



- (51) International Patent Classification: D03D 1/00 (2006.01) D03D 15/08 (2006.01) D03D 13/00 (2006.01)
(21) International Application Number: PCT/TR2014/000536
(22) International Filing Date: 30 December 2014 (30.12.2014)
(25) Filing Language: English
(26) Publication Language: English
(71) Applicant: SİRİKÇİOĞLU MENSUCAT SANAYİ VE TİCARET ANONİM ŞİRKETİ [TR/TR]; Oruç Reis Mah. Batı Çevre Yolu No:132, 46040 Kahramanmaraş (TR).
(72) Inventor: SİRİKÇİ, Atif; Oruç Reis Mah. Batı Çevre Yolu No:132, 46040 Kahramanmaraş (TR).
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,

HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

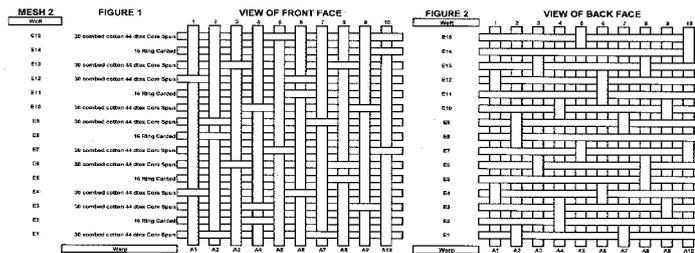
Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

- with international search report (Art. 21(3))

(54) Title: DENIM FABRIC WITH DENIM FRONT FACE AND TOWEL BACK FACE



REMARKS: As shown in Figures 1 and 2, the front and back view of the wicker-like repeat pattern of the denim fabric has the appearance of mesh.
* In the mesh, 10 warp yarns and 10 weft yarns are used.
* The mesh is composed of 20 combined cotton 44 denier cotton yarns and 100% cotton yarns. Total quantity of mesh is 2.220.
* The mesh is formed by using deep draw and narrow ribbing and narrow ribbing in the weaving process, and it is made by using the weaving after stitching.
* The mesh is composed of 20 combined cotton 44 denier cotton yarns and 100% cotton yarns. Total quantity of mesh is 2.220.
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* The mesh is composed of 20 combined cotton 44 denier cotton yarns and 100% cotton yarns. Total quantity of mesh is 2.220.
* The mesh is formed by using deep draw and narrow ribbing and narrow ribbing in the weaving process, and it is made by using the weaving after stitching.

(57) Abstract: The present invention is related to fabrics which are named denim or blue jeans, wherein it is characterized with over dye denim fabric comprising at least one warp yarn (1) dyed in warp or rope, rigid/straight weft yarns (2) and/or elastomeric weft yarns (2), at least one rigid/straight yarn align behind/over the warps to form the upper and lower portions according to the determined shape as wicker, rigid/straight yarns extending over at least one elastomeric yam, the warp and weft yarns (1, 2) formed according to the determined template/pattern which the weaving process is performed in determined frequency, extending to loops, warp and weft yarns (1, 2) and/or warp yarns (1) passing from the loop portion which the ratio of average number to the warp density is between 1 and 1.0 and/or the warp yarn (1) which the density value before shrinking is about 20-60 warp yarn/cm and/or the weft yarn (2) which the weft density is about 28-80 yarns/cm after weaving, before shrinking.

WO 2016/108773 A1

DESCRIPTION

DENIM FABRIC WITH DENIM FRONT FACE AND TOWEL BACK FACE

5 **Technical Field**

The present invention is related to fabrics which are called denim or blue jeans.

10 The invention is particularly related to the denim fabric obtained by the arrangements of the warp and weft and the meshes whose back face is similar to towel, and thus relates to denim fabric where appearance and wear comfort are obtained. This product provides many advantageous features such as wear comfort, flexibility, and a double layer fabric feature whose back face is towel-looking, preventing the contact of indigo dyed yarns with the skin or other clothes, easiness, comfort etc.

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Description of the State of the Art

20 The fabrics which are called as denim or blue jeans are the fabrics woven in various meshes from the yarns made of cotton, polyester, nylon, viscose, lycra and of various unit weights and whose the warp yarn is dyed blue indigo and the weft is undyed (raw).

25 The "Denim" name comes from the phrase of "Tissu de Nimes" used in the Rhone Valley of Southern France; and the "Blue jeans" similarly comes from the phrase of "Blue de Genes" used in the Italian Riviera.

30 The diversity of demand in the 1950s and 1960s set the manufacturers in motion to find the application of different washing techniques and the colors that can be applied to denim fabric. At the end of the 1980s, formfitting, lycra skinny jeans made from denim fabric began to spread. The fact that the Jeans becomes popular in all segments led the haute couture creators in new studies. Yves Saint Laurent, took the

jeans to the podium in 1970. Designers such as Calvin Klein, Armani, and Valentino followed him.

Blue jeans are produced from the denim fabric dyed with indigo. Jeans become ready to be packed after the cutting, sewing, washing, rinsing, drying, and ironing processes. Washing, which is one of the most important in these processes, gives different colors and effects to the fabric. According to the desired effect to be exerted, the jeans undergo various treatments after pre-washing.

Indigo is a dyestuff produced from the leaves of the "indigofera tinctoria" plant. Indigo, the utilization of which dates back to 1600 BC, was found in India, Indonesia, China and Africa. The blue indigo has gray, green and red tones. Paint manufacturers are making attempts in different colors with the indigo dye properties. However, the attempts have failed so far and fading of color could not be provided and fiber penetration could not be blocked. Since indigo does not penetrate into the yarn at once, immersion of the yarn into an indigo tank is repeated until the desired tone is obtained. The more the immersion is repeated the darker the color is obtained. After the dyeing process, the defunct dyestuff is removed from the yarn by using washing techniques.

