(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 428 281 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
11.09.2024 Bulletin 2024/37

(21) Application number: **22888784.0**

(22) Date of filing: **25.04.2022**

(51) International Patent Classification (IPC):
D04B 1/18 *(2006.01)* ***D04B 1/16*** *(2006.01)*
D04B 1/10 *(2006.01)* ***D04B 1/12*** *(2006.01)*

(86) International application number:
PCT/CN2022/089060

(87) International publication number:
WO 2023/077745 (11.05.2023 Gazette 2023/19)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **02.11.2021 CN 202111290852**

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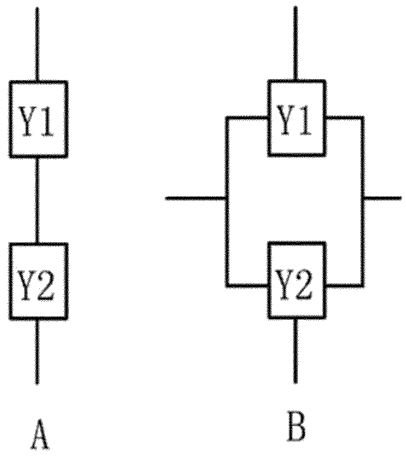
(54) SINGLE-SUBSTANCE FLEXIBLE HIGH-ELASTIC FLAKY TEXTILE FABRIC AND PREPARATION METHOD THEREFOR

(57) A single-substance flexible high-elastic flaky textile fabric and a preparation method therefor. The single-substance flexible high-elastic flaky textile fabric is formed with at least two elastic yarns of single substance, including the Y1 yarn and the Y2 yarn, and the elastic yarns are knitted into loops and linked together to form a fabric body with a serial structure and a parallel structure. The modulus of the Y1 yarn is smaller than or equal to that of the Y2 yarn, or the yarn count of the Y1 yarn is smaller than or equal to that of the Y2 yarn. The initial openness and modulus of the fabric body in the warp direction and the weft direction are changing accordingly with the changes in the modulus or yarn count of the elastic yarns. The fabric body is of a warp knitting structure or a weft knitting structure, and with a tension being applied on the fabric body and in the process of increasing the tension, the fabric body forms an integral structure with coexistence of a serial structure and a parallel structure, resulting in an increase in the initial openness or modulus of the Y1 yarn or the Y2 yarn. With such a design of coexistence of the serial structure and the parallel structure, the deformation of large openness in a low-modulus stage is realized, and the characteristics of high elasticity, lightness, high modulus, flexibility, breathable, large-area flakes, free-cut and other characteristics are achieved.

FIG. 1



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Description

Technical field

[0001] The invention relates to the field of textile fabrics, in particular to a flexible high-elastic flake-like textile fabric of a single substance and a preparation method thereof.

BACKGROUND OF THE INVENTION

[0002] Soft, comfortable and stylish underwear products (underwear, corsets or sportswear) are the first choice for contemporary women who pursue fashion and health. As an important textile material, knitted fabric has developed rapidly in recent years and played an important role in underwear, sports, leisure and other application fields. Knitted fabric consumes about 50% of the total fiber consumption, and it is still increasing. The most important advantage of knitted fabrics, compared to woven fabrics, undoubtedly is its characteristic of high elasticity. Due to their structural nature, no matter how woven fabrics are designed, they cannot achieve the high elasticity of knitted fabrics.

[0003] As contemporary women's pursuit of health and comfort is becoming more and more intense, soft, comfortable and stylish underwear products have seen greater demands in the consumer market. However, underwear products which contain elements for providing support and pull-up effects currently available in the market lack wearing comfort, leave strangle marks on the skin, oppress the body of the wearers, and affect the beauty of the body. This type of underwear product do not meet the consumer demands for products that have a certain support effect while being comfortable to wear without exerting pressure or leaving strangle marks on the body, so there is an urgent need for a highly elastic fabric to be supplied to the market. But at the same time, we also have to deal with the issue of low recovery rate brought by the high elasticity of knitted fabrics compared with elastic woven fabrics. A low recovery rate will be very detrimental to the feel and comfort of wearing the garments, and it is a major problem facing the fashion designers. How to deal with this problem has become a difficult task for those skilled in the art. High elasticity and high recovery rate are the actual needs of consumers. On the other hand, there are also needs to adjust the tightness of the garment according the circumstances in which the wearer situates and these needs must also be met at the same time.

