



(11) **EP 2 698 470 A1**

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

(43) Date of publication:  
**19.02.2014 Bulletin 2014/08**

(21) Application number: **11863535.8**

(22) Date of filing: **09.09.2011**

(51) Int Cl.:  
**D06M 13/144** (2006.01) **A41D 31/00** (2006.01)  
**D03D 15/00** (2006.01) **D06M 11/00** (2006.01)  
**D06M 11/05** (2006.01)

(86) International application number:  
**PCT/JP2011/005102**

(87) International publication number:  
**WO 2012/140704 (18.10.2012 Gazette 2012/42)**

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

(30) Priority: **13.04.2011 JP 2011089614**

(71) Applicant: **Komatsu Seiren Co., Ltd.**  
**Ishikawa 929-0124 (JP)**

(72) Inventors:  
• **TAKAGI, Yasuharu**  
**Ishikawa 929-0124 (JP)**

• **YONEZAWA, Kazuhiro**  
**Ishikawa 929-0124 (JP)**  
• **KOIZUMI, Makoto**  
**Ishikawa 929-0124 (JP)**

(74) Representative: **Vigand, Philippe et al**  
**Novagraaf International SA**  
**3 chemin de l'Echo**  
**1213 Onex Geneva (CH)**

(54) **METHOD FOR PRODUCING FIBROUS FABRIC, AND FIBROUS FABRIC**

(57) A method for manufacturing a fiber fabric having a hard handle is provided without using, in particular, thick yarns, manufacturing a fabric in the high density which increases loads at stages of composing and organizing the fabric, or performing resin treatment for hard finishing. The method includes performing treatment on a fabric mainly including nylon fibers with a treatment

liquid containing benzyl alcohol. The treatment with the treatment liquid is performed so that the fiber fabric has a bending resistance of 100 mm or higher in at least one of a warp direction and a weft direction as measured according to a 45-degree cantilever method specified in JIS L 1096.

**EP 2 698 470 A1**

## Description

[Technical Field]

**[0001]** The present invention relates to a method for manufacturing a fiber fabric having a hard texture.

[Background Art]

**[0002]** Fiber fabrics made of nylon or polyester are required to have a silky handle. Accordingly, various attempts have been conducted for softening fiber fabrics. Methods for softening fiber fabrics include, for example, a method for reducing a diameter of each of fibers which make up the fiber fabric. The method for reducing the diameter of a fiber includes some methods, such as a method for directly drawing a thin fiber at a spinning stage, and a method for spinning a conjugate yarn made of nylon yarns and polyester yarns, followed by dissolving and removing polyester components using alkali agent. In addition to the above, another method can be raised in which a swelling agent, such as benzyl alcohol, for swelling nylon yarns is used to swell the nylon yarns, so that the conjugate yarn is split (Patent Literature (PTL) 1). With the aforementioned methods, thin fibers are manufactured and soft fiber fabrics can be obtained.

**[0003]** However, consumers' preferences have changed in recent years, and fiber fabrics having a relatively hard handle have been desirable. To cope with the above, thick yarns are used for manufacturing fabrics, or fabrics in high density are manufactured, in addition, other countermeasures are also taken.

[Citation List]

[Patent Literature]

**[0004]** [PTL 1] Japanese Unexamined Patent Application Publication No. 7-305284

[Summary of Invention]

[Technical Problem]

**[0005]** However, manufacturing thick yarns in particular causes such problems that an amount of resin used for manufacturing yarns increases, or production per one lot is not high, resulting in increase in costs for spinning yarns or manufacturing yarns. Furthermore, weaving fabrics having high density reduces productivity, which is not desirable.

**[0006]** Meanwhile, other measures are taken. For example, a resin for finishing fabrics hard, such as a melamine resin, is used and applied to versatile fiber fabrics. However, resins cause a fabric to have a handle unique to the resin which appears on the fabric. In addition, the resin may be peeled off from the fabric due to laundry or abrasion, so that durability of the fabric using resin is

insufficient.

**[0007]** The present invention is made in view of the above, and aims to provide a method for manufacturing a fiber fabric. The method provides a fiber fabric having a hard handle, without using a particularly thick yarn, without manufacturing a fabric in the high density which increases loads at stages of composing and organizing the fabric, or without performing the resin treatment for hard finishing.