First of all, the fabric is cleansed from the required materials for weaving and ready-made clothing. After that it is washed with "pumice stone" until the desired color is obtained. This stone has an abrasive effect on the fabric and has an anti-adhesive effect for color to stick onto the fabric again. In the following step, the contrast between blue and white is increased by using chemical processes. In the bleaching process, the quantity of chemicals is increased and the color changes to blue ice. In addition, in the "rodeo" stage, bleaching of certain regions is provided by spraying in private cabins.

In the Japanese patent application No. JP19930131162 in 1993, a solution related to denim fabric and its production is described. However, a flexible solution providing comfort for the user in wearing is needed.

Description of the objects of the Invention

The object of the invention considering the state of the art is the development of a new denim fabric in which the existing disadvantages of the structure are removed and the back face is towel-looking and has the comfort of towel.

Another object of the invention is to develop a fabric providing comfort for the user of the clothing.

Another object of the invention is to provide the healthy use of jeans due to its flexible and formfitting fabric.

Another object of the invention is to provide wear comfort, flexibility, double layer fabric feature whose back face is towel-looking, prevention of the contact of indigo dyed yarns with skin or other clothes, easiness and comfort.

Another object of the invention is that the developed denim fabric is able to be used on clothing such as pants, shirts, coat etc.

Another object of the invention is the formation of loops whose back face is similar to towel due to the layout of the warp and wefts, thereby achieving the desired appearance and expected comfort on fabric. The most common fabric pattern design used in denim is classic 3/1 Z twill. In the present invention front view is close to the classic 3/1 Z twill view and back face is also seen as towel pattern.

In order to achieve the above-mentioned objects, a new denim fabric has been developed.

Description of Figures

Figure-1; is a drawing of the front view of the fabric weave report in a representative application of the invention.

Figure-2; is a drawing of the back view of the fabric weave report in a representative application of the invention.

Figure-3; is a drawing of the knitting pattern in a representative application of the invention.

5 Figure-4; is the drawing that indicates the knitting structure in a representative application of the invention.

Reference Numbers

1	Warp yarn	X	Warp yarns on top
2	Weft yarn	▪	Weft yarns on top

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Detailed Description of the Invention

The inventive denim fabric provides the desired appearance on fabric and wear comfort due to the formation of loops whose back face is similar to towel and arising
15 out of layouts of the warp yarn (1) and weft yarns (2).

As shown in Figure-1 and Figure-2, it is the front and rear view of the unit knitting report (pattern) of the inventive fabric. In the unit report, 10 warp yarns (1) and 15 weft yarns (2) conduct differently E1, E2, E3 ... represents weft yarns (2) in woven
20 fabric. A1, A2, A3 ... represents warp yarns (1) in woven fabric. The warp yarn (1) is comprised of 3,610 strings, 20 combed cotton slubs and 100% cotton yarns. Total quantity of warp strings is 7,220. The warp yarn (1) is dyed by using deep blue-colored indigo and sulfur dye mixtures in the warp dyeing machine and then brought to the weaving after slushing. The weft yarn (2) is comprised of 2, 30 combed cotton
25 44 dtex Core Spun (3.5 elastane inflected) and 1, 16 ring carded yarn.

The Flat process is performed on the woven raw fabric in the finishing process (fabric brushing, burning, caustic washing, neutralization, drying, sizing, and finishing and non-shrink finish operations). The warp density for the comb: 37.5 ± 2 counts/cm, mechanically woven fabric weft density: 33 ± 2 counts/cm, raw clothing weft density:
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34 ±2 counts/cm, finished fabric weft density: 39 ±2 counts/cm, finished fabric weight: 9.5 ±0.5 oz/sqyd, 3 x 60°C (3 times at 60°C) washed fabric weight: 11.0 ±0.6 oz/sqyd, finished fabric width: 130 ±3 cm, 3 x 60°C (3 times at 60°C) Washed fabric elasticity: 40 ±4%. Due to the knitted structure of fabric, there is stretching in the weft direction and transverse direction as in towel fabrics. Yarn counts, fiber types, weft or warp density, color or unshrinkability may be varied to be unlimited with finishing

By means of this process, it becomes a fabric with a new towel-looking back view. If overdyeing is applied into this fabric, the dyeing process is conducted by using various textile dyes (sulfur, indigo etc.) in the washing step of the finishing process or later. By means of this process, it becomes an overdyed fabric with new towel-looking back view. Color and finishing processes may be diversified without any limitation in this phase.

As shown in Figure-1 and Figure-2, in the 1st step, the warps numbered A1 - A3 - A4 - A5 - A6 - A8 - A9 - A10 are above, - A2 - A7 are below, E1 weft is hitched on 30 combed cotton 44 dtex core spun. In the 2nd step, the warps A1 - A2 - A3 - A5 - A6 - A7 - A8 - A9 - A10 are above, the warp - A4 is below, E2 weft is filled on 16 Ring carded weft. In the 3rd step, the warps A1 - A2 - A3 - A5 - A6 - A7 - A8 - A10 are above, the - A4 - A9 are below, E3 weft is filled on 30 combed cotton 44 dtex core spun weft. In the 4th step, A2 - A3 - A4 - A5 - A7 - A8 - A9 - A10 are above, the warps - A1 - A6 are below, E4 weft is filled on 30 combed cotton 44 dtex core spun weft. In the 5th step, the warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A9 - A10 are above, the - A8 warp is below, E5 weft is filled on 16 Ring carded weft. In the 6th step, the warps A1 - A2 - A4 - A5 - A6 - A7 - A9 - A10 are above, the warps - A3 - A8 are below, E6 weft is filled on 30 combed cotton 44 dtex core spun weft. In the 7th step, the warps A1 - A2 - A3 - A4 - A6 - A7 - A8 - A9 are above, the warps - A5 - A10 are below, the weft E7 is filled on 30 combed cotton 44 dtex core spun weft. In the 8th step, the warps A1 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the warp - A2 is below, the weft E8 is filled on 16 Ring carded weft. In the 9th, the warps A1 - A3 - A4 - A5 - A6 - A8 - A9 - A10 are above, the warps - A2 - A7 are below, the weft A9 is filled on 30 combed cotton 44 dtex core spun weft. In the 10th step, the warps A1 - A2 - A3 - A5 -