[0004] Spandex fiber is an excellent elastic fiber. Its elastic elongation rate is 450%-700%, and its elastic recovery rate is over 95%. It is strong and durable. Its excellent stretch and recovery properties increase the fit, comfort and drapability of clothing. However, spandex also has its disadvantages, such as sticky feel, easy to turn yellow, etc. Generally, elastic knitted fabrics are blended with spandex and other yarns, and as such the elasticity and recovery rate of the fabric cannot reach the elasticity and recovery rate of pure spandex. This is undesirable in meeting consumers' needs.

DESCRIPTION OF THE INVENTION

Summary of the Invention

[0005] The invention overcomes the problems that the fabrics in the prior art are difficult to meet consumers' demand for high elasticity and recovery and their feel and comfort is poor.

Technical Solution

[0006] A method for preparing a flexible and highly elastic flake-like textile fabric of a single substance, comprising the following process:

[0007] It is knitted with at least two elastic yarns of the same material of a single substance, including Y1 yarn and Y2 yarn. After each elastic yarn is knitted into loops and linked together to form a fabric body with coexistence of both a series structure and a parallel structure.

[0008] The modulus of Y1 yarn $\leq$ the modulus of Y2 yarn, or the yarn count of Y1 yarn $\leq$ the yarn count of Y2 yarn; with varies in the modulus or yarn count of the elastic yarns, the fabric body accordingly changes its initial opening and modulus in the warp and weft directions.

[0009] The fabric body is a warp-knitted structure or a weft-knitted structure, and with a tension force being applied on the fabric body and in the process of increasing the tension, the fabric body forms an overall structure in which series and parallel structures coexist, resulting in increases in the initial opening or modulus of the Y1 yarn or Y2 yarn in the warp direction or weft direction.

[0010] When the fabric body is a weft-knitted structure, as a tension applied on the fabric body increases, a series structure is formed in the warp direction, wherein specifically, the Y1 yarn is first pulled to deform the Y1 yarn, and the Y1 yarn then drives the Y2 yarn to gradually increase its initial opening and modulus in the warp direction; and a parallel

structure is formed in the weft direction, wherein specifically, the Y2 yarn is first pulled to deform the Y2 yarn, and the Y2 yarn then drives the Y1 yarn to gradually increase its initial opening of and modulus in the weft direction.

[0011] When the fabric body is a warp-knitted structure, as a tension applied on the fabric body increases, a series structure is formed in the weft direction, wherein specifically, the Y1 yarn is first pulled to deform the Y1 yarn, and the Y1 yarn then drives the Y2 yarn to gradually increase its initial opening and modulus of in the weft direction; and a parallel structure is formed in the warp direction, wherein specifically, the Y2 yarn is first pulled to deform the Y2 yarn, and then the Y2 yarn drives the Y1 to gradually increases its initial opening and modulus in the warp direction.

[0012] In the series structure of the fabric body, when a tension is applied on the fabric body, the same tension is transmitted to the elastic yarns having different moduli, and the elastic yarn with a small modulus is deformed first, and then the overall modulus of the fabric body is determined in turn by the elastic yarn with a lower modulus; at this time, the overall modulus of the fabric body is the minimum value of the elastic yarn modulus; while in the parallel structure, when the tension is applied on the fabric body, the tension is distributed among the elastic yarns, and each elastic yarn produces the same deformation and the synthesis of each modulus results in the overall modulus of the fabric body, that is, the overall modulus of the fabric body is greater than the modulus of any elastic yarn.

[0013] A flexible and highly elastic flake-like textile fabric of a single substance comprises a fabric body and the fabric body is knitted with at least two elastic yarns of the same material of a single substance, including Y1 yarn and Y2 yarn. The Y1 Yarns and Y2 yarns are looped and connected to each other to form a series structure and a parallel structure, wherein, the modulus of Y1 yarn $\leq$ the modulus of Y2 yarn, or the yarn count of Y1 yarn $\leq$ Y2 yarn yarn count.

