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(54) KNITTED OR WARP KNITTED FABRIC BLANK

GESTRICKTER ODER KETTENGEWIRKTER STOFFFROHLING

DECOUPE D'ETOFFE TRICOTEE OU A MAILLES JETEES

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• **PATENT ABSTRACTS OF JAPAN vol. 2003, no.**
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Description

[0001] The invention relates to a knitted or warp knitted fabric blank for use in garments, corsetry, sportswear, swimwear and the like, comprising a base fabric and at least one elastic thread inserted into the knitted base fabric.

[0002] There is a plurality of knitted articles in which threads or yarns which are relatively stiff are combined with elastic threads. An example is supporting or compression hosiery where the wearing comfort is obtained by a textile base thread of low elasticity, and the definite supporting and compression force is provided by the force of an elastic thread. Such combination of stiff and elastic threads is also used in other garments and corsetry, such as girdles, panties, body suits, swimsuits, brassieres and the like. Even though the knit structure already makes the garment resiliently stretchable, vertically and horizontally, it may be an option to insert elastic yarns in order to optimize the characteristics of the fabric blank with regard to the intended garment.

[0003] To improve wearer's comfort and appearance of the garment, it is attempted to provide curved hems. Those hems are often formed by a selvedge of the blank. In order to avoid that the selvedge becomes frayed when it is cut to obtain the curves, WO 2005/021852 proposes to include a polyether-based yarn into fabric blank which is heat fused to the yarn of the base fabric so that the processed fabric blank cannot ravel, curl or slip-in.

[0004] US 6,401,497 B1 discloses a garment with a figure control or muscle support function which includes a warp knit fabric having ground stitches by jacquard knitting of inelastic yarn, in which elastic yarn is further inserted and/or knitted. Portions with relatively strong and weak straining forces are formed in the warp knit fabric in predetermined places in predetermined patterns by changing the ground stitches depending on the required strength of the straining forces. There is substantially no difference in level at a boundary between the portion with strong and weak straining forces.

[0005] JP 2004-027465 A discloses a panty made of warp knit fabric provided by integrally knitting the stretchable knit fabric part and the unstretchable knit fabric part in a strip shape without generating puckering by inserting an inelastic yarn in a predetermined width into the stretchable warp knit fabric as a ground knit by using the inelastic yarn and an elastic yarn as knit yarns and suppressing stretching of the ground knit. Leg cuts are provided which are shown in a curved shape.

[0006] FR 2 852 026 relates to a textile knitted article of lingerie and discloses a rectangular band comprising a belt or strap zone in an area of very dense and very elastic interlacing. The straight end has to be cut at the separating line shown as a zigzag stitch.

[0007] WO 2005/006894 A1 relates to an elastic material having varying modulus of elasticity. The rectangular elastic material has an end which is fixed on the front by a seam.

[0008] US 652 731 discloses a method of manufacturing elastic, shape-knitted articles by using non-elastic or elastic warp threads as well as elastic or non-elastic raiseable weft threads. A shaped area with elastic rubber weft threads which are embedded in the fabric whilst being more or less extended is shown. The elastic rubber weft thread will contract again as soon as the courses leave a needle bar.

[0009] It is the object of the invention a knitted or warp knitted fabric blank as defined in the introductory which can be custom tailored for enhanced adaption to human anatomy and in particular in view of creating supporting and/or decorative zones to improve wearer's comfort and appearance and which has a design avoiding a cutting step as well as the problem of fraying and which does not require the addition of a narrow band.

[0010] This object is solved in a knitted or warp knitted fabric blank according to claim 1 by inserting at least one elastic thread into at least one predetermined curved zone of said base fabric to produce a predefined linear or non-linear profile of forces therein and by at least one curved selvedge. In this way, a variable modulus fabric blank is provided, so that in the respective garment supporting zones of practically any shape can be created which account for the straining forces induced by the wearer's body. For producing such a knitted product, a modified flat knitting machine can be used. US 6,170,301 B1 describes a flat knitting machine with simultaneous supply of two threads of different elasticities to needles of the machine by a feeding device. For each stitch to be formed the length of the thread of the higher elasticity to be supplied to a needle is calculated from the supplied length of a thread of the lower elasticity and the data about the material property of the thread of the higher elasticity, and the feeding device is controlled accordingly. Such machine may be configured appropriately, so that the desired curved zones are introduced into the base fabric.