A6 - A7 - A8 - A10 are above, the warps - A4 - A9 are below, the weft E10 is filled on 30 combed cotton 44 dtex core spun weft. In the 11th step, the warps A1 - A2 - A3 - A4 - A5 - A7 - A8 - A9 - A10 are above, the warp - A6 is below, the weft E11 is filled on 16 Ring carded weft. In the 12th step, the warps A2 - A3 - A4 - A5 - A7 - A8 - A9 - A10 are above, the warps - A1 - A6 are below, the weft E12 is filled on 30 combed cotton 44 dtex core spun weft. In the 13th step, the warps A1 - A2 - A4 - A5 - A6 A7 - A9 - A10 are above, the warps - A3 - A8 are below, and the weft E13 is filled on 30 combed cotton 44 dtex core spun weft. In the 14th step, the warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 are above, the warp - A10 is below, the weft E14 is filled on 16 Ring carded weft. In the 15th step, the warps A1 - A2 - A3 - A4 - A6 - A7 - A8 - A9 are above, the warps - A5 - A10 are below, the weft E15 is filled on 30 combed cotton 44 dtex core spun weft.

As shown on Figure-3,

Warp: 20 Combed cotton slub + 20 Combed cotton,

Weft 1: 16 Ring Carded,

Weft 2: 30 Combed cotton 44 dtex Core Spun (3.5 elastane inflected)

Warp density: 37.5 counts/cm comb density,

Weft density: 34 counts/cm in raw fabric. 39 counts/cm ready fabric is given.

The loop appearance formed by passing the warp yarn (1), weft yarn (2), warp-weft yarn (1, 2) connection, rigid/straight weft yarn (2) under many warp yarn (1) respectively, and the connection appearance of elastomeric warp yarn (1) connection with weft yarn (2) are shown in figure-4.

A denim fabric is comprised of a front face and a back face. It is comprised of weaving pattern in which the warp yarn (1) and the weft yarn (2) is woven together. (Figure-1, 2, and 3)

The warp yarn (1) is indigo and/or sulfur dyed. The weft yarn (1) is comprised of at least one straight/rigid weft and/or an elastomeric weft.

In the example shown in Figure-1 and Figure-2, two elastomeric weft yarn (2) are aligned with one rigid/straight yarn. However, the yarn can be aligned in different forms without going beyond the concept.

5 For example, the ratio of elastomeric yarn to rigid/straight yarn may be 2:1 or 1:2. 1:3 or 3:1 etc. may be preferred. The ratio of the yarn does not have to be regular or be the same throughout the fabric.

The weaving of the fabric is as from the bottom of the warp yarn (1) to top side. The
10 bottom parts are shaped by the rigid/straight yarn passing behind its warp and defined as a loop. The loop formation is shown in Figure-3 and Figure-4. The upper parts are shaped by the rigid/straight yarn passing over its warp and are defined as connected parts. Warp yarn is indicated on the upper side with (X) and the weft yarn is indicated on the upper side with (.)

15 The count of warp yarn (1) can be preferred between 5-50 Ne (British Numbering System Delicacy Unit). The count, the color and the slub effect of the whole warp yarn through which the loops pass do not need to be same. The count of warp yarn passing through the loop is at least 5 Ne. Warp count may change without changing the concept.

20 The weft count which the rigid yarn passes from the rear surface should be at least 5. In the pattern shown in the figure, the loops are passed below the 9 warp yarns and passed over one warp yarn (1). The rigid/straight yarns (16 ring carded) pass over 9 warp yarns (1) and a weft. This combination may be changed without ruining the
25 concept.

According to the example in the figure, the loops of rigid/straight yarns are less stretched than the elastomeric weft yarns (2). The loops provide a towel appearance on the fabric. If these loops are made from soft cotton yarns, a fabric having a soft
30 and comfortable rear surface is produced. The other advantage of these loops on the rear surface of the fabric is to prevent the contact of warp yarns (1) with the skin. This

is important since the warp yarns (1) are indigo-dyed. If the indigo-dyed yarn contacts to the wearers, the skin or clothing may be colored.

The loops extends to the weft and warp yarns (1, 2) in the transverse direction. Similarly, the connection parts extend to the weft and warp yarns (1, 2) in the transverse direction. The rigid/straight yarns in the pattern may be more different than the elastomeric yarns. Together with the other types of the chosen pattern for elastomeric yarns, stretching in a transverse direction is allowed related to the weaving pattern and/or yarn choice and weft and warp yarns (2, 1).

Many benefits can be obtained using a cross pattern. First, when warp yarn is dyed with indigo, the use of the cross pattern gives the fabric the conventional denim woven appearance, and protects the fabric mesh approach and its feeling, includes more woven fabric property.

The other features defining the layout and arrangement of warp and weft yarns (1, 2) besides appearance, touch, stretching etc. of the fabric is the density of the warp threads (1) or weft threads (2) with one another.

The density of warp yarns (1) before shrinking is approximately between 20-60 warp yarn/cm. After the fabric has been processed and subjected to home washing, the preferred warp density is approximately 25-75 warp yarn/cm. The home washing is performed at 60°C, then dried and left conditioning for eight hours. These tests are performed according to ASTM D 3776/96 and BS 63302A techniques. Even if the warp density is preferred after weaving, it becomes approximately 25-70 warp yarn/cm (after 3 home washings) after shrinking. If more is desired, the warp density becomes 28-80 yarns/cm after weaving, and becomes 30-85 yarns/cm (after 3 home washings).

Generally, the weft yarn (2) and warp yarn (1) density measurements are performed under the conditions of 65% humidity ($\pm 5\%$) and 20°C ($\pm 2\%$).

