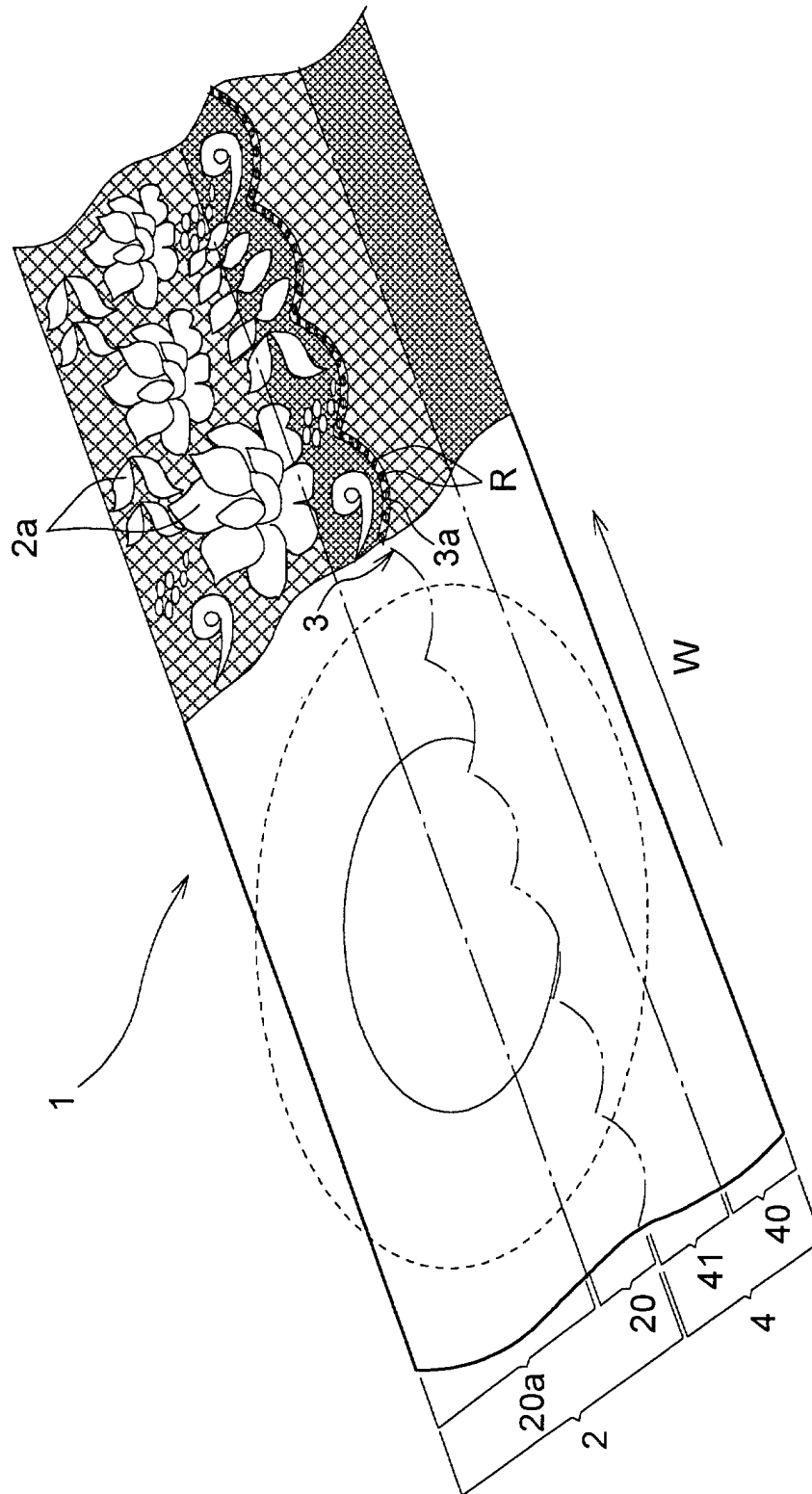


FIG.2