[0011] Normally, the outline of a garment is arranged on the fabric blank in such a manner that longer edges of the garment are brought in coincidence with the edges of the fabric blank. An example is the edge of a brassiere below the breast cups, where this part must be cut in a subsequent step to conform to the shape of the body. Conventionally, measures are required to avoid fraying, as disclosed in WO 2005/021852. By designing the selvedge itself in a curved manner, the cutting step as well as the problem of fraying can be avoided, and no add of narrow band is required. JP 10-245751 A discloses a method for felling the end of a knitted fabric enabling to form the knitted fabric and excellent in elasticity without deteriorating the tightness of felled end by the use of a flat knitting machine. The loops of the final course are subjected to a run-proof treatment comprising feeding knitting yarns to form the loops of the edge stitch portion followed to the loops of the final course, superposing the loops of the formed edge stitch portion on the loops of the adjacent final course and subsequently repeatedly

subjecting the superposed loops to knitting treatments from one end of the final course to the other end to fix the loops of the final course. A modification of this felling treatment can be applied to the selvedge, so that finally a curved selvedge is produced.

[0012] According to a preferred embodiment of the invention, said curved selvedge may also comprise at least one of said predetermined curved zones, so that a differentiated profile of forces may be created in the selvedge.

[0013] Another aspect of the invention provides that said at least one elastic thread is inserted into at least one of said predetermined curves to produce an embroidery look. This can be achieved, for example, by forming turn-ups to create protrusions, as disclosed in JP 2005-113354 A, or by modifying the teachings of US 6,170,301 B1 to produce specific inhomogeneities by supplying more or less length of the elastic thread than required to form a stitch of the same shape and size of the base fabric.

[0014] It is also possible to incorporate two or more elastic threads of different elasticities into said base fabric.

[0015] It is preferred that the elastic threads comprise polyurethane or polyurethane urea filaments. Even though other elastomers can be used, elastan threads, such as disclosed in US 6,637,181 B1 are preferred. Elastanes are mono- or multifil continuous yarns composed of at least 85 % by weight of segmented polyurethanes or polyurethane ureas. The elastic filaments are very useful alone or in combination yarns together with other filaments comprising for example polyamide, wool, cotton and polyester for processing into textile goods, for example by means of warp knitting, circular knitting and flat knitting. Because of their high thermostability, they are particularly useful for application in fields which require a specific heat-settability, for example underwear, corsetry, sportswear, outerwear and cover fabrics.

[0016] The elastic threads can be inserted into said base fabric by inlaying or meshing simultaneously with knitting the base fabric or in a consecutive course.

[0017] The above and other objects, features and advantages of the invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which:

Figure 1 is a schematic representation of a brassiere formed of a fabric blank having a curved selvedge and curved supporting zones;

Figure 2 shows a schematic representation of an alternative embodiment of a brassiere cup in Figure 2a and an example of a profile of force in Figure 2b;

Figure 3 is a schematic representation of a swimsuit, comprising curved zones having a prede-

fined profile of forces; and

Figure 4 is a schematic representation of a panty where the leg cuts are provided with curved zones of a specific profile of forces.

[0018] In Figure 1, a brassiere is shown, having two cups 10, 12 and a two-part belt 14, 16 integral with cups 10, 12 where the two parts 14, 16 of the belt can be closed at the wearer's back, as usual. The brassiere may optionally be provided with straps which are not illustrated here. The bottom edge 18 of the brassiere is coincident with the curved selvedge of the fabric blank and comprises between the lower part cups 10, 12, a zone 26 free of elastic threads. Otherwise, elastic threads, such as elastan, are incorporated in bottom edge 18 in a strip 22 of constant or varying width where such a profile of forces is created that the wearer's comfort is optimized. This means in particular that those parts of bottom edge 18 or strip 22, respectively, which bound cups 10, 12 show higher forces than those zones forming part of belts 14, 16. Equally, upper edge 20 of the brassiere is provided with elastic threads in a strip 24 to create such a profile of forces that close fit of cups 10, 12 is ensured. Strips 22, 24 may be continuous, as shown, however, can be designed that left-hand part of strip 24 is continuous with left-hand part of strip 22, and similarly, right-hand part of strip 24 is continuous with right-hand part of strip 22, optionally leaving a segment of base fabric between them at the interconnection of cups 10, 12.

[0019] Figure 2a shows an alternative embodiment of a brassiere cup where only the upper edge of the cup 12 is provided with elastan containing curved zones in strip 24. Figure 2b shows an example of a profile of forces in strip 24, where 1 indicates the length of the circumference or outer edge of cup 12 or strip 24, respectively. It is seen that the elastic or straining force F starts at a basic value F_0 , remains on a constant level and then starts to rise until a maximum value F_m and decreases to a final value F_1 . Other profiles are possible, linear or non-linear, according to the garment specification.