[0014] The loops formed by the Y1 yarn and the loops formed by the Y2 yarn are connected in the warp direction and the weft direction of the fabric body to form, respectively, a series structure and a parallel structure.

[0015] The single material elastic yarn is any one selected from spandex yarn, hard elastic fiber, polyolefin elastic fiber, composite elastic fiber, polyetherester elastic fiber, polyurethane fiber and diene elastic fiber.

[0016] The fabric body is mesh fabric or double flattened fabric.

[0017] The fabric body is a plain weave double-sided structure.

[0018] The elastic yarn density is 50-200 denier.

[0019] The elastic recovery rate of the fabric body is above 95%.

Beneficial Effects of the Invention

[0020] Through the design of the series structure and the parallel structure coexisting in the fabric body, the invention realizes the deformation of the large opening at the low modulus stage, improves the stretching comfort range of the fabric, and has high elasticity, lightness, high modulus, flexibility, breathable, large-area flakes, free-cut and other characteristics. It is mainly used in the middle layer of clothing to improve the modulus, recovery rate and wrinkle resistance of composite materials, and can be widely used in underwear, corsets, sportswear and other clothing.

BRIEF DESCRIPTION OF DRAWINGS

[0021]

FIG. 1 is a schematic diagram of the principle of the present invention.
FIG. 2 is the structural representation of embodiment 1 of the present invention.
FIG. 3 is a schematic diagram of a weft-knitting structure loop of the present invention.
wherein A is a series structure, B is a parallel structure.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0022] Embodiments of the present invention are described in detail below, examples of which are shown in the drawings, wherein the same or similar reference numerals denote the same or similar elements or elements having the same or similar functions throughout. The embodiments described below by referring to the figures are exemplary only for explaining the present invention and should not be construed as limiting the present invention.

[0023] In the description of the present invention, it should be noted that, unless otherwise specified and limited, the terms "connected" and "linked" should be understood in a broad sense, for example, for those of ordinary skill in the art, the specific meanings of the above terms in the present invention can be understood according to specific circumstances.

[0024] As shown in accompanying FIGs 1-3, the present invention relates to a flexible and highly elastic flake-like textile fabric of a single substance, including a fabric body, which is knitted from at least two elastic yarns of the same material of a single substance. In the embodiment shown, two yarns, Y1 and Y2, are used as an example for illustration. The Y1 yarn and the Y2 yarn are knitted to form several loops, and then the loops are entrained together to form a series structure A and a parallel structure B. The modulus of Y1 yarn $\leq$ the modulus of Y2 yarn, or the yarn count of Y1 yarn

≤ the yarn count of Y2 yarn. The fabric body changes its initial opening and modulus in the warp and weft directions in response to the variations in the modulus or yarn count of the elastic yarns.

[0025] Of course, as long as meeting other requirements, the fabric body can be formed from three or more elastic yarns. And each elastic yarn is of a single substance, which is the same material, thereby obtaining a fabric of a single substance.

[0026] For example, as shown in FIG.1, through such coexistence of a series and a parallel structure, no matter in which direction the force is applied, a certain elastic yarn of the fabric will increase its initial opening and modulus in the warp or weft direction.

[0027] The fabric body is a warp-knitted structure or a weft-knitted structure, and with a tension being applied on the fabric body and in the process of increasing the tension, the fabric body forms a series structure or a parallel structure in the warp direction and weft direction respectively, so that the Y1 yarn or Y2 yarn increases its initial opening or modulus in the warp or weft direction.

[0028] More specifically, when the fabric body is a weft-knitted structure, as the tension applied on the fabric body increases, a series structure is formed in the warp direction: first pull the Y1 yarn to deform the Y1 yarn, and then the Y1 yarn drives the Y2 yarn to gradually increase the initial opening and modulus in the warp direction; and a parallel structure is formed in the weft direction: Y2 yarn is pulled to deform the Y2 yarn, and then Y2 yarn drives the Y1 yarn to gradually increase its initial opening and modulus in the weft direction.

[0029] When the fabric body is a warp-knitted structure, as the tension applied on the fabric body increases, a series structure is formed in the weft direction: first pull the Y1 yarn to deform the Y1 yarn, and the Y1 yarn then drives the Y2 yarn to gradually increases the initial opening and modulus in the weft direction; and a parallel structure is formed in the warp direction: first pull the Y2 yarn to deform the Y2 yarn, and the Y2 yarn then drives the Y1 yarn to gradually increase the initial opening and modulus in the warp direction.

