



(11) **EP 2 045 381 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
07.12.2011 Bulletin 2011/49

(21) Application number: **06781553.0**

(22) Date of filing: **25.07.2006**

(51) Int Cl.:
D03D 15/00 (2006.01)

(86) International application number:
PCT/JP2006/314641

(87) International publication number:
WO 2008/012869 (31.01.2008 Gazette 2008/05)

(54) **WEFTWISE STRETCH LINING CLOTH AND METHOD OF PRODUCING THE SAME**

IN SCHUSSRICHTUNG DEHNBARER EINLAGESTOFF UND HERSTELLUNGSVERFAHREN
DAFÜR

TISSU DE DOUBLURE À ÉLASTICITÉ DE TYPE TRAMÉE ET SON PROCÉDÉ DE FABRICATION

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

(43) Date of publication of application:
08.04.2009 Bulletin 2009/15

(73) Proprietor: **Asahi Kasei Fibers Corporation**
Osaka-shi, Osaka 530-8205 (JP)

(72) Inventors:
• **NAKAGAWA, Masanori**
Tokyo 100-8440 (JP)

• **UENO, Ryoza**
Tokyo 100-8440 (JP)

(74) Representative: **von Kreisler Selting Werner**
Deichmannhaus am Dom
Bahnhofsvorplatz 1
50667 Köln (DE)

(56) References cited:
EP-A1- 1 063 328 JP-A- 11 256 413
JP-A- 53 024 462 JP-A- 2001 303 394
JP-A- 2001 316 923 JP-A- 2003 013 337
JP-A- 2006 207 078 JP-Y1- 35 027 975

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 045 381 B1

Description

[0001] The present invention relates to a specific weft-wise stretch lining cloth and a method of producing the same.

5 Background Art

[0002] Recently, there is a growing demand for wearing comfort in the field of clothing and an increased number of products now have stretching features. In particular, stretching of cloth used as outer cloth has been developed and with that trend, stretchability is also required for auxiliary materials such as lining cloth and interlining cloth. As a result, lining cloths of some products are also made stretchable using various methods.

[0003] For example, a method using a covering yarn comprising a spandex yarn which stretches like rubber as a core yarn around which multifilament is wound is generally known. However, the lining cloth prepared by the method tends to be thick, fluffy and less slippery, and therefore is not so widely used. Other approaches include use of bulkiness and crimpness of false-twist textured yarn or use of untwisting force of additionally twisted yarn and twisted yarn of false-twist textured yarn. However, the lining cloths prepared by these methods are also fluffy, rough and creped and the quality is poor.

[0004] On the other hand, Patent Document 1 discloses a lining cloth having a weft-wise stretchability of 5% or more to less than 12% using a non-twisted yarn for both warp and weft yarns. Also, Patent Document 2 discloses a lining cloth having a weft-wise stretchability of 3% or more to less than 30% using a polytrimethylene terephthalate yarn for the weft yarn. In Patent Document 1, weft crimp is produced by using a soft, pliable yarn (single fine fiber or flat yarn) for the weft yarn. In Patent Document 2, weft crimp is produced by using a stretch yarn for the weft yarn. In these methods, however, achieving a higher level of stretching with maintaining smoothness is difficult.

[0005] As these documents describe, so far a lining cloth having stretchability in the weft-wise direction using a stretch yarn (elastic yarn or twisted yarn) as a weft yarn and a lining cloth using a non-twisted yarn for both warp and weft yarns and a soft, pliable yarn as the weft yarn are proposed. However, as latest outer cloth comes to have a stretchability of about 15% to 20%, the actual situation is that, to follow the elongation of the outer cloth with the above-described lining cloth, no lining cloth can satisfy such good slipperiness and stretchability and respond to high stretchability of the recent outer cloth.

[0006]

Patent Document 1: International Patent Publication WO 99/31309 (EP 1063328 A1)

Patent Document 2: JP-A-2001-172843

Disclosure of the Invention

Problems to be Solved by the Invention

[0007] An object of the present invention is to provide a lining cloth having stretchability with high elongation in the weft-wise direction having excellent wearing comfort without losing slipperiness. In other words, a lining cloth excellent in dressing convenience when worn, seam slippage and follow-up properties upon movement in addition to such slipperiness and stretching properties can be provided by controlling crimp index which is a measure of the surface structure of a lining cloth.

[0008] Another object of the present invention is to provide a 100% polyester filament lining cloth, a mixed lining cloth of polyester filament and cellulose filament and a 100% cellulose filament lining cloth having the above features.

Means for Solving the Problems

[0009] To solve the above problem, the present inventors have intensively studied how the weft yarn crimp ratio in fabric, which is directly reflected in the weft-wise elongation of a lining cloth, is increased. As a result, it has been found that using a non-twisted yarn as a weft yarn and adequately twisting a warp yarn make it possible to efficiently generate weft yarn crimp at the stage of grey fabric, and the high weft yarn crimp ratio generated in the grey fabric serves as a precursor, making it easier to increase the weft yarn crimp ratio in a fabric, which results in the stretching ratio in the post steps (scouring, heat treatment, set), and the present invention has been accomplished. The crimp ratio described herein refers to a value calculated by the following formula from length (L) obtained when putting marks of a 20-cm length in the weft-wise direction on grey fabric or a finished product and then applying a load of 1/10 the fineness on the weft yarn extracted from the fabric.

$$\text{Crimp ratio (\%)} = \{(L - 20)/20\} \times 100 \quad (3)$$

Accordingly, the present invention is as follows:

[0010]

[1] A weft-wise stretch lining cloth, said cloth comprises a woven fabric in which a polyester filament or a cellulose filament is used for a warp yarn and a substantially non-twisted polyester filament or cellulose filament is used for a weft yarn, and that the woven fabric has a weft-wise elongation of 12% or more and 20% or less, a coefficient of dynamic friction on the surface of 0.20 or more and 0.40 or less and a crimp index C defined by a first formula (1) of 0.007 or more and 0.015 or less, wherein: with the second formula

$$K = (0.9 \times D)^{0.5} \times T \quad (2) \Rightarrow$$

the first formula is:

$$C = \text{crimp ratio of weft yarn of product} / \{M \times (D)^{0.5}\} \quad (1)$$

in which D means a warp fineness (dtex), and M means a warp density (ends/2.54 cm), characterized in that the warp yarn has a twist multiplier (K) defined by a second formula (2) of 2000 or more and 15000 or less. in which T means a number of twists (t/m).

Herein the weft-wise elongation and the coefficient of dynamic friction mean values measured by the KES (manufactured by KATO TECH CO., LTD.) method described later.

[0011] [3] A weft-wise stretch lining cloth according to the above [1], wherein the cellulose filament is any one selected from the group consisting of a cuprammonium rayon filament, a viscose rayon filament and a refined cellulose filament.