We can define the weft density similar to warp density. After weaving, before shrinking, the weft density becomes 28-80 yarns/cm. It becomes 30-96 yarns/cm after 3 home washings. The preferred weft density after weaving and before shrinking is 35-85 yarns/cm. It becomes 40-90 yarns/cm after 3 home washings. If more is required, it is 35-75 yarns/cm after weaving, before shrinking; and it is 40-80 yarns/cm after 3 home washings. The warp and weft density not only gives fabric behavior property to the fabric that has a towel-looking back face but also brings in different weights.

In the particular embodiment, the ratio of average count of warp yarns passing through the loop portion to a warp density is approximately between 0.1 and 1.0. Also, the ratio of warp yarns (1) passing through the loop portion to the average weft count is between 1-25.

The other point is the thickness of weft and warp yarn (2, 1). Because the elastomeric yarns should be synthetic or Core spun. The fineness of synthetic yarn is defined as the denier fineness unit, the warp and rigid weft yarns are defined with Ne. As shown in Figure-1, Figure-2 and Figure-3, the warp, the rigid weft and elastomeric weft yarns (2) may have different thicknesses and elastomeric yarns may have a smaller thickness than rigid/straight yarns.

In the example the warp yarn number is preferred between Ne 5 - Ne 50. In the example the rigid/straight yarns are preferred between Ne 8 - Ne 80. In the example the elastomeric yarns may be preferred between about 15 - 50 Ne or 40 - 200 denier. If desired, 60 - 100 denier may be chosen. We may provide various advantages choosing the yarn thicknesses in the original concept. For example if the thickness of the rigid/straight yarn is greater than that of the elastomeric yarn, we hide the loop portions better and reduce its being felt. Choosing the correct yarn thickness affects the sensing of the fabric as conventional denim or a towel fabric and the weight property, shrinkage values etc.

Figure-1 and Figure-2 are two perspectives of the original concept. The fabric can be considered as having two weavings. The first weaving is generally comprised of the structure being firmly woven from warp yarns (1) and elastomeric wefts (2) from the front face of the fabric. The second weaving is generally comprised of back face and warp yarns (1) and firmly woven rigid weft yarns (2). This rigid weft yarn (2) is comprised of lower portion and upper portion. The lower portion is formed by the rigid weft yarn (2) passed behind the warp yarn (1). Upper portion is formed by the rigid weft yarn (2) passed over the warp. As shown in the figure, each loop passes under 9 warps, but in a different example, this number may change.

PROCESS STEPS:

Warp yarns (1):

The first step of the process is the warp yarn (1). This step may comprise the selection of the thickness or the density of the warp. Generally the choice is the indigo-dyed warp yarn (1). The shranked warp yarns (1) are dyed in the form of warp or rope.

Rigid/straight warp yarns (2):

In this step the rigid/straight warp yarn (2) is provided. This step may comprise any aspect of the yarn. It is not limited to the fineness, the shrinkage ratio, elasticity, color, weft density, winding value, and fiber type etc. of the yarn.

Elastomeric weft yarns (2):

This step represents the step related to the weft yarn (2). This step may comprise any aspect of the yarn. It is not limited to the fineness, the shrinkage ratio, elasticity, elastane number, color, weft density, winding value, and fiber type etc. of the yarn.

Fabric, pattern:

This step is the determination of the template. The template is chosen, and at least one rigid/straight yarn and at least one elastomeric yarn is arranged. Rigid/straight yarns pass behind/over the warps as wicker in order to form the alignment of the lower and upper portions according to determined template.

Weaving:

Weaving is performed using warp and weft yarns according to the determined template/pattern with the determined frequency.

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Non-shrinking and finishing processes of fabric:

This step is related to the shrinkage of the fabric after weaving. Elastomeric yarns shrink more by comparison with rigid/straight yarns (to make the loop patterns with rigid/straight yarns on the lower portion of the fabric). Shrinking occurs when the fabric is removed from the weaving loom. Besides, shrinking can be applied to the fabric during the finishing process. If the finishing process of the fabric is over dyeing in various colors, the finishing process comprises various dyeing and shrinking process steps.

15 A fabric has first weaving and second weaving. First weaving is the front face of the fabric and comprises warp yarn (1) and firmly woven elastomeric weft yarns (2) of the fabric. The second weaving is the back surface of the fabric and comprises the warp yarns (1) and loosely woven rigid yarns. The second weaving on the back surface of the fabric covers the warp and elastomeric yarns, it is difficult to see and feel these
20 yarns on the rear surface.

A woven fabric comprising weft and warp yarn (2, 1) are extended onto the chosen warp yarns (1) in order to form the upper portion of the weft yarns (2) and then extended to the bottom part from the adjacent yarn. The second weft yarns (2) have
25 greater shrinking ratio than the first weft yarns (2). The second weft yarns (2) have greater knitting ratio than the second weft yarns (2).

The fabric production method is shown in Figure-1 and Figure-2. Here the unit report of the pattern is described according to the weft alignment. The unit report is applied
30 on all warp and weft yarns (1, 2). The connection shapes of warp yarn (1) and weft yarn (2), side views and loop formation are shown in Figure-3 and Figure-4. Warp yarn is indicated on the upper side (X) and the weft yarn is indicated on the upper

side with (.) Here the connection of rigid weft or elastomeric wefts with warp yarns (1) are given as an example.

Moreover, the fabric production comprises one of these applications: mercerize, caustic, over-dye coloring, bleaching, hand scraping, sandblasting, stone wash, printing, embroidery, brushing, grinding, etc. as further step comprises tailoring apparel.

Over dye denim fabric has been produced comprising at least one warp yarn (1) dyed in warp or rope, rigid/straight weft yarns (2) and/or elastomeric weft yarns (2), at least one rigid/straight yarn align behind/over the warps to form the upper and lower portions according to the determined shape as wicker, rigid/straight yarns extends over at least one elastomeric yarn, the warp and weft yarns (1, 2) formed according to the determined template/pattern which the weaving process is performed in determined frequency, extending to loops, warp and weft yarns (1, 2) and/or warp yarns (1) passing from the loop portion which the ratio of average number to the warp density is between 1 and 1.0 and/or the warp yarn (1) which the density value before shrinking is about 20-60 warp yarn/cm and/or the weft yarn (2) which the weft density is about 28-80 yarns/cm after weaving, before shrinking.