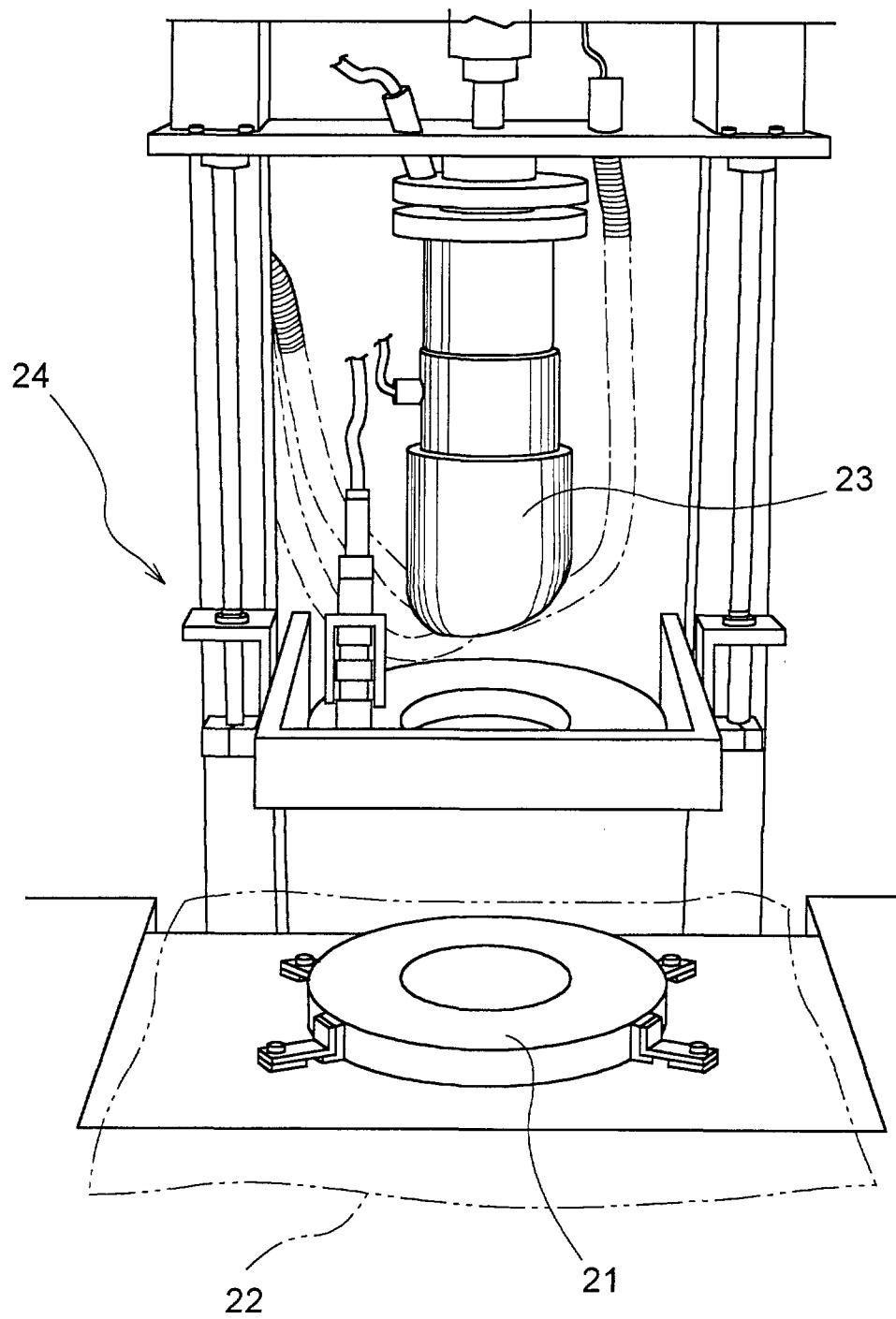


FIG.3

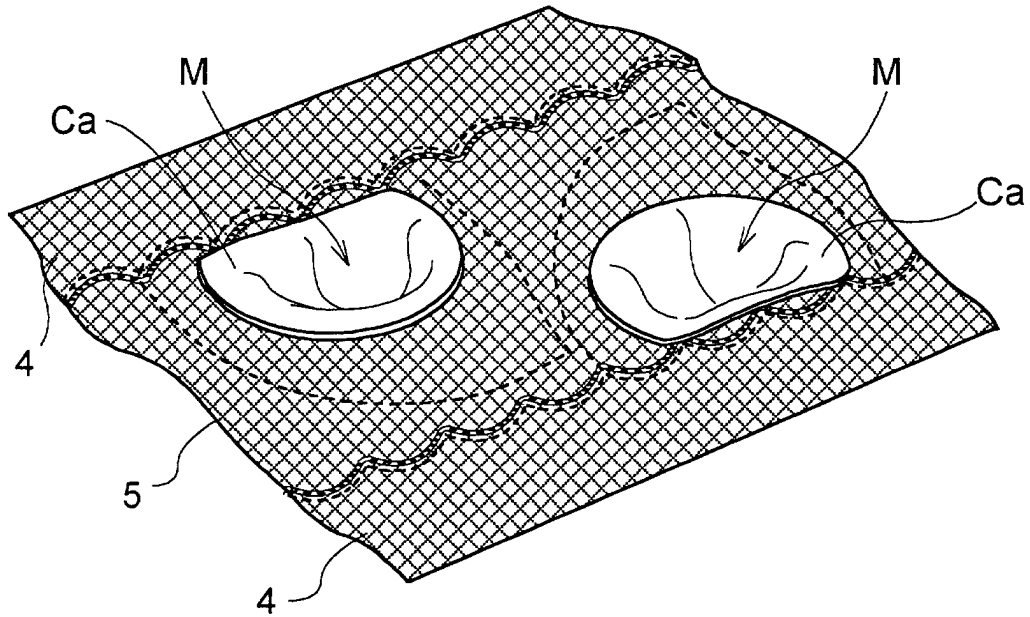