[0030] It can be seen from the situation where a tension is applied to different fabric structures above that when one elastic yarn is subject to a tension it will produce a related impact on other elastic yarns, making the initial opening and modulus in the corresponding direction of the corresponding elastic yarns become larger.

[0031] Through the series and parallel structure design of the elastic yarn coexistent in the fabric body, the change of different elastic yarns is utilized to realize the deformation of the large opening at the low modulus stage, and to improve the range of stretch comfort of the fabric body so that the fabric possesses high elasticity, lightness, high modulus, flexibility, breathable, large-area flakes, free-cut and other characteristics. It is mainly used in the middle layer of clothing to improve the modulus, recovery rate and wrinkle resistance of composite materials.

[0032] In the series structure of the fabric body, when a tension is applied on the fabric body, the same tension is transmitted to the elastic yarns having different moduli, and the elastic yarn having a small modulus is deformed first, and then the overall modulus of the fabric body changes, determined in turn by the elastic yarns with a lower modulus at the time, the overall modulus of the fabric body is the minimum value of the elastic yarn modulus. In the parallel structure, when the tension is applied on the fabric body, the tension is distributed among the elastic yarns, and each elastic yarn produces the same deformation and the synthesis of each modulus results in the overall modulus of the fabric body, that is, the overall modulus of the fabric body is greater than the modulus of any elastic yarn.

[0033] In addition, the elastic yarn of the single substance is any yarn selected from spandex yarn, hard elastic fiber, polyolefin elastic fiber, composite elastic fiber, polyether ester elastic fiber, polyurethane fiber and diene elastic fiber. In the example, the elastic yarn selected is a spandex yarn, that is, the entire fabric body is made from spandex yarn.

[0034] The fabric body is a mesh fabric or a double-flattened fabric, which adopts a plain weave double-sided structure.

[0035] Furthermore, the elastic yarn density is 50-200 denier, and the elastic recovery rate of the resulting fabric is above 95%, which can ensure that the fabric body has good resilience.

[0036] In the present invention, by adjusting the modulus or yarn count of the Y1 yarn and Y2 yarn, the initial opening degree and modulus of the fabric body in the warp and weft directions can be changed. When the fabric body is a weft-knitted structure, each yarn receives the same tensile force in the warp direction, so the warp direction opening and modulus of the fabric are determined by the thinnest yarn. As the tension increases, the original low modulus yarn, due to the change of tensile properties, increase its modulus over that of the original high modulus yarn, and then the original high modulus yarn takes over the low modulus yarn and continues to deform. When the fabric body is stretched in the weft direction, the force on the fabric body is shared by both Y1 yarn and Y2 yarn, and the initial opening and modulus are determined by the thickest elastic yarn. For the warp knitting structure, it is just the opposite, the warp opening and modulus are determined by the thickest yarn, and the weft opening and modulus are determined by the thinnest yarn. Therefore, it can be ensured that both the warp-knitted structure and the weft-knitted structure have the characteristic of large opening deformation in the low modulus stage.

[0037] Knitting plain or double-sided fabrics on the weft knitting machine can make the fabric reach the required elasticity and modulus by changing the specifications of the spandex yarn fed into each channel. When using, if the modulus is required to be small, the warp direction can be consistent with the direction of use, and if the modulus is required to be large, the weft direction can be consistent with the direction of use.

[0038] The following will be described with specific embodiments.