[Solution to Problem]

**[0008]** As a result of keen examination for solving the above problems, inventors have achieved the present invention. The inventors have found that a fiber fabric having a hard handle can be obtained by performing treatment on a fabric made of nylon fibers without including polyester fibers, using a treatment liquid containing benzyl alcohol which has customarily been used, for manufacturing a soft fabric, on conjugate fibers made of nylon fibers and polyester fibers.

**[0009]** In other words, for solving the above problems, a method for manufacturing a fiber fabric includes performing treatment on a fabric mainly including nylon fibers with a treatment liquid containing benzyl alcohol.

**[0010]** In the method for manufacturing a fiber fabric according to the present invention, it is preferable that the treatment with the treatment liquid is performed so that the fiber fabric has a bending resistance of 100 mm or higher in at least one of a warp direction and a weft direction as measured according to a 45-degree cantilever method specified in JIS L 1096.

**[0011]** In the method for manufacturing a fiber fabric according to the present invention, it is preferable that the treatment liquid contains water and 10 grams or more of the benzyl alcohol per liter of the treatment liquid.

**[0012]** In the method for manufacturing a fiber fabric according to the present invention, if the fabric including the nylon fibers is in rope form, it is preferable that the treatment with the treatment liquid is performed at a temperature from 80 degrees Celsius to 130 degrees Celsius.

**[0013]** In the method for manufacturing a fiber fabric according to the present invention, if the fabric including the nylon fibers is in open width form, it is preferable that the treatment with the treatment liquid is performed at a temperature from 80 degrees Celsius to 130 degrees Celsius.

**[0014]** In the method for manufacturing a fiber fabric according to the present invention, it is preferable that the fabric made only of the nylon fibers.

**[0015]** A fiber fabric according to the present invention can be obtained by performing treatment on a fabric mainly including nylon fibers with a treatment liquid containing benzyl alcohol.

**[0016]** In the fiber fabric according to the present invention, it is preferable that the fiber fabric resulting from the treatment with the treatment liquid has a bending re-

sistance of 100 mm or higher in at least one of a warp direction and a weft direction as measured according to a 45-degree cantilever method specified in JIS L 1096.

**[0017]** In the fiber fabric according to the present invention, it is preferable that the fabric made only of the nylon fibers.

**[0018]** The fiber fabric according to the present invention can be used as a garment. Alternatively, the fiber fabric according to the present invention can be used as a storage tool.

#### [Advantageous Effects of Invention]

**[0019]** With the method for manufacturing a fiber fabric according to the present invention, a fiber fabric having a hard handle can be obtained. The fabric resulting from the method can maintain a shape thereof without using an interlining or the like, to thereby enable a fiber product to be obtained which is excellent in design and suitable for needs.

**[0020]** Furthermore, in the method for manufacturing a fiber fabric according to the present invention, yarns having versatile diameters can be used. The use of such yarns provides a fiber fabric having a hard handle without specifically weaving or organizing a woven fabric or a knitted fabric in a high density. Accordingly, production costs which occur at stages of producing yarns or woven knitted products can be reduced.

#### [Description of Embodiments]

**[0021]** Hereinafter, a method for manufacturing a fiber fabric according to the present invention is described based on embodiments.

**[0022]** According to the present invention, treatment is performed on a fiber fabric mainly made of nylon fibers using a treatment liquid containing benzyl alcohol, to thereby obtain a fiber fabric having a hard handle.

**[0023]** Well-known nylon fibers may be used for the nylon fibers in the present invention. For example, nylon 6, nylon 10, nylon 11, nylon 12, nylon 6.6, nylon 6.10, or copolyamide made of these nylons may be used. Among them, the nylon 6 and the nylon 6.6 are preferable in terms of fiber properties, such as dyeability and strength, and a cost performance.

**[0024]** The fineness of each of the nylon fibers is not specifically limited, but ranges from 0.0001 dtex to 500 dtex referred to as a nano-fiber in terms of fineness of a single fiber. Furthermore, the nylon fibers may be a monofilament, a multifilament, or a staple.

**[0025]** Although the fineness of a yarn (a line of thread) may range from 0.0001 dtex to 1000 dtex, the fineness is not limited thereto.

**[0026]** In view of cost reduction, versatility, and excellent processability, the nylon fibers are preferable which have a single fiber with the fineness of 0.1 to 10 dtex and a line of thread with the fineness of 10 dtex to 500 dtex.

**[0027]** Furthermore, the nylon fibers may be flat yarns

or textured yarns including false-twisting, twisting, Taslan-processed yarns, or other processed yarns.