FIG.4

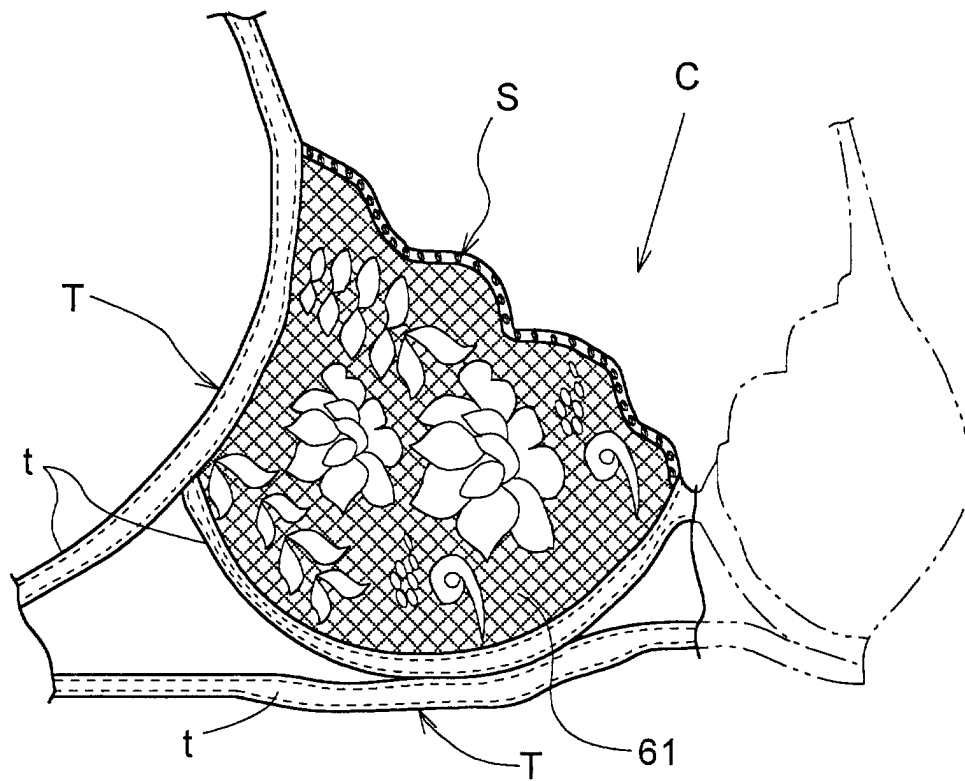