[0012] [4] A weft-wise stretch lining cloth according to any one of the above [1] to [3], wherein the polyester filament is a polyethylene terephthalate filament.

[0013] [5] A method of producing a weft-wise stretch lining cloth according to any one of the above [1] to [3], characterized in that a woven fabric is exposed to an aqueous alkaline solution as a grey fabric and then the woven fabric is treated by heating while the width thereof is narrowed by 5 to 30% relative to the width of the grey fabric.

Advantages of the Invention

[0014] Since the lining cloth of the present invention has adequate stretchability, the lining cloth has low pressure when worn and has superior follow-up properties upon movement. In addition, the lining cloth causes less slippage and has good shape retaining property. Moreover, since the lining cloth has good slipperiness, not only putting on and taking off is easy, but also the lining cloth allows more freedom of movement.

Brief Description of the Drawings

[0015]

Figure 1 shows an electron micrograph of the cross-sectional shape of the woven fabric in Comparative Example 2; and

Figure 2 shows an electron micrograph of the cross-sectional shape of the woven fabric in Example 7.

Best Mode for Carrying Out the Invention

[0016] The present invention will be described in more detail below.

[0017] A first aspect of the present invention is to use a polyester filament or a cellulose filament having a twist multiplier (K) of 2000 or more and 15000 or less as a warp yarn and a substantially non-twisted polyester filament or cellulose filament as a weft yarn.

[0018] When using a non-twisted yarn (raw yarn) as a weft yarn, the weft-wise elongation of the woven fabric is virtually dependent on the crimp ratio of the weft yarn, and therefore it is important how efficiently the weft yarn is crimped. From various studies, the present inventors have found that, for a polyester filament or a cellulose filament, the value of the crimp ratio of the weft yarn at the stage of grey fabric correlates with the crimp ratio of the weft yarn developed in the post steps (scouring step, heat treatment step). In other words, the larger the crimp ratio of the weft yarn of grey fabric, the higher the weft-wise stretching ratio of the final product.

[0019] Therefore, when the weft yarn crimp ratio of grey fabric can be increased by some means, the weft-wise stretching ratio can be higher. The present inventors have intensively studied that means and found that twisting a warp yarn improves the weft yarn crimp ratio of grey fabric, leading to improvement of the weft yarn crimp ratio of a final product, which, in other words, is reflected in the weft-wise elongation, and arrived at the present invention.

[0020] When both the warp yarn and the weft yarn of a woven fabric are made of a filamentary non-twisted yarn (raw yarn), the cross sections of the warp yarn and the weft yarn in the woven fabric are both flat because the binding force between dozens of filaments is weak and the warp yarn and the weft yarn are mutually pressed. In that case, the weft yarn crimp ratio of the grey fabric is extremely low and high stretch cannot be achieved no matter what post steps are employed.

[0021] A technical key which has improved the weft-wise stretching ratio in the present invention compared to that in conventional arts even using a non-twisted yarn (raw yarn) as a weft yarn is that (1) filaments used as a warp yarn are bound together by twisting the warp yarn under specific conditions, thereby making the cross-sectional shape of the warp yarn circular, enabling easier formation of crimps in the weft yarn; and (2) the bending rigidity of the warp yarn is increased relative to that of the weft yarn by twisting the warp yarn, making it easier to form crimps in the soft, pliable weft yarn. In other words, the cross-sectional shape of the warp yarn is made circular by twisting the warp yarn under specific conditions and at the same time the bending rigidity is increased, successfully making it much easier to generate crimps in the weft yarn at the stage of grey fabric, which led to production of the weft-wise stretch lining cloth of the present invention. Essential conditions are twisting of a warp yarn and use of a raw yarn as a weft yarn, and among types of raw yarns, a soft, pliable yarn is preferably used for the weft yarn as described later.

[0022] For comparison of the cross-sectional shapes of a conventional woven fabric and a woven fabric used for the lining cloth of the present invention, Figure 1 shows an electron micrograph of the cross-sectional shape of the woven fabric of Comparative Example 2 described later and Figure 2 shows an electron micrograph of the cross-sectional shape of the woven fabric of Example 7 described later. These micrographs show cross-sections observed by an electron microscope, which are obtained by cutting each woven fabric before dyeing and after scouring, narrowing and drying so as to reveal a cross section of a warp yarn and subjecting to metal deposition (this form is similar to the form of a final product; the form is also similar to that of grey fabric before scouring and finishing treatment), showing the cross-sectional shape of a warp yarn and the form of crimps in a weft yarn.

[0023] Comparison of the cross-sectional shapes of the warp yarns shows that the cross-sectional shapes of the warp yarns are different in Example 7 using a twisted yarn having a twist multiplier (K) = 7100 as a warp yarn and in Comparative Example 2 using a substantially non-twisted yarn having a twist multiplier (K) = 1050 as a warp yarn, and consequently the form of crimps in the weft yarn is widely different.

[0024] Preferable twist conditions for the warp yarn of the woven fabric used in the present invention vary depending on the number of twist and the fineness of the warp yarn, and therefore in the present invention, the conditions are defined by the twist multiplier (K) shown by the following formula (2).

$$\text{Twist multiplier (K)} = (0.9 \times D)^{0.5} \times T \quad (2)$$

in which D means a warp fineness (dtex) and T means a number of twists (t/m).

[0025] The present invention is characterized by using a yarn having a twist multiplier (K) of 2000 or more and 15000 or less as a warp yarn. Although a twist multiplier (K) of less than 2000 makes it easier to form crimps than using a non-twisted yarn, the cross-sectional shape of the warp yarn is slightly flat and a satisfactorily stretching lining cloth cannot be produced.

[0026] On the other hand, a twist multiplier of more than 15000 is not preferable because untwisting tends to occur to cause crepes and fluffiness, and also due to low apparent fineness, the fabric becomes more transparent and stiff.

[0027] Filaments that can be used as the weft yarn of the woven fabric of the present invention include polyester filaments and cellulose filaments having the above twist multiplier.

[0028] Polyester filaments used for the warp yarn in the present invention include fiber from fiber-forming polyester polymer including homopolymer such as polyethylene terephthalate and polybutylene terephthalate, or polyester copolymer of these polymers. Fibers composed of polyethylene terephthalate are preferred in terms of slipperiness. Additives may be added to the filament, such as an antistatic agent, a flame-retardant, a heat stabilizer, a light stabilizer and

titanium oxide. A cross-sectional shape of the filament is not particularly limited but may include a circle, a polygon such as a triangle, an L-shape, a Y-shape or a T-shape, a multi-lobal shape, a hollow shape, a flat shape or an indefinite shape.

[0029] Typical examples of cellulose filaments used for the warp yarn include cuprammonium rayon, viscose rayon, polynosic rayon, regenerated cellulose fiber such as cellulose made of bamboo as a raw material, refined cellulose fiber spun in an organic solvent (N-methylmorpholine N-oxide) and acetate fiber such as diacetate and triacetate. Cuprammonium rayon filaments, viscose rayon filaments and polynosic rayon filaments are preferred in terms of slipperiness and touch.