**[0028]** A fiber fabric made of nylon fibers according to the present invention is mainly made of nylon fibers. In other words, for the fiber fabric made of nylon fibers, other fibers may be concurrently used, such as polyester fibers, in a range without departing from a purpose of the present invention for obtaining a fiber fabric having a hard handle. However, the fiber fabric made only of the nylon fibers without including other fibers, such as polyester fibers, is preferable in light of obtaining the fiber fabric having a hard handle.

**[0029]** It should be noted that the fiber fabric having a hard handle cannot be obtained by performing treatment on a fabric made of 50 percent polyester fibers and 50 percent nylon fibers with a treatment liquid containing benzyl alcohol. This is because that shrinkage of the nylon fibers and that of the polyester fibers largely differs upon the treatment with the treatment liquid containing the benzyl alcohol. In other words, if a fiber fabric made in combination of nylon fibers and other fibers which substantially differ from the nylon fibers in the shrinkage and are used in a large part of the fiber fabric is used, the fiber fabric with the hard handle cannot be obtained at a low cost, which should be the effect of the present invention.

**[0030]** Even if fibers, lines of thread, or woven knitted organizations, which are used in versatile styles, are used, the fiber fabric made of the nylon fibers according to the present invention can have the hard handle.

**[0031]** Next, the method for manufacturing a fiber fabric according to the present invention is described in more detail.

**[0032]** In the present invention, treatment is performed on the fiber fabric made of the nylon fibers with the treatment liquid containing the benzyl alcohol. The treatment is preferably performed using a treatment liquid containing water and 10 grams to 300 grams of the benzyl alcohol per liter of the treatment liquid.

**[0033]** If an amount of the benzyl alcohol is less than 10 grams per liter of the treatment liquid, the fiber fabric having sufficiently hard handle may not be obtained. For making the handle of the fiber fabric be hardened, it is preferable that the amount of the benzyl alcohol is more than or equal to 30 grams per liter of the treatment liquid. On the other hand, if the amount of the benzyl alcohol exceeds 300 grams per liter, the fiber fabric is not hardened so much amount as an increased amount of the benzyl alcohol. Strength of the nylon fibers, on the contrary, may decrease. In addition, if the amount of the benzyl alcohol increases, a duty on effluent processing of the treatment liquid and the like increases.

**[0034]** It should be noted that benzyl alcohol which is emulsified using an emulsifying agent is preferable in view of treatment stability. To the treatment liquid containing the benzyl alcohol, a defoaming agent, a softener for treatment in bath, a friction mark prevention agent, or the like may be added.

**[0035]** The treatment using the treatment liquid containing the benzyl alcohol can be performed at a treatment temperature of 60 to 150 degrees Celsius.

**[0036]** When a relatively plane fiber fabric is required, it is preferable that the treatment using the treatment liquid containing the benzyl alcohol is performed under a condition that a fiber fabric is in an open width state. For the occasion, the treatment temperature preferably ranges from 80 to 130 degrees Celsius.

**[0037]** In this case, if the treatment temperature is lower than 80 degrees Celsius, the fiber fabric with a sufficiently hard handle may not be obtained. On the other hand, depending on types of nylons, if the treatment temperature exceeds 130 degrees Celsius, strength of the fiber fabric, such as tear strength or the like, may decrease. For obtaining the hard handle, the treatment is performed at a temperature from 90 to 125 degrees Celsius, and more preferably, over 100 to 120 degrees Celsius.

**[0038]** Depending on the treatment temperature or concentration of the benzyl alcohol, treatment time is preferably at a level from 5 to 180 minutes. If the treatment time is less than 5 minutes, non-uniformity may be caused in a hardened portion, or the fiber fabric having the sufficient hard handle cannot be obtained. In contrary, the treatment time over 180 minutes is not preferable for the productivity.

**[0039]** Furthermore, the treatment time is preferably from 7 to 120 minutes inclusive, in terms of uniformity of the hard handle, hardness of the fabric, and the productivity.

**[0040]** As a processing machine used for obtaining a plane fiber fabric, an atmospheric pressure jigger, a high pressure jigger can be raised.

**[0041]** When a fiber fabric having a bulky texture, a wrinkled texture, or a relatively intensive concave-convex surface is required, it is preferable that the treatment using the treatment liquid containing the benzyl alcohol is performed under a condition that the fiber fabric is in a rope form state. For the occasion, the treatment temperature ranges preferably from 80 to 130 degrees Celsius.