Example 1:

[0039]

1. Elastic yarn used: Y1 yarn is PU 70D + Y2 yarn is PU 105D.
2. Warping of spandex yarn:

[0040] Warping machine type: Karl MayerDSE-H21/30 NC-2, positive yarn feeding.
[0041] Warping temperature: 24°C, warping humidity: 78%.
[0042] Setting the process parameters in the workshop under the above temperature and humidity conditions.
[0043] 3. Knitting equipment: 32-needle Raschel warp knitting machine.
[0044] 4. Finishing project.
[0045] Washed - Ordered - Inspected.
[0046] 5. Test results

Tensile elasticity test	Elongation Rate		Modulus (lbf)
Length %	280%	40%	0.450
		60%	0.830
		80%	1.190
Width%	245%	40%	0.200
		60%	0.310
		80%	0.630

[0047] It can be seen from the test results in the above table that the warp-knitted fabric body is knitted from two spandex yarns of different fineness, and the fabric body is wrapped together by the loops of the Y1 yarn and the Y2 yarn to form a soft and light fabric. In different knitting structures, different situations are formed. In the series structure (weft direction), the same tensile force is transmitted to the yarn structures with different moduli, so that the yarn with a small modulus is deformed first, and then overall modulus of the fabric is determined alternately by one of the two yarns with a lower modulus at the time; therefore, the overall modulus of the fabric is the minimum value of the yarn modulus. In the parallel structure (warp direction), the tension is distributed on the two yarns, and the modulus is synthesized and deformed in the same way to adapt to a given tensile force. Therefore, the overall modulus of the fabric is greater than the modulus of any independent yarn, and its warp opening and modulus are determined by the thickest 105D yarn, that is, the Y2 yarn, while the weft opening and modulus are determined by the thinnest 70D yarn, that is, the Y1 yarn. It can also be seen from the results that through this structural setting, the resulting fabric has the characteristics of high elasticity, lightness, high modulus, flexibility, breathability, large-area flakes, and free-cut. It is mainly used in the middle layer of the fabric of underwear, corsets or sports aprons, and can improve the modulus, recovery rate and wrinkle resistance of the composite material.

Example 2:

[0048] On the basis of embodiment 1, yarn PU 105D as Y1 and yarn PU 140D as Y2 are knitted into double drawer plain warp knitted fabric. For the elastic test, in the series structure (weft direction), the same tensile force is transmitted to the yarn structures of different moduli. As a result, the yarn with a small modulus is deformed first, and the overall modulus of the fabric is determined alternately by one of the two yarns with the lower modulus at the time. Therefore, the overall modulus of the fabric is the minimum value of the yarn modulus. In the parallel structure (warp direction), the tension is distributed on the two yarns. The modulus is synthesized and deformed in the same way to adapt to a given tensile force. Therefore, the overall modulus of the fabric is greater than the modulus of any independent yarn, and its warp opening and modulus are determined by the thickest 140D yarn, that is, Y2, while the weft opening and modulus are determined by the thinnest 105D yarn, that is, the Y1.

Example 3:

[0049] Yarns: yarn PU 75D as Y1 and yarn PU 140D as Y2 are knitted into plain double-sided weft-knitted fabric. For elastic testing, in the series structure (warp direction), the same tensile force is transmitted to yarns with different moduli and the yarn with a small modulus is deformed first, and the overall modulus of the fabric is determined alternately by one of the two yarns with the lower modulus at the time. Therefore, the overall modulus of the fabric is the minimum value of the yarn modulus. In the parallel structure (weft direction), the tensile force is distributed on the two yarns, and its modulus is synthesized and deformed in the same way to adapt to a given tensile force. Therefore, the overall modulus of the fabric is greater than the modulus of any independent yarn, and its warp opening and modulus are determined by the thickest 140D yarn, namely, the Y2 yarn, and the weft opening and modulus are determined by the thinnest 75D yarn, namely the Y1 yarn.

[0050] It should be noted that the foregoing is only preferred embodiments of the present invention, and are not intended to limit the present invention. Although the present invention has been described in detail with reference to the embodiments, those skilled in the art can still implement the modifications to the technical solutions described in the examples, or equivalent replacements for some of the technical features, but within the spirit and principles of the present invention, any modifications, equivalent replacements, improvements, etc., shall be within the scope of protection of the present invention.