It comprises the connection parts extending in a transverse direction to the warp and weft yarn (2,1) allowing stretching in the transverse direction related to weft and warp yarn (1,2).

The looser loops by comparison with the weft yarn (2) that prevent the contact of the warp yarn (1) with the skin at the rear surface of the fabric comprise the loops of the rigid/straight yarns providing the rear side of the fabric to appear as a towel.

It comprises indigo and/or sulfur dyed warp yarns (1) between 5 and 50 Ne and weft yarns (2) comprised of at least one straight/rigid weft and/or an elastomeric weft. There is warp yarn (1), weft yarn (2), connection of warp and weft yarn (1, 2) and the loops formed by rigid/straight yarn (2) passing under the many warp yarns (1).

It comprises warp density, 37.5 counts/cm comb density, 34 counts/cm in raw fabric, 39 counts/cm in ready fabric weft density.

It is comprised of the warp yarn (1) 3,610 string 20 combed cotton and 3,610 string 20 combed cotton slub 100% cotton threads with a total warp count of 7,220 threads. It comprises 2 x 30 combed cotton 44 dtex Core Spun (3.5 elasthan inflected) and 1 x 16 ring carded weft yarns (2).

There are loops from the lower portion of the warp yarn (1) to the upper portion formed by passing behind the warp of the rigid/straight yarn.

Preparation of at least one warp yarn (1) dyed as warp or a rope,

- preparation of rigid/straight weft yarns (2) and/or elastomeric weft yarns (2),
- in order to comprise the alignment of lower and upper portions, at least one rigid/straight yarn is passed behind/over the warps according to the template, as wicker
- formation of connection parts which allow stretching in a transverse direction related to weft and warp yarns (2, 1) and extends to the weft and warp yarn (2, 1) in transverse direction,
- formation of the loops made by passing of warp yarn (1), weft yarn (2), warp, weft yarn (1, 2) connection and rigid/straight yarns under the warp yarn (1) respectively,
- weaving processing according to the determined template/pattern with warp and weft yarns in determined frequency,
- it comprises process steps such as mercerize, caustic, over-dye coloring, bleaching, hand scraping, sandblasting, stone wash, printing, embroidery, brushing, grinding.

CLAIMS

1. The present invention is related to fabrics known as denim or blue jeans wherein it comprises:

- at least one warp yarn (1) which is dyed as warp or rope,
- rigid/straight weft yarns (2) and/or elastomeric weft yarns (2),
- at least one rigid/straight yarn which is aligned behind/over warps to form the alignments of the lower and upper portions according to the determined template, rigid/straight yarns over at least one elastomeric yarns forming wicker,
- warp and weft yarns formed according to the determined template/pattern which extends transversely to the loops warps and weft yarns (1, 2) and woven in determined density.
- the ratio of average number to the warp density of the warp yarn (1) passing from the loop portion is between 0.1 and 1.0,
- the warp yarns (1) which has the density of about 20-60 warp yarns/cm before shrinking and/or
- flat or dye denim fabric which comprises weft yarns (2) of about 28-80 yarns/cm after weaving.

2. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;

- to comprise the connection parts extending in a transverse direction to the warp and weft yarn (1, 2) allowing stretching in the transverse direction related to weft and warp yarn (1, 2).

3. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;

- to comprise loops to provide less stretch appearance by comparison with elastomeric weft yarns (2) preventing contact of the warp yarn (1) with skin at the back face of the fabric and the loops provide appearance like towel fabric.

4. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;
- to comprise indigo and/or sulfur dyed warp yarns (1) of 5 - 50 Ne.
- 5
5. It is flat or over-dyed denim fabric according to any of the aforementioned Claims, wherein its characteristic is;
- to comprise weft yarns (2) which are comprised of at least one rigid/straight weft and/or an elastomeric weft.
- 10
6. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;
- to comprise loops made by passing of warp yarn (1), weft yarn (2), warp, weft yarn (1, 2) connection and rigid/straight yarn (2) under the warp yarn (1) respectively.
- 15
7. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;
- to comprise the warp density, 37.5 counts/cm comb density,
 - weft density, 34 counts/cm in raw fabric, 39 counts/cm in ready fabric.
- 20
8. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;
- warp density for comb; 37.5 ± 2 counts/cm, mechanically woven fabric weft density;
 - 33 ± 2 counts/cm raw cloth density,
 - 34 ± 2 counts/cm, finished fabric weft density,
 - 39 ± 2 counts/cm, finished fabric weight: 9.5 ± 0.5 oz/sqyd, 3 x 60°C (3 times at 60°C) washed fabric weight: 11.0 ± 0.6 oz/sqyd, finished fabric width: 130 ± 3 cm, 3 x 60°C (3 times at 60°C) Washed fabric elasticity: $40 \pm 4\%$.
- 25
- 30

9. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;

- warp yarn (1) 3610 string 20 combed cotton and 3610 string 20 combed cotton slub 100% cotton threads with a total warp count of 7220 threads.

10. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;

- to comprise 2 x 30 combed cotton 44 dtex Core Spun (3.5 elasthan inflected) and 1 x 16 ring carded weft yarns (2).