**[0042]** In this case, if the treatment temperature is lower than 80 degrees Celsius, the fiber fabric with the sufficiently hard handle may not be obtained. On the other hand, depending on a type of nylons, if the treatment temperature exceeds 130 degrees Celsius, the strength of the fiber fabric, such as the tear strength or the like, may decrease. For obtaining the hard handle, the treatment is performed at a temperature from 90 to 125 degrees Celsius, and more preferably, over 100 to 125 degrees Celsius.

**[0043]** The processing machines used for obtaining the fiber fabric having a wrinkled texture or a relatively intensive convex-concave surface include a high-pressure jet dyeing machine or a high-pressure type wince dyeing machine. It is preferable to use the jet dyeing machine for the uniformity in hardness.

**[0044]** The method for manufacturing a fiber fabric ac-

cording to the present invention can be applied to a fiber fabric shaped in a garment, a storage tool, or the like.

**[0045]** For example, when sewn products, such as garments or storage tools which are prepared using a fabric made of nylon fibers, are hardened, treatment may be performed with the treatment liquid containing the benzyl alcohol, using a washer (a drum type processing machine), at a temperature from 80 to 130 degrees Celsius for 5 to 180 minutes. It is more preferable that the treatment is performed at a temperature from 90 to 125 degrees Celsius.

**[0046]** Heretofore, an embodiment for the method for manufacturing a fiber fabric according to the present invention is described. Here, in the present invention, it is preferable to perform soaping on the fabric made of the nylon fibers after the treatment with the treatment liquid containing the benzyl alcohol.

**[0047]** The soaping is washing processing with water, or hot water at a temperature of 40 to 100 degrees Celsius. Alternatively, the soaping is processing with a soaping solution prepared by adding, to water at a normal temperature or hot-water at temperature of 40 to 100 degrees Celsius, caustic soda, an alkaline agent, such as soda ash or sodium tripolyphosphate, a surfactant, or a chelating agent.

**[0048]** The soaping may be performed more than once. In this case, the first soaping may be performed using the soaping solution to which the alkaline agent or the surfactant is added, and the second soaping is performed using only water.

**[0049]** Furthermore, drying or thermal setting may be performed after the soaping, as needed. In addition to the above, dyeing finishing, water repellent finishing, antibacterial finishing, anti-odor finishing, water-absorption finishing, ultraviolet screening finishing, or antistatic finishing may be performed.

**[0050]** It should be noted that these processing including the dyeing finishing may be performed after sewing or other processing. Hard finishing may be supplementarily performed using polyester resin and the like.

**[0051]** When thermal processing, such as preliminary setting or finishing setting, is performed on the fabric made of the nylon fibers which underwent the treatment with the treatment liquid containing the benzyl alcohol, a temperature of the thermal processing may be arbitrarily set at a level of 120 to 200 degrees Celsius in view of a handle, appearance, weight, density, or other factors of the fiber fabric according to the present invention.

**[0052]** In the present invention, the fiber fabric having the hard handle can be manufactured with the aforementioned manufacturing method.

**[0053]** It is preferable that the fiber fabric obtained with the manufacturing method according to the present invention has bending resistance of 100 mm or higher in at least one of a weft direction and a warp direction, which is measured under a condition that an environment at the measurement is set to 20 degrees Celsius x 40 % RH, pursuant to a 45-degree cantilever method specified

in "JIS L 1096". Furthermore, it is more preferable that the fiber fabric has the bending resistance of 150 mm or more in at least one of the weft direction and the warp direction. Still furthermore, it is preferable that the fiber fabric has the bending resistance of 100 mm or more both in the weft direction and the warp direction. It is more preferable that the fiber fabric has the bending resistance of 150 mm or more both in the weft direction and the warp direction.

**[0054]** As described above, the bending resistance of 100 mm or more provides a harder handle than a case when a traditional hard finishing is applied, which is preferable for tailoring presentation.

**[0055]** If the bending resistance is 100 mm or more, clothing and goods made by fabrics, which have customarily been manufactured in combination with an interlining in a separate step can be produced only using the fiber fabric according to the present invention but not using interlining. Such clothing and goods can retain shapes thereof and include a collar, a cuff, headwear, or shoes.