Claims

1. 1. A method for preparing a flexible and highly elastic sheet-like textile fabric of a single substance is **characterized in that** it comprises the following steps:

   knitting with at least two elastic yarns of the same material of a single substance,
   including Y1 yarn and Y2 yarn, wherein after each elastic yarn is knitted into coils and is looped together to form a fabric with both a series structure and a parallel structure;
   wherein the modulus of Y1 yarn ≤ the modulus of Y2 yarn, or the yarn count of Y1 yarn ≤ the yarn count of Y2 yarn, and the initial opening and modulus of the fabric in the warp and weft directions change accordingly in responding to the changes of the modulus or yarn count of the elastic yarns; and
   wherein the fabric body is a warp-knitted structure or a weft-knitted structure,
   when a tension a tension force being applied on the fabric body and in the process of increasing the tension, the fabric body forms an overall structure in which series and parallel structures coexist, so that the initial opening or modulus of the Y1 yarn or the Y2 yarn in the warp direction or the weft direction becomes larger.

2. The method according to claim 1, **characterized in that**, in the series structure of the fabric body, when a tension being applied on the fabric body acts, the same tension is transmitted to the elastic yarns of different moduli, and the elastic yarn with a smaller modulus is deformed first, and then the overall modulus of the fabric body is determined in turn by each elastic yarn with lower modulus and at this time, the overall modulus of the fabric body is the minimum value of the yarn modulus, and in the parallel structure, when a tension being applied on the fabric body, the tension is distributed on each elastic yarn, and each elastic yarn produces the same deformation and the synthesis of each modulus to obtain the overall modulus of the fabric body and thus the overall modulus of the fabric body is greater than the modulus of any elastic yarn.

3. The method according to claim 1, **characterized in that** when the fabric body is a weft-knitted structure, as the tension applied on the fabric body increases, a series structure is formed in the warp direction, specifically first pulling the Y1 yarn to deform the Y1 yarn, the Y1 yarn drives the Y2 to gradually increases the initial opening and modulus of the Y2 yarn in the warp direction; and a parallel structure is formed in the weft direction, specifically first pulling the Y2 yarn to deform the Y2 yarn, and the Y2 yarn then drives the Y1 yarn to gradually increase the initial opening and modulus of the Y1 yarn in the weft direction; and when the fabric body is a warp-knitted structure, as the tension applied on the fabric body increases, a series structure is formed in the weft direction wherein specifically, the Y1 yarn is first pulled to deform the Y1 yarn, and the Y1 yarn then drives the Y2 yarn to gradually increases the initial opening and modulus of the Y2 yarn in the weft direction; and a parallel structure is formed in the warp direction wherein specifically, the Y2 yarn is first pulled to deform the Y2 yarn, and the Y2 yarn then drives the Y1 yarn to gradually increase the initial opening and modulus of the Y1 yarn in the warp direction.

4. A flexible and highly elastic flate-like textile fabric of a single substance, **characterized in that** it comprises a fabric body, and the fabric body is knitted by at least two elastic yarns of the same material of a single substance, including

Y1 yarn and Y2 yarn, wherein the Y1 yarn and the Y2 yarn are looped and connected to each other to form a series structure part and a parallel structure part; and wherein, the modulus of the Y1 yarn ≤ the modulus of the Y2 yarn, or the yarn count of the Y1 yarn ≤ Yarn count of Y2 yarn.

5. The textile fabric according to claim 4, **characterized in that**, when the fabric body is a weft-knitted structure, the loops formed by the Y1 yarn and the Y2 yarn are connected to respectively form a series structure in the warp direction of the fabric body, and form a parallel structure in the weft direction of the fabric body.

6. The textile fabric according to claim 4, **characterized in that**, when the fabric body is a warp-knitted structure, the loops formed by the Y1 yarn and the Y2 yarn are connected to respectively form respectively a parallel structure in the warp direction, and form a series structure in the weft direction.

7. The textile fabric according to claim 4, **characterized in that** the elastic yarn of the single substance is selected from spandex yarn, hard elastic fiber, polyolefin elastic fiber, composite elastic fiber, polyether Any of ester elastic fibers, polyurethane fibers, and diene elastic fibers.

8. The textile fabric according to claim 5, **characterized in that** the fabric body is a mesh fabric or a double-flattened fabric, and the fabric body is a plain weave double-sided structure.

9. The textile fabric according to claim 8, **characterized in that** the density of the elastic yarn is 50-200 denier.

10. The textile fabric according to claim 9, **characterized in that** the elastic recovery rate of the fabric body is above 95%.