11. It is flat or over-dyed denim fabric according to the Claim 1, wherein its characteristic is;

- to comprise loops being shaped as by passing lower portion of warp yarn (1) to the upper portions passing behind the warp yarns of lower portions

12. The present invention is related to fabrics known as denim or blue jeans wherein it comprises:

- preparation of at least one warp yarn (1) dyed as warp or a rope,
- preparation of rigid/straight weft yarns (2) and/or elastomeric weft yarns (2),
- in order to comprise the alignment of lower and upper portions, at least one rigid/straight yarn is passed behind/over the warps according to the template, as wicker
- formation of connection parts which allow stretching in a transverse direction related to weft and warp yarns (2, 1) and extends to the weft and warp yarn (2, 1) in transverse direction,
- formation of the loops made by passing of warp yarn (1), weft yarn (2), warp, weft yarn (1, 2) connection and rigid/straight yarns under the warp yarn (1) respectively,

- weaving processing according to the determined template/pattern with warp and weft yarns in determined frequency,
- it comprises process steps such as mercerize, caustic, over-dye coloring, bleaching, hand scraping, sandblasting, stone wash, printing, embroidery, brushing, grinding.

5

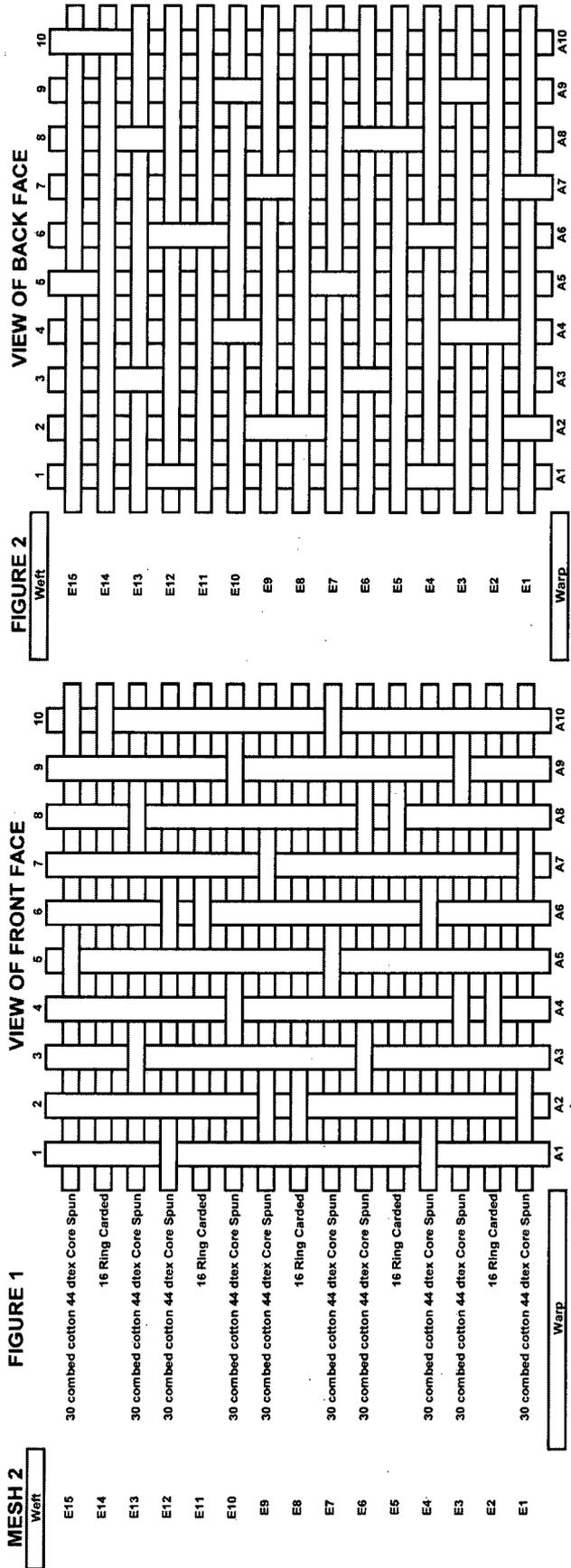


FIGURE 1

FIGURE 2

MESH 2
Weft

- E15 30 combed cotton 44 dtex Core Spun
- E14 16 Ring Carded
- E13 30 combed cotton 44 dtex Core Spun
- E12 30 combed cotton 44 dtex Core Spun
- E11 16 Ring Carded
- E10 30 combed cotton 44 dtex Core Spun
- E9 30 combed cotton 44 dtex Core Spun
- E8 16 Ring Carded
- E7 30 combed cotton 44 dtex Core Spun
- E6 30 combed cotton 44 dtex Core Spun
- E5 16 Ring Carded
- E4 30 combed cotton 44 dtex Core Spun
- E3 30 combed cotton 44 dtex Core Spun
- E2 16 Ring Carded
- E1 30 combed cotton 44 dtex Core Spun

Weft

- E16
- E14
- E13
- E12
- E11
- E10
- E9
- E8
- E7
- E6
- E5
- E4
- E3
- E2
- E1

Warp

REMARKS

As shown in Figure-1 and Figure-2, it is the front and rear view of the unit knitting report (pattern) of the denim fabric that has the appearance of towel.

In the unit report, 10 warp yarns and 15 weft yarns conduct differently.

E1, E2, E3 ... represents weft yarns in woven fabric.

A1, A2, A3 ... represents warp yarns in woven fabric.

The warp yarn is comprised of 3,610 strings, 20 combed cotton slubs and 100% cotton yarns. Total quantity of warp strings is 7,220.

The warp yarn is dyed by using deep blue-colored indigo and sulphur dye mixtures in warp dyeing machine and then brought into the weaving after slushing.

The weft yarn is comprised of 2, 30 combed cotton 44 dtex Core Spun (3.5 elastane inflected) and 1, 16 ring carded yarn.

The Flat process is performed on the woven raw fabric in the finishing process (fabric burning, caustic washing, sizing, finishing and non-shrink finish operations).

The warp density for the combi: 37.5 ±2 counts/cm

mechanically woven fabric weft density: 33 ±2 counts/cm

Raw cloth weft density 34 ±2 counts/cm

Finished fabric weft density: 39 ±2 counts/cm

3 x 60 °C (3 times at 60°C) washed fabric weight: 11.0 ±0.6 oz/sqyd

Finished fabric width 130 ±4 cm

3 x 60 °C (3 times at 60°C) washed fabric elasticity: 40 ±0.6 oz/sqyd

Due to the knitted structure of fabric, there is stretching in weft direction and transverse direction as in tricot woven fabrics.