[0030] The polyester filament and cellulose filament used for the warp yarn have a fineness of preferably 33 to 133 decitex (dtex), more preferably 56 to 110 dtex. The single yarn fineness is not particularly limited and preferably 0.5 to 10 dtex, more preferably 0.5 to 5 dtex.

[0031] Examples of fiber that can be used for the weft yarn in the present invention, on the other hand, include raw yarns of non-twisted polyester filaments or cellulose filaments substantially not false-twisted or twisted. Although these raw yarns are substantially non-twisted, they may be interlaced or slightly twisted (about 10 to 200 t/m) in order to converge the filament.

[0032] Examples of polyester filament used for the weft yarn in the present invention include fiber from fiber-forming polyester polymer including homopolymer such as polyethylene terephthalate and polybutylene terephthalate, or polyester copolymer of these polymers. Fibers composed of polyethylene terephthalate are preferred in terms of slipperiness. Additives may be added to the filament, such as an antistatic agent, a flame-retardant, a heat stabilizer, a light stabilizer and titanium oxide.

[0033] Typical examples of cellulose filaments used for the weft yarn include cuprammonium rayon, viscose rayon, polynosic rayon, regenerated cellulose fiber such as cellulose made of bamboo as a raw material, refined cellulose fiber spun in an organic solvent (N-methylmorpholine N-oxide) and acetate fiber such as diacetate and triacetate. Cuprammonium rayon filaments, viscose rayon filaments and polynosic rayon filaments are preferred in terms of slipperiness and touch.

[0034] The polyester filament and cellulose filament used for the weft yarn have a fineness of preferably 33 to 133 decitex (dtex), more preferably 56 to 110 dtex. The single yarn fineness is not particularly limited and is preferably 0.5 to 10 dtex, more preferably 0.5 to 5 dtex.

[0035] Although the cross-sectional shape of the filament is not particularly limited, a soft, pliable raw yarn is desirably used in order to efficiently generate weft-wise elongation. When the filament has a circular cross section, the smaller the single yarn fineness, in other words, the smaller the single yarn diameter, the better. A raw yarn having a high flatness is particularly preferably used. Flat cross-sectional shapes are not particularly limited and raw yarns having a cross-sectional structure not simply flat but substantially flat, and soft, pliable in a specific direction, such as of a W-shape, an I-shape, a boomerang shape, and a skewered-balls shape, are particularly preferred.

[0036] Combinations of materials of the warp yarn and the weft yarn include, but not limited to, a total of four combinations - a 100% polyester filament lining cloth, a 100% cellulose filament lining cloth and two types of mixed lining cloths of a polyester filament and a cellulose filament.

[0037] According to a second aspect of the present invention, the woven fabric used as a lining cloth has a weft-wise elongation of 12% or more and 20% or less, a coefficient of dynamic friction on its surface of 0.20 or more and 0.40 or less and a crimp index (C) of 0.007 or more and 0.015 or less.

[0038] To obtain a lining cloth with reduced seam slippage and tightness in wearing and excellent wearing comfort, which is an object of the present invention, the woven fabric for the lining cloth must have an elongation in the weft-wise direction and a coefficient of dynamic friction on its surface designed in the above specific ranges. Specifically, the lining cloth of the present invention has a weft-wise elongation of preferably 12% or more and 20% or less.

The weft-wise elongation of the lining cloth of the present invention can be controlled and adjusted by twist multipliers (warp fineness, number of twist), densities of woven fabric and processing conditions (degree of narrowing).

[0039] For a conventional outer cloth having a weft-wise elongation of about 5 to 10%, a weft-wise elongation of a lining cloth about 70% as much as the weft-wise elongation of the outer cloth, i.e., 3.5 to 7% is sufficient in consideration of the presence of a "kise" (fullness work) and shape retaining properties of the outer cloth, wherein the "kise" is provided in order not to damage wear comfort and formed by cutting lining cloth in a size larger than the mating outer cloth and folding the former along a line closer to a seam line so that the lining cloth is superfluous relative to the outer cloth. However, as described above, recent outer cloths mostly have an elongation of about 15 to 20% and in order to correspond to such stretch outer cloths, lining cloths must have a higher weft-wise elongation. As a result of the present inventors' wearing tests with lining cloths having different weft-wise elongations, each of which was put on an outer cloth having a weft-wise elongation of 15%, the present inventors have found that no tightness or discomfort was felt even upon movement when the lining cloth has an elongation of 12% or more. On the other hand, a lining cloth having a weft-wise elongation of more than 20% is not preferred because the weft yarn has a larger crimp and the surface becomes rougher, lowering slipperiness and losing wearing comfort.

[0040] Also, to satisfy properties required for a lining cloth, such as migration durability and fraying of the weft yarn,

the crimp index (C) defined by the following formula (1) is desirably in a specific range.

$$\text{Crimp index (C)} = \text{crimp ratio of weft yarn of product} / \{M \times (D)^{0.5}\} \quad (1)$$

in which D means a warp fineness (dtex) and M means a warp density (ends/inch).

[0041] The crimp index is a parameter for identifying the surface structure of a lining cloth in relation to a weft-wise elongation of a woven fabric and a cover factor of a warp yarn. The lining cloth of the present invention has a crimp index of woven fabric in a range of preferably 0.007 or more and 0.015 or less. A crimp index of less than 0.007 is not preferable because the weft yarn has a lower crimp ratio and the resulting lining cloth has a weft-wise elongation of less than 8% and because the warp density becomes too high or the warp fineness becomes too large, resulting in a solid touch. On the other hand, a crimp index of more than 0.015 is not preferable because the crimp ratio of the weft yarn is too large or the warp density is too low and the warp fineness is too small, resulting in a fabric structure in which weft yarns are slack, easily causing fraying and migration.

[0042] Another property of lining cloth that determines wearing comfort is slipperiness. To have a satisfactory slipperiness, it is necessary that the lining cloth has a coefficient of dynamic friction of 0.20 or more and 0.40 or less.

[0043] The coefficient of dynamic friction tends to increase in proportion to the weft-wise elongation, but wear comfort is not reduced when the coefficient of dynamic friction is 0.40 or less. A coefficient of dynamic friction of more than 0.4 is not preferable because the resulting lining cloth is poor in dressing convenience and the touch. Also, a coefficient of dynamic friction of less than 0.20 is not preferable because there would be a trouble when, for example, sitting down on a chair wearing a skirt, the hem of the skirt easily slips because of high slipperiness over outer cloth, skin or panty stockings, or the wearer's position is easily disturbed.