FIG.5

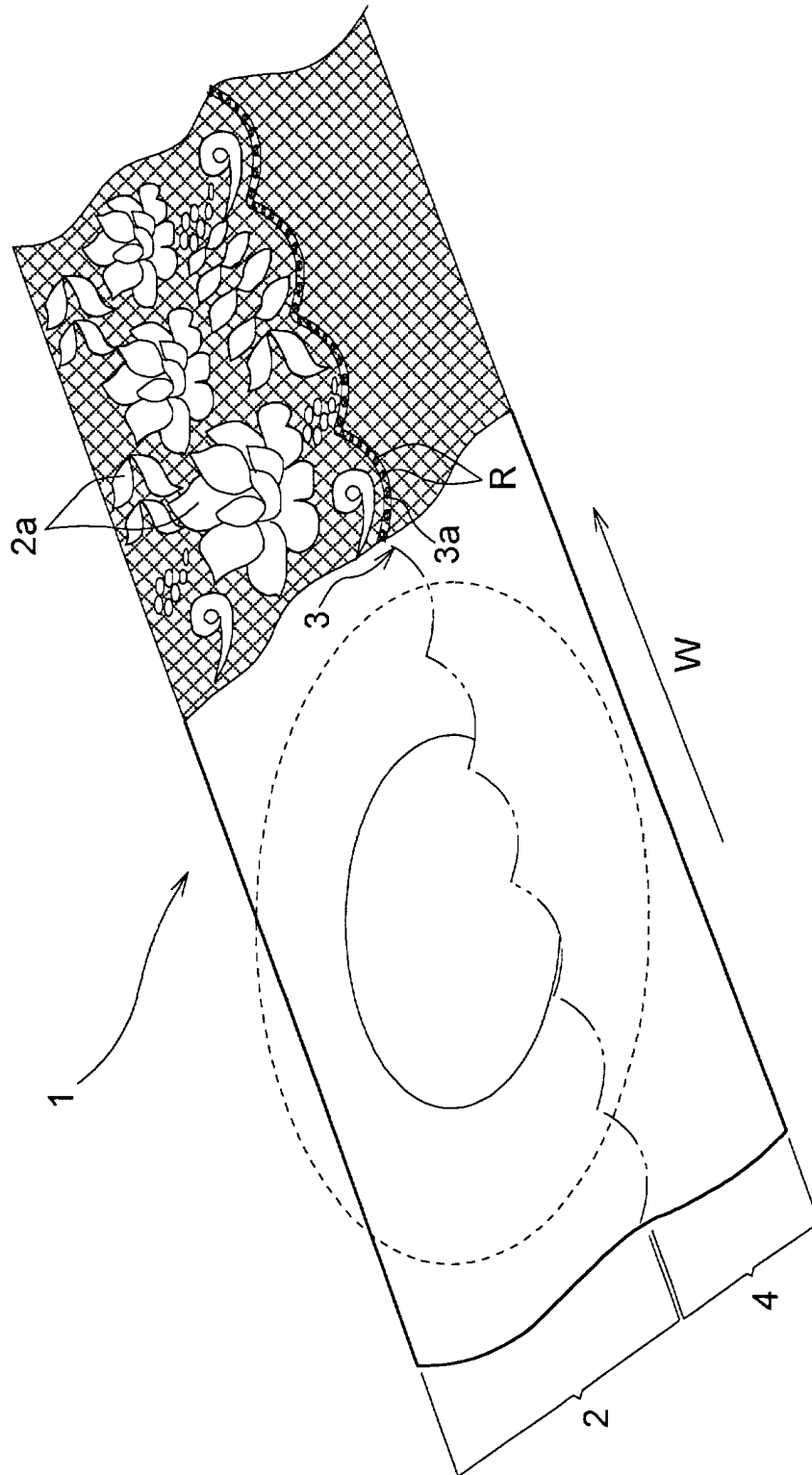


FIG.6