It is not limited to yarn counts, fiber types, weft or warp density, color or unshrinkability, finishing processes.

The warps A1 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the warps - A2 - A7 are below, the weft E5 is filled on 30 combed cotton 44 dtex core spun weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the warp - A4 is below, E2 weft is filled on 16 Ring carded weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 are above, the - A4 - A9 are below, E3 weft is filled on 30 combed cotton 44 dtex core spun weft.

The warps A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the - A8 warp is below, the weft E4 is filled on 30 combed cotton 44 dtex core spun weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the - A3 - A8 are below, E5 weft is filled on 16 Ring carded weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 are above, the - A5 - A10 are below, E7 weft is filled on 30 combed cotton 44 dtex core spun weft.

The warps A1 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the warps - A2 - A7 are below, the weft E5 is filled on 30 combed cotton 44 dtex core spun weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 are above, the - A4 - A9 are below, E10 weft is filled on 30 combed cotton 44 dtex core spun weft.

The warps A2 - A3 - A4 - A5 - A7 - A8 - A9 - A10 are above, the warps - A1 - A6 are below, the weft E11 is filled on 16 Ring carded weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 - A10 are above, the - A3 - A8 are below, E13 weft is filled on 30 combed cotton 44 dtex core spun weft.

The warps A1 - A2 - A3 - A4 - A5 - A6 - A7 - A8 - A9 are above, the warp - A10 is below, the weft E14 is filled on 16 Ring carded weft.

The warps A1 - A2 - A3 - A4 - A6 - A7 - A8 - A9 are above, the - A5 - A10 are below, E15 weft is filled on 30 combed cotton 44 dtex core spun weft.

1 st Step
2 nd Step
3 rd Step
4 th Step
5 th Step
6 th Step
7 th Step
8 th Step
9 th Step
10 th Step
11 th Step
12 th Step
13 th Step
14 th Step
15 th Step

FIGURE 3

MESH 2

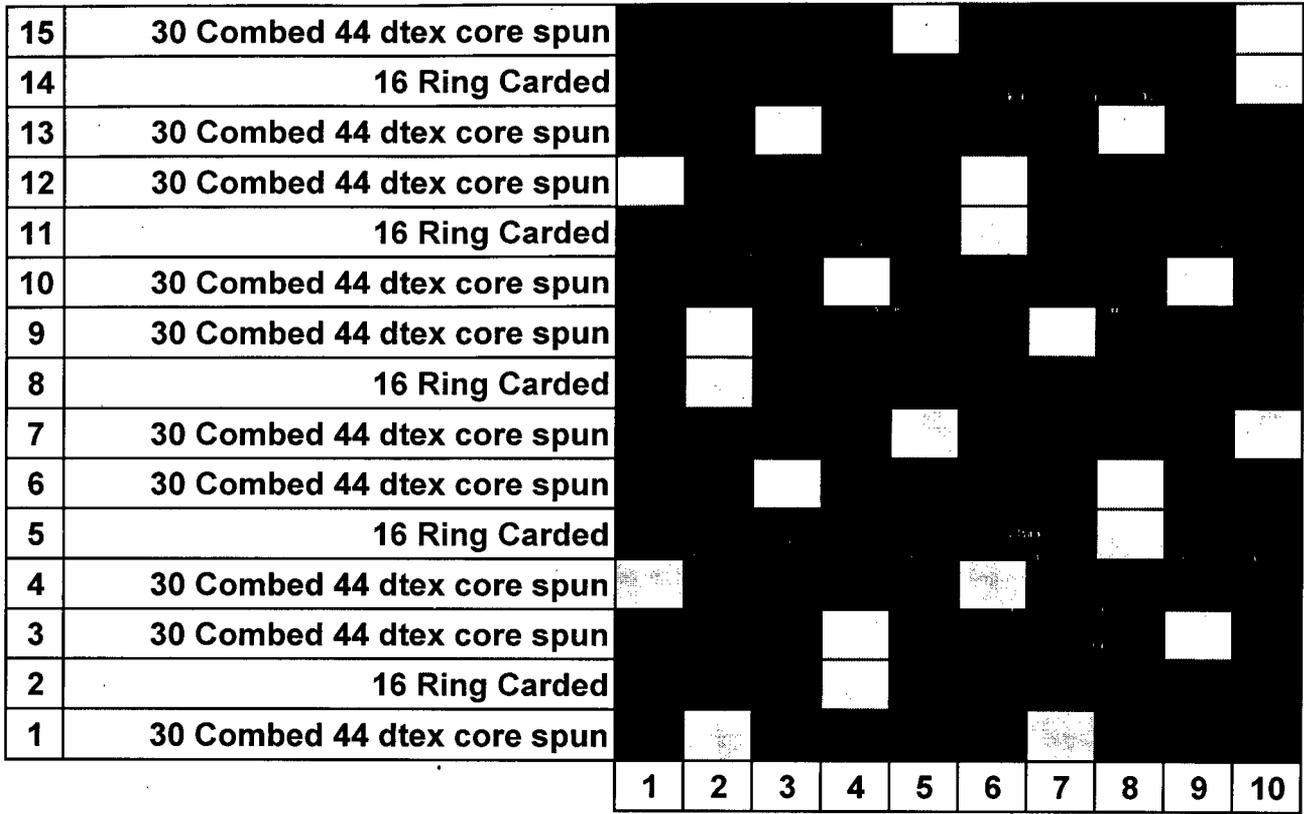
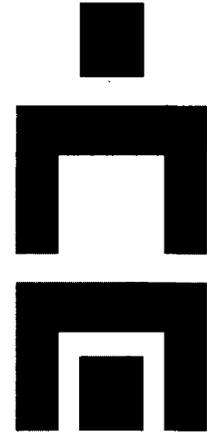