[0020] Figure 3 is a schematic representation of a swimsuit with curved zones 30, 32, in the waist and hip region of the swimsuit, where the profile of forces created by the elastic threads contained in those zones 30, 32 is such that the forces are lower in direction of the breast part, whereas the forces increase at the stomach part and decrease again in order to avoid cutting into the wearer's skin at the leg cutouts 34, 36 of the swimsuit. The swimsuit further comprises crescent-like supporting zones 40, 42 of curved shape simulating the function of a brassiere in the breast part of the swimsuit. It is an option to give an embroidery look for example to zones 30, 32 by creating protruding loops of elastic threads, by introducing a second elastic thread of same or different elasticity or combinations thereof.

[0021] Figure 4 is a schematic representation of the front 44 and back 48 of a panty. The front 44 of the panty

is provided with a triangle shaped zone 46 where two sides of the triangle are curved, in the example inwardly curved. Any other curvature may be provided. These zones contain elastic threads to improve the wearer's appearance. The back 48 of the panty has curved zones 50, 52 at the leg cut outs ensuring the close fit of the panty to the wearer's body.

[0022] The features disclosed in the foregoing description, in the claims and/or in the accompanying drawings are, both separately and in any combination thereof, material for realizing the invention in diverse forms thereof.

Claims

1. A knitted or warp knitted fabric blank for use in garments, corsetry, sportswear, swimwear and the like, comprising a base fabric and at least one elastic thread inserted into the knitted base fabric, **characterized by** at least one curved selvedge (18), and by at least one elastic thread which is inserted into at least one predetermined curved zone (22, 24, 30, 32, 40, 42, 46, 50, 52, 54, 56) of said base fabric to produce a predefined linear or non-linear profile of forces therein.
2. The knitted or warp knitted fabric blank of claim 1, **characterized in that** said curved selvedge (18) comprises at least one of said predetermined curved zones (22).
3. The knitted or warp knitted fabric blank of claim 1, **characterized in that** said at least one elastic thread is inserted into at least one of said predetermined curved zones (30, 32) to produce an embroidery look.
4. The knitted or warp knitted fabric blank of any of claims 1 to 3, **characterized in that** two or more elastic threads of different elasticities are incorporated into said base fabric.
5. The knitted or warp knitted fabric blank of any of claims 1 to 4, **characterized in that** said elastic threads comprise polyurethane or polyurethane urea filaments.
6. The knitted or warp knitted fabric blank of any of claims 1 to 5, **characterized in that** said elastic threads are inserted into said base fabric by inlaying or meshing.

Patentansprüche

1. Gestrickte oder kettengewirkte Materialbahn für die Verwendung in Kleidungsstücken, Miederwaren, Sportbekleidung, Badebekleidung und dergleichen,

die ein Grundgewirke und zumindest einen elastischen Faden aufweist, der in das gestrickte Grundgewirke eingebracht ist, **gekennzeichnet durch** zumindest eine gekrümmte Webkante (18) und **durch** zumindest einen elastischen Faden, der in zumindest einen vorbestimmten gekrümmten Bereich (22, 24, 30, 32, 40, 42, 46, 50, 52, 54, 56) des Grundgewirkes eingebracht ist, um in diesem ein vorgegebenes lineares oder nichtlineares Kräfteprofil zu erzeugen.

2. Gestrickte oder kettengewirkte Materialbahn gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die gekrümmte Webkante (18) zumindest einen der vorbestimmten gekrümmten Bereiche (22) aufweist.
3. Gestrickte oder kettengewirkte Materialbahn nach Anspruch 1, **dadurch gekennzeichnet, dass** der zumindest eine elastische Faden in zumindest einen der vorbestimmten gekrümmten Bereiche (30, 32) eingebracht ist, um das Aussehen einer Stickerei zu erzeugen.
4. Gestrickte oder kettengewirkte Materialbahn gemäß einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** zwei oder mehr elastische Fäden unterschiedlicher Elastizitäten in das Grundgewirke eingebracht sind.
5. Gestrickte oder kettengewirkte Materialbahn gemäß einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die elastischen Fäden Polyurethan- oder Polyurethan-Urea-Fasern aufweisen.
6. Gestrickte oder kettengewirkte Materialbahn gemäß einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die elastischen Fäden in das Grundgewirke mittels Einlegen oder Vermaschen eingebracht sind.

Revendications

1. Découpe d'étoffe tricotée ou à mailles jetées pour une utilisation dans des vêtements, de la corseterie, des vêtements de sport, des vêtements de bain et analogue, comportant une étoffe de base et au moins un fil élastique inséré dans l'étoffe de base tricotée, **caractérisée par** au moins une lisière courbe (18), et par au moins un fil élastique qui est inséré dans au moins une zone courbe prédéterminée (22, 24, 30, 32, 40, 42, 46, 50, 52, 54, 56) de ladite étoffe de base pour produire un profil de forces linéaire ou non linéaire prédéfini dans celle-ci.
2. Découpe d'étoffe tricotée ou à mailles jetées selon la revendication 1, **caractérisée en ce que** ladite lisière courbe (18) comporte au moins une desdites

zones courbes prédéterminées (22).