**[0056]** Furthermore, if the bending resistance is 100 mm or more, the fiber fabric according to the present invention can be used for manufacturing bags, or storage tools including a magazine rack, a storage box, a clothing case, or a pen case. In this case, the bags or the storage tools such as a storage box which retain their shapes can be obtained without coating the fiber fabric with a hard resin, or without combining, with the fiber fabric, interlinings made of cardboard boxes, plastic plates, woods, metals, or resins.

**[0057]** The upper limit of the bending resistance is not specifically defined. In view of a design or the like of the clothing and the bags, the fiber fabric having the necessary bending resistance may be used. According to the measurement pursuant to a 45-degree cantilever method specified in JIS L 1096, the upper limit of the bending resistance of the fiber fabric of the present invention is 150 mm. However, the fiber fabric which exceeds this upper limit can be used.

**[0058]** When wrinkles having the hard handle is formed in the fiber fabric, a measurement sample may be folded at the wrinkles upon measurement of the bending resistance, and the bending resistance of less than 100 mm may be measured. To cope with this, the measurement sample is taken from a portion having less effect on the measurement of the bending resistance, and the bending resistance is measured on the portion.

**[0059]** As described above, the fiber fabric obtained with the manufacturing method according to the present invention has the hard handle. When the fiber fabric is used to produce clothing including a jacket, headwear, and shoes, the clothing, the headwear, and the shoes having an unprecedented handle, and rough and vigorous appearance can be obtained. In addition, clothing which can retain shapes can be obtained without using the interlining.

**[0060]** The fiber fabric having the hard handle, which

is obtained with the manufacturing method according to the present invention, is used to produce the storage tools including a bag, a pouch, a magazine rack, a storage box, a clothing case, or a pen case, to thereby obtain a new storage tool having excellent shape-retention properties in addition to a fabric handle without using the interlining.

[Examples]

**[0061]** Hereinafter, a method for manufacturing a fiber fabric according to the present invention is described more specifically, based on examples and comparative examples. It should be noted that the present invention is not limited to these examples. Bending resistances in below-shown examples and comparative examples were measured in an atmosphere in which an environment at the measurement was 20 degrees Celsius x 40 % RH, pursuant to a 45-degree cantilever method specified in JIS L 1096.

Example 1

**[0062]** First, Example 1 is described. In Example 1, a woven fabric (twill, 6-nylon was used for warp and weft at 100 %, in which the warp has 78 dtex / 34 filament, while the weft has 235 dtex / 34 filament. Weaving density is such that a warp density x a weft density = 244 yarns / 2.54 cm x 77 yarns / 2.54 cm) made from nylon fibers was used.

**[0063]** After the woven fabric was scoured, the scoured woven fabric was soaked in a treatment liquid containing 150 grams of benzyl alcohol per liter of the treatment liquid, which was prepared by injecting emulsified dispersion liquid of the benzyl alcohol into water. A temperature of the treatment liquid was raised from a room temperature to 98 degrees Celsius taking 40 minutes by using an atmospheric pressure jigger, and treatment was performed for 40 minutes with maintaining 98 degrees Celsius (open width fabric state). After that, the fiber fabric was washed with hot water at 80 degrees Celsius twice, as soaping.

**[0064]** Next, the fabric is dyed black with acid dye using the atmospheric pressure jigger (95 degrees Celsius for 60 minutes). Then, the soaping and fixing processing using synthetic tannin were performed on the fabric. Subsequently, drying, i.e., finishing set, is performed at 140 degrees Celsius.

**[0065]** The density of the obtained fiber fabric was such that the warp density x the weft density = 270 yarns / 2.54 cm x 88 yarns / 2.54 cm.

**[0066]** Upon measuring the bending resistance, the bending resistance in a warp direction was 148 mm while that in the weft direction was 118 mm. Thus, the fiber fabric having the hard handle was obtained.

**[0067]** A bag was produced using the obtained fiber fabric. The produced bag was able to maintain a three-dimensional shape only with the fiber fabric without using

an interlining, and had excellent appearance.

#### Comparative example 1

**[0068]** Next, Comparative example 1 is described. In Comparative example 1, a fiber fabric was obtained in the same manner with that in Example 1 except that the treatment with the treatment liquid containing the benzyl alcohol was not performed.

**[0069]** The density of the obtained fiber fabric was such that the warp density x the weft density = 250 yarns / 2.54 cm x 79 yarns / 2.54 cm.