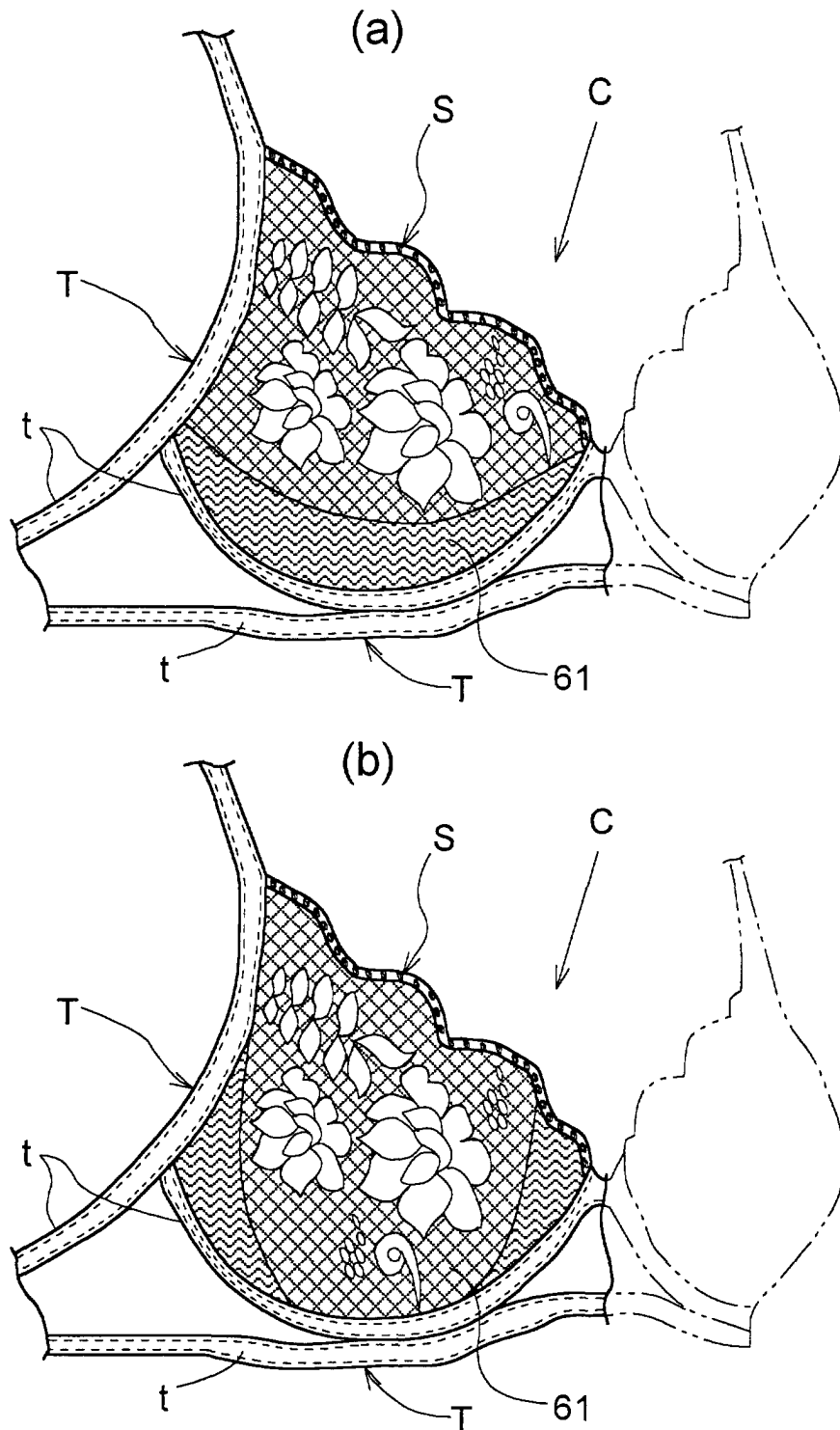


FIG.7

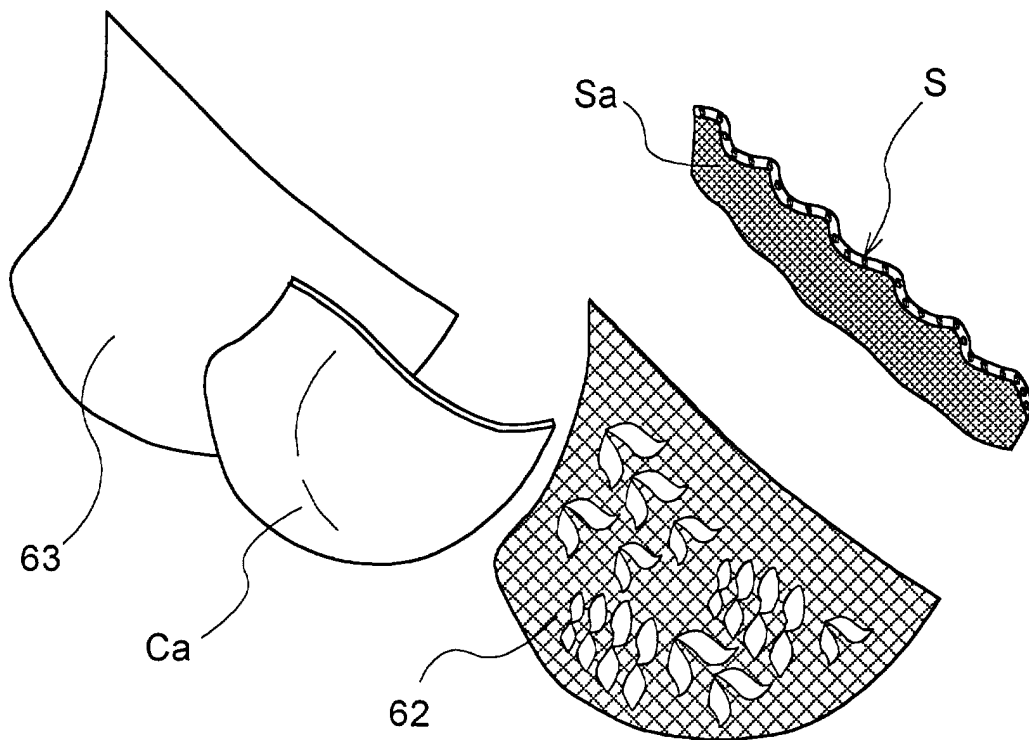