[0044] Examples of weaves of the lining cloth of the present invention include a plain weave, a twill weave and a satin weave. The type of weave may be suitably adopted in accordance with application fields and required qualities of the lining cloth. For example, as for women's dresses, a plain weave lining cloth is preferable because a thin and soft touch is favored. For men's dresses, a twill weave lining cloth is preferable because slippage and a certain thickness are required.

[0045] The lining cloth of the present invention can be produced by the method described later. The production method is basically similar to the method described in Patent Document 1 and when treating grey fabric, narrowing heat treatment of 5 to 30% relative to the width of the grey fabric may be performed before or after scouring. More specifically, by performing narrowing with maintaining a tensioned state at a higher level in the warp direction than in the weft-wise direction (width direction), structural shrinkage of woven fabric in the width direction caused by increase in the warp density is induced (crimp is formed in weft yarn) while suppressing increase of the weft density as much as possible, whereby the method is accomplished.

[0046] When the weft yarn is a polyester filament, the lining cloth of the present invention can be produced by heat treatment at 160° to 210°C with subjecting grey fabric to narrowing of 5 to 30% relative to the width of the grey fabric before or after scouring. This is based on a principle of utilizing crimp of a weft yarn formed at the stage of grey fabric and heat shrinkage percentage of a polyester filament to form a high degree of crimp in the weft yarn, thereby generating weft-wise elongation. When, for example, performing heat treatment by a heat setter of a pintenter type generally used for heat treatment of fabric, such heat treatment is performed with both ends of woven or scoured fabric being fixed. Such heat treatment may be performed with setting the width between the fixed ends narrower than the width of the woven or scoured fabric and at the same time, with maintaining a tensioned state at a higher level in the warp direction. Herein, the scouring is a process for removing oil or warp-sizing agent etc. on the woven fabric. The treatment liquid used in the scouring is preferably water or an aqueous solution containing surfactant and alkali. A machine conventionally used for fabric scouring such as an open soaper type continuous scouring machine, a liquid-jet type dyeing machine, a bath-suspension type continuous scouring machine, a wince dyeing machine or a sofsa scouring machine may be used.

[0047] After completing the narrowing heat treatment and scouring, a dyeing/finishing process, which is common in the production of lining cloth, is adopted. When a softer touch is desired, an alkaline weight reduction treatment may be carried out prior to dyeing. For the dyeing process of polyester filament, a common lining cloth processing process is applied. A liquid-jet type dyeing machine, a jigger dyeing machine, a beam dyeing machine or a wince dyeing machine may be used. In the same way, a common lining cloth processing process may be employed as the finishing process. In the finishing process, a finishing agent such as an antistatic agent, a water repellent or a sweat absorber may be additionally added. Also, to improve the luster, smoothness or touch of the surface of the woven fabric, a calendaring treatment or an emboss treatment may be applied.

[0048] When dyeing a mixed woven fabric using a polyester filament as a weft yarn and a cellulose filament as a warp yarn, the polyester filament is initially dyed after narrowing and scouring in the same manner as described above. Subsequently, the cellulose filament is dyed. At this stage, the cellulose filament may be dyed using the same dyeing machine

as used for dyeing the polyester filament, or may be dyed using another dyeing machine according to a cold pad batch method, a pad steam method or a jigger method.

[0049] When the weft yarn is composed of a cellulose filament, a heat treatment at 100°C to 210°C may be carried out with narrowing the width of grey fabric of woven fabric by 5 to 15% after applying water, steam and an alkaline aqueous solution to the grey fabric. This is based on a principle of taking maximum advantage of crimp of a weft yarn formed at the stage of grey fabric and swelling properties of a cellulose filament by water to form a high degree of crimp in the weft yarn, thereby generating weft-wise elongation. When using cellulose acetate as the cellulose filament, heat treatment may be carried out at 160°C to 210°C with narrowing the width of the woven fabric by 5 to 15% relative to the width of the grey fabric before scouring. This is based on a principle of utilizing crimp of a weft yarn formed at the stage of grey fabric and heat shrinkage percentage of a cellulose acetate filament to form a high degree of crimp in the weft yarn, thereby generating weft-wise elongation.

[0050] To apply water to grey fabric before scouring, for example, a dipping method, a spray method or a kiss roll method, which is capable of evenly applying water to woven fabric, may be used. In consideration of processing cost and stability, the dipping method is preferred. To facilitate swelling of cellulose filament, an alkali compound such as sodium hydroxide, potassium hydroxide or sodium carbonate may be added in an amount up to about 10% by weight. When performing heat treatment by a heat setter of a pintenter type generally used as a heating machine after applying water, the heat treatment is carried out with both ends of woven or scoured fabric being fixed. The narrowing treatment may be performed with setting the width between the fixed ends narrower than the width of the woven or scoured fabric, and at the same time, with maintaining a tensioned state at a higher level in the warp direction. After completing narrowing heat treatment and scouring, a dyeing/finishing process, which is common in the production of lining cloth, is adopted.

[0051] The lining cloth of the present invention can be produced in a suitable manner by using a woven fabric prepared by the method described above.

Examples

[0052] The present invention is described in detail by Examples below, but the present invention is not limited to these Examples. Methods of measurement and evaluation are as follows.

(1) Evaluation of weft-wise elongation

[0053] Using KES-FB1 manufactured by KATO TECH CO., LTD., a 20 cm × 20 cm fabric was stretched in the weft-wise direction with a holding length (L) of 5 cm at a tensile speed of 0.2 mm/sec. Elongation E (%) under a stress of 490 N/m was calculated by the following formula.

$$E (\%) = (\Delta L / L) \times 100 \quad (4)$$

in which ΔL means elongated length (cm) under a stress of 490 N/m.

(2) Evaluation of coefficient of dynamic friction

[0054] Using KES-SE manufactured by KATO TECH CO., LTD., a scoured cotton cloth of a plain weave No. 3 of shirting was attached to a frictional slider weighing 25 g having a frictional surface of 1 cm × 1 cm and was slid on the surface of a fixed lining cloth at a speed of 5 cm/min. Based on the frictional resistance in the test, the coefficient of dynamic friction (μ) was determined by the following formula. In the formula, A means a mean value (gf) of frictional resistances displayed on the measurement device and B means the weight (g) of the frictional slider. An average of values obtained when slid in the warp direction and the weft-wise direction of a lining cloth was defined as the coefficient of dynamic friction of the lining cloth.

$$\text{Coefficient of dynamic friction } (\mu) = A / B \quad (5)$$

(3) Weft yarn crimp ratio in fabric

[0055] The crimp ratio of a woven fabric (grey fabric, fabric after finishing, lining cloth product) was calculated by the following formula by measuring length (L) when putting marks of a 20-cm length in the weft yarn direction of the fabric

and applying a load of 1/10 the fineness on the weft yarn extracted from the fabric.

$$\text{Weft yarn crimp ratio (\%)} = \{(L - 20)/20\} \times 100 \quad (3)$$

(4) Seam slippage

[0056] Seam slippage was measured in accordance with JIS-L-1096 method (B method). Since stress is easily generated in the weft-wise direction when the product is worn, slippage in the weft-wise direction (deviation of warp yarns along weft yarns) was measured. A piece of 10 cm in the warp direction (width) and 17 cm in the weft-wise direction (length) was folded in half the length and lockstitched with a margin of 1 cm (needle No. 11, yarn No. 50 polyester yarn, 5 stitches/cm) and the fold was cut. The piece was subjected to a tensile test in which a constant load (5 kg/2.54 cm) was applied and after an hour without a load, a load of 0.5 kg/2.54 cm was applied. The seam deviation at the moment was defined as seam slippage. The value was calculated in an average of $n = 3$.