FIG. 1

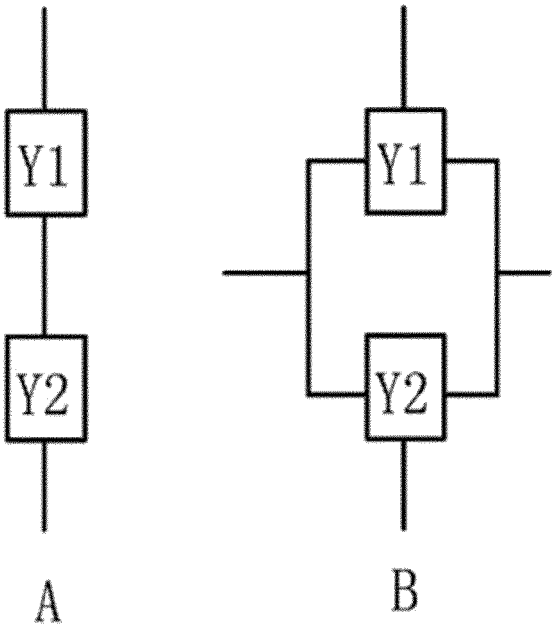


FIG. 2

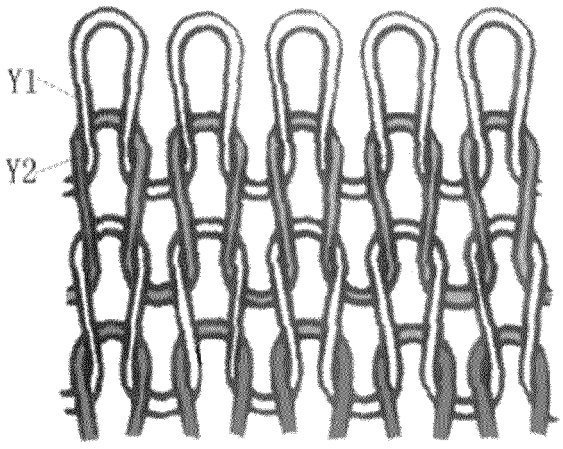
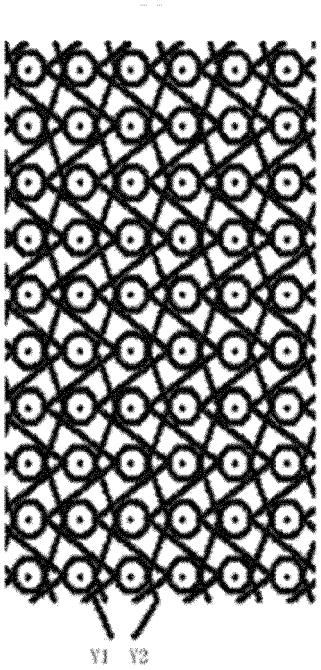


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/089060

A. CLASSIFICATION OF SUBJECT MATTER

D04B 1/18(2006.01)i; D04B 1/16(2006.01)i; D04B 1/10(2006.01)i; D04B 1/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT; ENTXTC; CNKI: 纱支, 模量, 细度, 东莞超盈纺织有限公司, 弹力, 弹性, 氨纶, 聚氨酯, count, modulus, fineness, elastic, stretch, spandex, PU, polyurethone

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 113957596 A (DONGGUAN BEST PACIFIC TEXTILE COMPANY LIMITED) 21 January 2022 (2022-01-21) claims 1-11, description, pages 1-6, and figures 1-3	1-10
A	CN 104106883 A (ADIDAS AG) 22 October 2014 (2014-10-22) description, specific embodiments, and figures 2, 3, 8, and 9	1-10
A	CN 1582348 A (ASAHI KASEI FIBERS CORP.) 16 February 2005 (2005-02-16) entire document	1-10
A	CN 211092048 U (JINPAI WARP KNITTING TECHNOLOGY CO., LTD.) 28 July 2020 (2020-07-28) entire document	1-10
A	CN 213804218 U (JINPAI WARP KNITTING TECHNOLOGY CO., LTD.) 27 July 2021 (2021-07-27) entire document	1-10
A	CN 112553768 A (ZHEJIANG WANFANG TEXTILE TECHNOLOGY CO., LTD.) 26 March 2021 (2021-03-26) entire document	1-10

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
10 July 2022	**27 July 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2022/089060

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