FIG.8

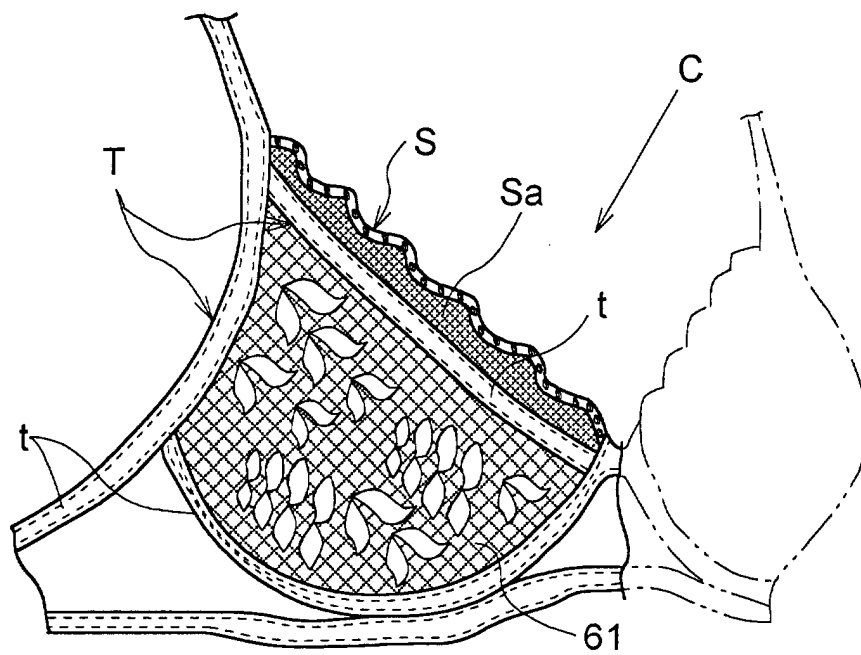