[0057] Hereinafter examples using a polyester filament as a warp yarn are disclosed in Examples 1 to 5 and Comparative Example 1.

Example 1

[0058] A plain weave fabric having a warp density of 122 ends/2.54 cm and a weft density of 99 picks/2.54 cm was woven using a polyethylene terephthalate filament (sheath/core type antistatic fiber) of 56 dtex/24f having a twist multiplier (K) of 4260 as a warp yarn and a non-twisted polyethylene terephthalate filament of 56 dtex/30f having a W-shaped cross-section (the ratio between the longer diameter and the shorter diameter being about 3:1) as a weft yarn.

[0059] The grey fabric was subjected to narrowing of 15% relative to the width of the grey fabric by a pin tenter under the condition of $190^{\circ}\text{C} \times 30$ seconds. Then, after scouring in a bath containing 5 g/l of sodium hydroxide and a 2 g/l of nonionic surfactant at 90°C using an open soaper type continuous scouring machine, the fabric was rinsed with hot water (80°C), dehydrated and dried (120°C). Subsequently, the fabric was impregnated with a treatment liquid containing 125 g/l of sodium hydroxide and NEORATE NA30 (manufactured by NICCA CHEMICAL CO. LTD., alkyl phosphate penetrant, 10 g/l) and squeezed (pick up: 40% by weight) by a pad steam method and continuous weight reduction with alkali was carried out, and neutralization, rinsing with hot water and drying were carried out according to a conventional method. The fabric was dyed using a liquid-jet type dyeing machine in a bath containing a disperse dye (C.I DISPERSE BLUE 291: 1% owf), DISPER TL (manufactured by MEISEI CHEMICAL WORKS, LTD.: Tamol type dispersant, 1 g/l) and a pH adjustor (acetic acid, 0.5 cc/l) at $130^{\circ}\text{C} \times 30$ minutes, and then reduced and rinsed to give a dyed fabric. The fabric was subjected to finishing using an aqueous solution containing NK GUARD FGN800 (manufactured by NICCA CHEMICAL CO. LTD., fluorine water repellent, 1% by weight) and MEWLON AS222 (manufactured by MIYOSHI OIL & FAT CO., LTD., cationic antistatic agent, 1% by weight) by a pad-dry-cure method (pre-drying at $100^{\circ}\text{C} \times 1$ minute, drying $180^{\circ}\text{C} \times 30$ seconds), and a lining cloth was prepared using the finished fabric. Property results are shown in Table 1.

Example 2

[0060] A plain weave fabric having a warp density of 117 ends/2.54 cm and a weft density of 80 picks/2.54 cm was woven using a polyethylene terephthalate filament (sheath/core type antistatic fiber) of 56 dtex/24f having a twist multiplier (K) of 4260 as a warp yarn and a non-twisted polyethylene terephthalate filament of 84 dtex/30f having a W-shaped cross-section (the ratio between the longer diameter to the shorter diameter being about 3: 1) as a weft yarn.

[0061] The grey fabric was subjected to narrowing of 18% relative to the width of the grey fabric by a pin tenter under the condition of $195^{\circ}\text{C} \times 30$ seconds. Scouring, continuous weight reduction with alkali, dyeing and finishing treatment were carried out in the same manner as in Example 1 to prepare a lining cloth. Property results are shown in Table 1.

Example 3

[0062] A plain weave fabric having a warp density of 120 ends/2.54 cm and a weft density of 82 picks/2.54 cm was woven using a polyethylene terephthalate filament (sheath/core type antistatic fiber) of 56 dtex/24f having a twist multiplier (K) of 7100 as a warp yarn and a non-twisted polyethylene terephthalate filament of 84 dtex/70f having a circular cross-section as a weft yarn.

[0063] The grey fabric was subjected to narrowing of 16% relative to the width of the grey fabric by a pin tenter under the condition of $190^{\circ}\text{C} \times 30$ seconds. Scouring, weight reduction with alkali, dyeing and finishing treatment were carried

out in the same manner as in Example 1 to prepare a lining cloth. Property results are shown in Table 1.

Example 4

[0064] A plain weave fabric having a warp density of 120 ends/2.54 cm and a weft density of 85 picks/2.54 cm was woven using a polyethylene terephthalate filament (sheath/core type antistatic fiber) of 56 dtex/24f having a twist multiplier (K) of 7100 as a warp yarn and a cuprammonium rayon filament of 84 dtex/45f as a weft yarn.

[0065] The grey fabric was dipped in water at 25°C for about 5 seconds and dehydrated by a dehydrator at a pick-up of 48%. The fabric was then continuously subjected to narrowing of 14% relative to the width of the woven fabric under the condition of 170°C × 30 seconds. The fabric was scoured using an open soaper type continuous scouring machine as in Example 1. The fabric was dyed using a liquid-jet type dyeing machine at 130°C for 60 minutes. For dyeing conditions, the bath ratio was 1:20 and the pH of the bath was pH 5.5, and a disperse dye (C.I. DISPERSE BLUE 291: 1 % owf), a direct dye (C.I. DIRECT BLUE 291: 1 % owf), DISPER TL (manufactured by MEISEI CHEMICAL WORKS, LTD.: Tamol type dispersant, 1 g/l) and 50 g/l of sodium sulfate were used as chemicals. For finishing treatment, after dipping and nipping by a pad-dry-cure method using Sumitex Resin NF-500K (manufactured by Sumitomo Chemical Co. Ltd., non-formalin resin, 5% by weight), Sumitex ACC X-110 (manufactured by Sumitomo Chemical Co. Ltd., metallic salt catalyst, 1.5% by weight) and NICCA MS-1F (manufactured by NICCA CHEMICAL CO. LTD., methylolamide softening agent, 1% by weight), the fabric was pre-dried (100°C × 1 minute) and subjected to heat treatment (160°C × 90 seconds) for crosslinking to prepare a lining cloth. Property results are shown in Table 1.

Example 5

[0066] A lining cloth was prepared in the same manner as in Example 2 except for using a polyethylene terephthalate filament of 84 dtex/36f having a circular cross-section as the weft yarn in Example 3. Property results are shown in Table 1.