3. Découpe d'étoffe tricotée ou à mailles jetées selon la revendication 1, **caractérisée en ce que** ledit au moins un fil élastique est inséré dans au moins une desdites zones courbes prédéterminées (30, 32) pour produire un aspect de broderie. 5
4. Découpe d'étoffe tricotée ou à mailles jetées selon l'une quelconque des revendications 1 à 3, **caractérisée en ce que** deux ou plus de deux fils élastiques de différentes élasticités sont incorporés dans ladite étoffe de base. 10
5. Découpe d'étoffe tricotée ou à mailles jetées selon l'une quelconque des revendications 1 à 4, **caractérisée en ce que** lesdits fils élastiques comportent des filaments de polyuréthane ou de polyuréthane urée. 15
6. Découpe d'étoffe tricotée ou à mailles jetées selon l'une quelconque des revendications 1 à 5, **caractérisée en ce que** lesdits fils élastiques sont insérés dans ladite étoffe de base par incrustation ou maillage. 20 25

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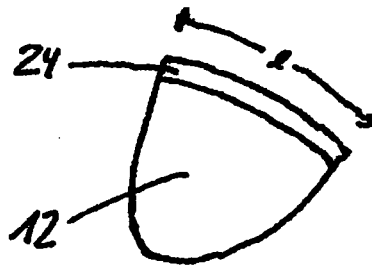
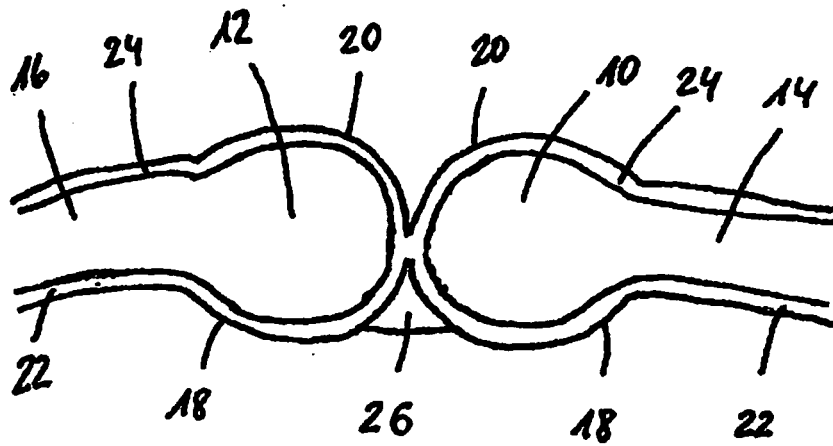


Fig. 2a

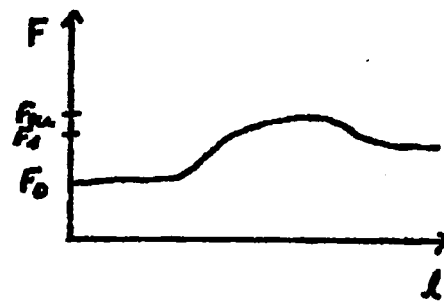


Fig. 2b

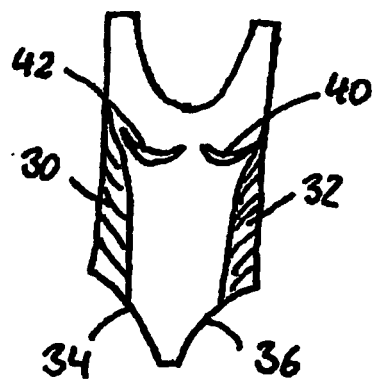


Fig. 3

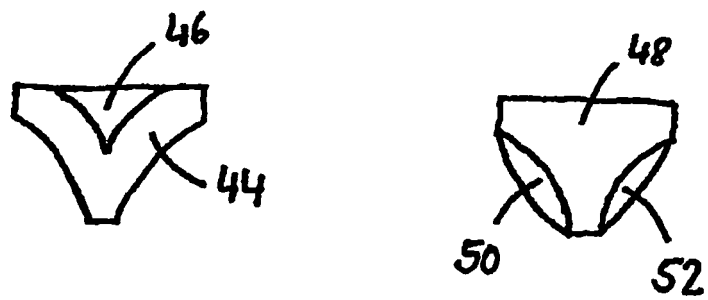


Fig. 4

REFERENCES CITED IN THE DESCRIPTION

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