FIG.9

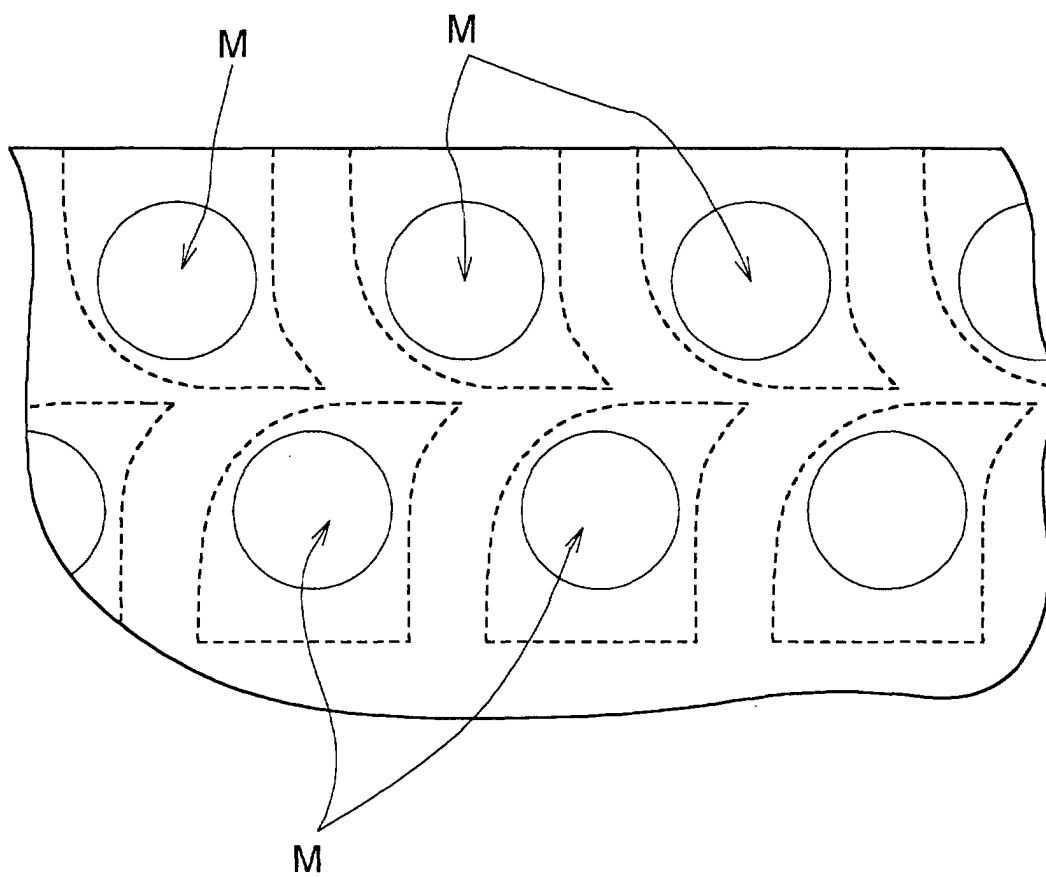


FIG.10