Comparative Example 1

[0067] A lining cloth was prepared in the same manner as in Example 1 except for using a non-twisted polyethylene terephthalate filament (sheath/core type antistatic fiber) of 56 dtex/24f as the warp yarn in Example 1. Property results are shown in Table 1.

[0068] Examples using a cellulose filament as a warp yarn are disclosed in Examples 6 to 13 and Comparative Examples 2 to 4 below.

Examples 6 to 8

[0069] A plain weave fabric having a warp density of 136 ends/2.54 cm and a weft density of 103 picks/2.54 cm was woven using cuprammonium rayon filament of 56 dtex/30f having a twist multiplier (K) of 2100 (Example 6), 4260 (Example 7) and 7100 (Example 8) as a warp yarn and a non-twisted cuprammonium rayon filament of 56 dtex/45f as a weft yarn.

[0070] The grey fabric was dipped in a 3.15% by weight aqueous sodium hydroxide solution (5° Baume) at 30°C using an open soaper type continuous scouring machine to carry out narrowing of about 12% relative to the width of the woven fabric, and then repeatedly rinsed with hot water (80°C) and water, and dehydrated and dried (120°C). The higher the twist multiplier, the higher the substantial degree of narrowing (9.5% in Example 6, 10.2% in Example 7, 11.2% in Example 8). Dyeing was carried out by a cold batch method at 25°C for 15 hours. A vinylsulfon reactive dye (SUMIFIX NAVY BLUE GS: 1% owf) was used as a dye and 10 g/l of sodium hydroxide was used. Through the subsequent finishing treatment according to the method in Example 4, a lining cloth was prepared. The amount of the resin and the catalyst concentration were twice the original. Property results are shown in Table 2.

Comparative Examples 2 and 3

[0071] A plain weave fabric having a warp density of 136 ends/2.54 cm and a weft density of 103 picks/2.54 cm was woven using cuprammonium rayon filament of 56 dtex/30f having a twist multiplier (K) of 1060 (Comparative Example 2) and 16300 (Comparative Example 3) as a warp yarn and a non-twisted cuprammonium rayon filament of 56 dtex/45f as a weft yarn.

The grey fabric was subjected to scouring, narrowing, dyeing and finishing treatment according to the method in Example 6 to prepare a lining cloth. Property results are shown in Table 2.

Example 9

[0072] A plain weave fabric having a warp density of 118 ends/2.54 cm and a weft density of 83 picks/2.54 cm was woven using, as a warp yarn, a cuprammonium rayon filament of 66 dtex/36f in an alternating SSZZ arrangement of two by two having a twist multiplier (K) of 14100 and a cuprammonium rayon filament of 84 dtex/45f as a weft yarn. The grey fabric was subjected to scouring, narrowing, dyeing and finishing treatment according to the method in Example 6 to prepare a lining cloth. Property results are shown in Table 2.

Example 10

[0073] A plain weave fabric having a warp density of 113 ends/2.54 cm and a weft density of 72 picks/2.54 cm was woven using, as a warp yarn, a cuprammonium rayon filament of 84 dtex/45f in an alternating SSZZ arrangement of two by two having a twist multiplier (K) of 14200 and a non-twisted cuprammonium rayon filament of 84 dtex/45f as a weft yarn. The grey fabric was subjected to scouring, narrowing, dyeing and finishing treatment according to the method in Example 6 to prepare a lining cloth. Property results are shown in Table 3.

Comparative Example 4

[0074] A lining cloth was prepared in the same manner as in Example 10 except for using a non-twisted cuprammonium rayon filament of 84 dtex/45f as the warp yarn in Example 10. Property results are shown in Table 3.

Example 11

[0075] A plain weave fabric having a warp density of 136 ends/2.54 cm and a weft density of 85 picks/2.54 cm was woven using a cuprammonium rayon filament of 56 dtex/30f having a twist multiplier (K) of 7100 as a warp yarn and a non-twisted polyethylene terephthalate filament of 84 dtex/30f having a W-shaped cross-section (the ratio between the longer diameter and the shorter diameter being about 3:1) as a weft yarn.

[0076] The grey fabric was subjected to narrowing of 12% relative to the width of the grey fabric by a pin tenter under the condition of $190^{\circ}\text{C} \times 30$ seconds. The fabric was scoured using an open soaper type continuous scouring machine as in Example 1. The fabric was dyed using a liquid-jet type dyeing machine at 130°C for 60 minutes. For dyeing conditions, the bath ratio was 1:20 and the pH of the bath was pH 5.5, and a disperse dye (C.I. DISPERSE BLUE 291: 1% owf), a direct dye (C.I. DIRECT BLUE 291: 1% owf), DISPER TL (manufactured by MEISEI CHEMICAL WORKS, LTD.: Tamol type dispersant, 1 g/l) and 50 g/l of sodium sulfate were used as chemicals. For finishing treatment, after dipping and nipping by a pad-dry-cure method using Sumitex Resin NF-500K (manufactured by Sumitomo Chemical Co. Ltd., non-formalin resin, 5% by weight), Sumitex ACC X-110 (manufactured by Sumitomo Chemical Co. Ltd., metallic salt catalyst, 1.5% by weight) and NICCA MS-1F (manufactured by NICCA CHEMICAL CO. LTD., methylolamide softening agent, 1% by weight), the fabric was pre-dried ($100^{\circ}\text{C} \times 1$ minute) and subjected to heat treatment ($160^{\circ}\text{C} \times 90$ seconds) for crosslinking to prepare a lining cloth. Property results are shown in Table 3.

Example 12

[0077] A twill weave fabric having a warp density of 136 ends/2.54 cm and a weft density of 71 picks/2.54 cm was woven using a viscose rayon filament of 84 dtex/33f having a twist multiplier (K) of 5200 as a warp yarn and a non-twisted viscose rayon filament of 110 dtex/44f as a weft yarn.

[0078] The grey fabric was subjected to scouring, narrowing, dyeing and finishing treatment according to Example 6 to prepare a lining cloth. Property results are shown in Table 3.

Example 13

[0079] A plain weave fabric having a warp density of 136 ends/2.54 cm and a weft density of 80 picks/2.54 cm was woven using a cuprammonium rayon filament of 56 dtex/30f having a twist multiplier of 7100 as a warp yarn and a non-twisted diacetate filament of 84 dtex/20f as a weft yarn.

[0080] The grey fabric was dipped in water at 25°C for about 5 seconds and dehydrated by a dehydrator at a pick-up of 51 %. The fabric was then continuously subjected to narrowing of 10% relative to the width of the woven fabric under the condition of $190^{\circ}\text{C} \times 30$ seconds. Scouring was carried out according to Example 1. For dyeing, the diacetate filament was dyed by a jigger dyeing method using a disperse dye (C.I. DISPERSE BLUE 291: 1% owf) and DISPER TL (manufactured by MEISEI CHEMICAL WORKS, LTD.: Tamol type dispersant, 1 g/l) at 95°C for 1 hour and then the cuprammonium rayon filament was dyed using a direct dye (C.I. DIRECT BLUE 291: 1% owf) and 50 g/l of sodium sulfate.