FIGURE 4

Warp yarn

Weft yarn

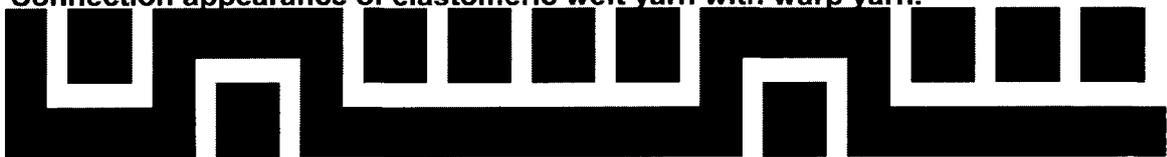
Warp - weft connection



The loop appearance formed by rigid/straight weft yarn passing under the many



Connection appearance of elastomeric weft yarn with warp yarn.



example 1

36	50 combed cotton
35	50 combed cotton
34	75/40 pes els
33	50 combed cotton
32	50 combed cotton
31	75/40 pes els
30	50 combed cotton
29	50 combed cotton
28	75/40 pes els
27	50 combed cotton
26	50 combed cotton
25	75/40 pes els
24	50 combed cotton
23	50 combed cotton
22	75/40 pes els
21	50 combed cotton
20	50 combed cotton
19	75/40 pes els
18	50 combed cotton
17	50 combed cotton
16	75/40 pes els
15	50 combed cotton
14	50 combed cotton
13	75/40 pes els
12	50 combed cotton
11	50 combed cotton
10	75/40 pes els
9	50 combed cotton
8	50 combed cotton
7	75/40 pes els
6	50 combed cotton
5	50 combed cotton
4	75/40 pes els
3	50 combed cotton
2	50 combed cotton
1	75/40 pes els

MESH 3

X	X	X	X	X	X	X	X	X	.	X	X	X
X	X	X	.	X	X	X	X	X	X	X	X	X
X	X	.	X	X	.	X	X	.	X	X	.	
X	.	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	.	X	X	X	X
X	.	X	X	X	X	X	X	X	X	X	X	X
.	X	X	.	X	X	.	X	X	.	X	X	
X	X	X	X	X	X	X	X	X	X	X	X	.
X	X	X	X	X	X	.	X	X	X	X	X	X
X	X	.	X	X	.	X	X	.	X	X	.	
X	X	X	X	.	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	X	X	X	X	X	.
X	.	X	X	.	X	X	.	X	X	.	X	
X	X	X	X	X	X	X	X	X	X	X	X	X
X	X	.	X	X	X	X	X	X	X	X	X	X
X	.	X	X	.	X	X	.	X	X	.	X	
.	X	X	X	X	X	X	X	X	X	X	X	X
X	X	X	X	X	X	X	.	X	X	X	X	X
.	X	X	.	X	X	.	X	X	.	X	X	
X	X	X	X	X	.	X	X	X	X	X	X	X
.	X	X	X	X	X	X	X	X	X	X	X	X
X	X	.	X	X	.	X	X	.	X	X	.	
X	X	X	X	X	X	X	X	X	X	X	X	X
.	X	X	.	X	X	.	X	X	.	X	X	

1	2	3	4	5	6	7	8	9	10	11	12
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example 2 WEFT REPORT

6	elastane yarn
5	rigid slub yarn
4	elastane yarn
3	elastane yarn
2	rigid slub yarn
1	elastane yarn

MESH 4

X	.	X	.	X	X	.	X	.	X
X	.	X	X	X	X	X	X	X	X
.	.	X	X	X	.	X	X	X	X
X	.	.	X	X	X	.	.	X	X
X	X	X	X	X	X	.	X	X	X
X	X	X	X	.	X	.	X	X	.

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

example 3 WEFT REPORT

6	elastane yarn
5	rigid slub yarn
4	elastane yarn
3	elastane yarn
2	rigid slub yarn
1	elastane yarn

MESH 5

.	X	X	.	X	.	X	X	X	.
X	X	X	.	X	X	X	X	X	X
X	.	X	X	X	X	.	X	X	.
X	X	X	.	.	X	X	X	.	.
X	X	X	X	X	X	X	X	X	.
X	X	.	.	X	X	X	.	X	X

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

example 4 WEFT REPORT

6	elastane yarn
5	rigid slub yarn
4	elastane yarn
3	elastane yarn
2	rigid slub yarn
1	elastane yarn

MESH 6

X	.	.	X	X	X	.	X	.	X
X	X	.	X	X	X	X	X	X	X
.	X	.	X	X	.	X	X	X	X
X	X	.	.	X	X	X	.	.	X
X	X	X	X	X	X	X	X	.	X
X	X	X	X	.	X	X	X	.	.

1	2	3	4	5	6	7	8	9	10
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INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2014/000536

A. CLASSIFICATION OF SUBJECT MATTER
 INV. D03D1/00 D03D13/00 D03D15/08
 ADD.

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)
 D03D

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)
 EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2013/048140 A1 (YENICI HAMIT [TR] ET AL) 28 February 2013 (2013-02-28) paragraphs [0005] - [0015]; claims 1-45; figures 1-15	1-12
X	----- US 2011/212659 A1 (YENICI HAMIT [TR] ET AL) 1 September 2011 (2011-09-01) claims 1-43; figures 1-15 -----	1-12

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

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
20 April 2015	29/04/2015

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Iamandi, Daniela
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/TR2014/000536

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2013048140	A1	28-02-2013	NONE
US 2011212659	A1	01-09-2011	CN 102834557 A 19-12-2012
		DE 11706485	T1 16-04-2015
		DK 2539493	T1 13-04-2015
		EP 2539493	A1 02-01-2013
		ES 2531979	T1 23-03-2015
		JP 2013520579	A 06-06-2013
		US 2011212659	A1 01-09-2011
		WO 2011104022	A1 01-09-2011