EP 2 045 381 B1

For finishing treatment, after dipping and nipping by a pad-dry-cure method using Sumitex Resin NF-500K (manufactured by Sumitomo Chemical Co. Ltd., non-formalin resin, 5% by weight), Sumitex ACC X-110 (manufactured by Sumitomo Chemical Co. Ltd., metallic salt catalyst, 1.5% by weight) and NICCA MS-1F (manufactured by NICCA CHEMICAL CO. LTD., methylolamide softening agent, 1% by weight), the fabric was pre-dried ($100^{\circ}\text{C} \times 1$ minute) and subjected to heat treatment ($160^{\circ}\text{C} \times 90$ seconds) for crosslinking to prepare a lining cloth. Property results are shown in Table 3.

[0081]

[Table 1]

	Ex. 1	Ex. 2	Ex. 3	Ex. 4	Ex. 5	Comp. Ex. 1
Number of twist of warp yarn (t/m)	s 600	s 600	s 1000	s 1000	s 1000	0
Twist multiplier	4260	4260	7100	7100	7100	0
Density of grey fabric (warp/weft) ends or picks/ 2.54 cm	122/99	117/80	120/82	120/85	120/82	122/99
Density of product (warp/weft) ends or picks/ 2.54 cm	42/104	146/85	139/84	149/85	142/83	138/102
Weft-wise elongation (%)	11.8	11.4	8.9	12.9	8.1	6.2
Coefficient of dynamic friction	0.317	0.311	0.349	0.343	0.301	0.320
Seam slippage resistance (mm)	0.5	0.2	0.4	0.8	1.9	0.6
Degree of fraying	clear	clear	clear	clear	clear	clear
Crimp index	0.0105	0.0101	0.0083	0.0116	0.0074	0.0058

[0082]

[Table 2]

	Ex. 6	Ex.7	Ex. 8	Ex.9	Comp. Ex. 2	Comp. Ex. 3
Number of twist of warp yarn (t/m)	s 300	s 600	s 1000	s z 1825	s 150	S2300
Twist multiplier	2100	4260	7100	14100	1060	16300
Density of grey fabric (warp/weft) ends or picks/2.54 cm	136/103	136/103	136/103	118/83	136/103	136/103
Density of product (warp/weft) ends or picks/2.54 cm	150/105	155/105	150/105	150/85	146/105	156/107
Weft-wise elongation (%)	10.1	12.4	12.1	17.6	7.7	9.8
Coefficient of dynamic friction	0.281	0.315	0.306	0.291	0.280	0.483
Seam slippage resistance (mm)	0.7	0.7	0.7	0.2	0.7	0.5
Degree of fraying	clear	clear	clear	clear	clear	clear
Crimp index	0.0085	0.0103	0.0102	0.0142	0.0068	0.0082
Remarks						creped and rough

[0083]

[Table 3]

	Ex.10	Ex.11	Ex. 12	Ex. 13	Comp. Ex. 4
Number of twist of warp yarn (t/m)	s z 1630	s 1000	s 600	s 1000	0
Twist multiplier	1420	7100	5200	7100	0
Density of grey fabric (warp/weft) ends or picks/2.54 cm	113/72	136/85	136/71	136/80	113/72

(continued)

	Ex.10	Ex.11	Ex. 12	Ex. 13	Comp. Ex. 4
Density of product (warp/weft) ends or picks/2.54 cm	136/73	154/87	146/72	145/81	121/73
Weft-wise elongation (%)	17.5	10.4	9.8	9.1	7.2
Coefficient of dynamic friction	0.254	0.368	0.289	0.317	0.294
Seam slippage resistance (mm)	0.6	0.3	0.9	0.7	0.7
Degree of fraying	clear	clear	clear	clear	clear
Crimp index	0.0138	0.0087	0.0073	0.0082	0.0063

Industrial Applicability

[0084] An object of the present invention is to provide a stretch lining cloth having an elongation of 12% or more in the weft-wise direction without losing slipperiness. The characteristics can provide a lining cloth having reduced seam slippage and tightness and excellent wearing comfort in wearing. The lining cloth of the present invention is particularly suitable as a lining cloth for clothing whose outer cloth has a stretchability ratio of 15% or more.

Claims

1. A weft-wise stretch lining cloth, said cloth comprises a woven fabric in which a cellulose filament or a polyester filament is used for a warp yarn and a non-twisted cellulose filament or polyester filament is used for a weft yarn, and that the woven fabric has a weft-wise elongation of 12% or more and less than 20%, a coefficient of dynamic friction on the surface of 0.20 or more and 0.40 or less and a crimp index C defined by a first formula (1) of 0.007 or more and 0.015 or less, wherein the first formula is:

$$C = \text{crimp ratio of weft yarn of product} / \{M \times (D)^{0.5}\} \quad (1)$$

in which D means a warp fineness (dtex), and M means a warp density (ends/2.54 cm). **characterized in that** the warp yarn has a twist multiplier (K) defined by a second formula (2) of 2,000 or more and 15,000 or less with the second formula

$$K = (0.9 \times D)^{0.5} \times T \quad (2)$$

in which T means a number of twists (t/m)

2. A weft-wise stretch lining cloth according to claim 1, wherein the weft yarn is from a cellulose filament.
3. A weft-wise stretch lining cloth according to claim 1 or 2, wherein the cellulose filament is any one selected from the group consisting of a cuprammonium rayon filament, a viscose rayon filament and a refined cellulose filament.
4. A weft-wise stretch lining cloth according to claim 1 or 2, wherein the polyester filament is a polyethylene terephthalate filament.
5. A method of producing a weft-wise stretch lining cloth according to claim 1 or 2, **characterized in that** a woven fabric is exposed to an aqueous alkaline solution as a grey fabric and then the woven fabric is treated by heating while the width thereof is narrowed by 5 to 30% relative to the width of the grey fabric.

Patentansprüche

1. In Schussrichtung dehnbarer Stretch-Futterstoff, wobei der Stoff ein Gewebe umfasst, bei dem ein Cellulosefilament

oder ein Polyesterfilament als Kettgarn verwendet wird und ein ungezwirntes Cellulosefilament oder Polyesterfilament als Schussgarn verwendet wird, und das Gewebe eine Dehnung in Schussrichtung von 12% oder mehr und weniger als 20%, einen dynamischen Reibungskoeffizienten auf der Oberfläche von 0,20 oder mehr und 0,40 oder weniger und einen Kräuselungsindex C, der durch die erste Formel (1) definiert ist, von 0,007 oder mehr und 0,015 oder weniger aufweist, wobei die erste Formel lautet:

$$C = \text{Kräuselungsverhältnis des Schussgarns des Produkts} / \{M \times (D)^{0,5}\} \quad (1),$$

wobei D den Titer in Kettrichtung (dtex) bedeutet und M die Kettdichte (Enden/2,54 cm) bedeutet, **dadurch gekennzeichnet, dass** das Kettgarn einen durch eine zweite Formel (2) definierten Zwirnmultiplikator (K) von 2000 oder mehr und 15 000 oder weniger aufweist, mit der zweiten Formel:

$$K = (0,9 \times D)^{0,5} \times T \quad (2),$$

wobei T die Anzahl der Zwirndrehungen (t/m) bedeutet.

2. In Schussrichtung dehnbarer Stretch-Futterstoff gemäß Anspruch 1, wobei das Schussgarn von einem Cellulosefilament stammt.
3. In Schussrichtung dehnbarer Stretch-Futterstoff gemäß Anspruch 1 oder 2, wobei das Cellulosefilament eines ist, das aus der Gruppe ausgewählt ist, die aus einem Cupro-Filament, einem Viskosefilament und einem raffinierten Cellulosefilament besteht.
4. In Schussrichtung dehnbarer Stretch-Futterstoff gemäß Anspruch 1 oder 2, wobei das Polyesterfilament ein Polyethylenterephthalat-Filament ist.
5. Verfahren zur Herstellung eines in Schussrichtung dehnbaren Stretch-Futterstoffs gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** ein Gewebe als Rohware einer wässrigen alkalischen Lösung ausgesetzt wird und dann das Gewebe durch Erhitzen behandelt wird, während seine Breite um 5 bis 30% relativ zur Breite der Rohware reduziert wird.

Revendications

1. Tissu de doublure à élasticité de type tramée, ledit tissu comprenant une étoffe tissée dans laquelle un filament de cellulose ou un filament de polyester est utilisé pour un fil de chaîne et un filament de cellulose sans torsion ou un filament de polyester est utilisé pour un fil de trame, et l'étoffe tissée présente une extensibilité de type tramée de 12% ou plus et inférieure à 20%, un coefficient de friction dynamique sur la surface de 0,20 ou plus et de 0,40 ou moins, et un indice de frisure C défini par une première formule (1) de 0,007 ou plus, et de 0,015 ou moins, dans lequel la première formule est :

$$C = \text{taux de frisure du fil}$$

$$\text{de trame du produit} / \{M \times (D)^{0,5}\} \quad (1)$$

dans laquelle D représente une finesse de chaîne (dtex), et M représente une densité de chaîne (fils de chaîne/2,54 cm)

caractérisé en ce que le fil de chaîne possède un multiplicateur de torsion (K) défini par une seconde formule (2)

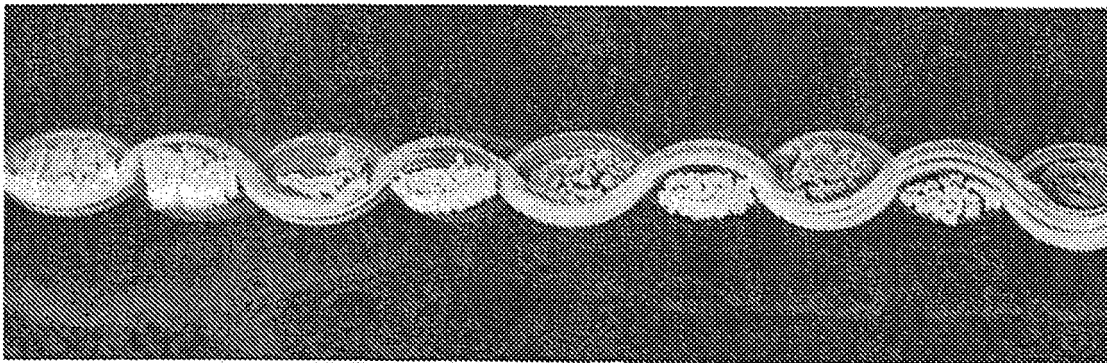
de 2 000 ou plus et de 15 000 ou moins dans laquelle avec la seconde formule

$$K = (0,9 \times D)^{0,5} \times T \quad (2)$$

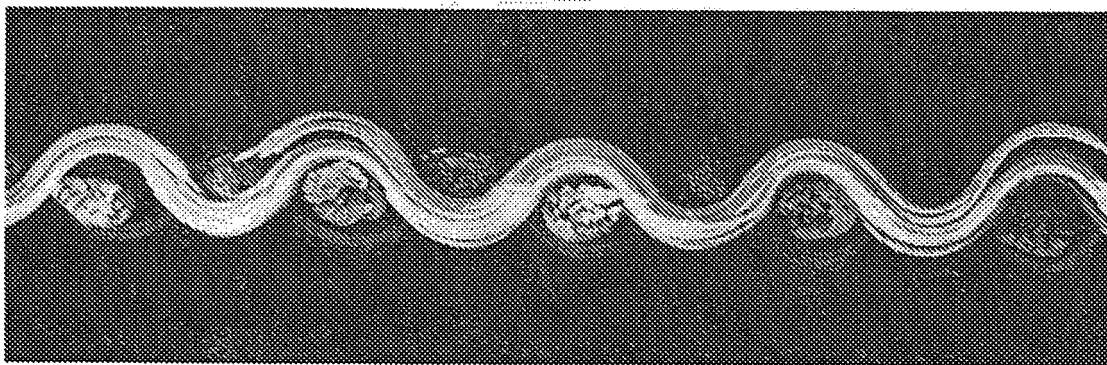
dans laquelle T représente un nombre de torsions (t/m).

2. Tissu de doublure à élasticité de type tramée selon la revendication 1, dans lequel le fil de trame est fait à partir d'un filament de cellulose.
3. Tissu de doublure à élasticité de type tramée selon la revendication 1 ou 2, dans lequel le filament de cellulose est l'un quelconque des filaments sélectionné dans le groupe constitué d'un filament de rayonne cuproammoniacale, d'un filament de rayonne viscosse et d'un filament de cellulose raffinée.
4. Tissu de doublure à élasticité de type tramée selon la revendication 1 ou 2, dans lequel le filament de polyester est un filament de polytérephtalate d'éthylène.
5. Procédé de fabrication d'un tissu de doublure à élasticité de type tramée selon la revendication 1 ou 2, **caractérisé en ce qu'**une étoffe tissée est exposée à une solution aqueuse alcaline sous la forme d'un tissu écru et ensuite l'étoffe tissée est traitée par chauffage tandis que sa largeur est rétrécie de 5 à 30 % par rapport à la largeur du tissu écru.

[Figure 1]



[Figure 2]



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 9931309 A [0006]
- EP 1063328 A1 [0006]
- JP 2001172843 A [0006]