**[0070]** Upon measuring the bending resistance, the bending resistance in a warp direction was 42 mm while that in a weft direction was 85 mm. Thus, the fiber fabric having a soft handle was obtained.

**[0071]** A bag was produced using the obtained fiber fabric. The produced bag was not able to maintain a three-dimensional shape thereof without using an interlining.

#### Example 2

**[0072]** Next, Example 2 is described. In Example 2, a woven fabric made of nylon fibers (twill, 6-nylon was used for warp and weft at 100 %, in which the warp was 355 dtex / 192 filament, while the weft was 355 dtex / 192 filament. The weaving density was such that the warp density x weft density = 95 yarns / 2.54 cm x 62 yarns / 2.54 cm) was used.

**[0073]** After the woven fabric was scoured, the scoured woven fabric was soaked in a treatment liquid containing 60 grams of benzyl alcohol per liter of a treatment liquid, which was prepared by injecting emulsified dispersion liquid of the benzyl alcohol into water. A temperature of the treatment liquid was raised from a room temperature to 110 degrees Celsius taking 50 minutes using a jet dyeing machine, and treatment was performed for 40 minutes with maintaining 110 degrees Celsius (rope form).

**[0074]** Then, the fabric was washed, as soaping, with hot water to which soda ash and surfactant were added, at a temperature of 90 degrees Celsius for 10 minutes, followed by being washed only with water and dried.

**[0075]** Next, preliminary setting was performed at a temperature of 160 degrees Celsius, and the fabric was dyed yellow with acid dye (105 degrees Celsius for 30 minutes). Then, fixing processing using synthetic tannin was performed on the fabric, followed by performing drying processing at 120 degrees Celsius.

**[0076]** Next, water repelling processing was performed using 5% solution of a fluorine-based water repelling agent including AsahiGuard AG710 (product of ASAHI GLASS CO., Ltd.), followed by performing finishing setting at 140 degrees Celsius.

**[0077]** The density of the obtained fiber fabric was such that the warp density x the weft density = 116 yarns / 2.54 cm x 85 yarns / 2.54 cm.

**[0078]** Upon measuring the bending resistance, the

bending density in the warp direction was 148 mm, while that of the weft direction was 117 mm. A fiber fabric having bulky feeling and a hard handle was obtained.

**[0079]** In addition, a coat was produced using the obtained fiber fabric. The produced coat had stiff feeling, and vigorous external appearance.

#### Comparative example 2

**[0080]** Next, Comparative example 2 is described. In Comparative example 2, a fiber fabric was obtained in the same manner (including jet dyeing processing) with that in Example 2 except that the treatment with the treatment liquid containing the benzyl alcohol was not performed.

**[0081]** The density of the obtained fiber fabric was such that the warp density x the weft density = 98 yarns / 2.54 cm x 69 yarns / 2.54 cm.

**[0082]** Upon measuring the bending resistance, the bending resistance in the warp direction is 40 mm while that in the weft direction is 35 mm. Thus, the fiber fabric having a soft handle was obtained. In addition, a coat produced with the fiber fabric had a soft handle and drape. Thus, the coat having a soft appearance was obtained.

#### Example 3

**[0083]** Next, Example 3 is described. In Example 3, a woven fabric made of nylon fibers (a plain woven fabric, 6-nylon was used for warp and weft at 100%, in which the warp was 355 dtex / 192 filament, while the weft was 355 dtex / 192 filament. The weaving density was such that the warp density x weft density = 89 yarns / 2.54 cm x 42 yarns / 2.54 cm) was used.

**[0084]** After the woven fabric was scoured, the scoured woven fabric was soaked in a treatment liquid containing 50 grams of benzyl alcohol per liter of the treatment liquid, which was prepared by injecting emulsified dispersion liquid of the benzyl alcohol into water. A temperature of the treatment liquid was raised from a room temperature to 115 degrees Celsius taking 50 minutes using a jet dyeing machine, and treatment was performed for 10 minutes with maintaining 115 degrees Celsius (rope form).

**[0085]** Then, the fabric was washed, as soaping, with hot water to which soda ash and surfactant were added, at a temperature of 90 degrees Celsius for 10 minutes, followed by being washed only with water and dried.

**[0086]** The density of the obtained fiber fabric was such that the warp density x the weft density = 109 yarn / 2.54 cm x 59 yarn / 2.54 cm.

**[0087]** Upon measuring the bending resistance, the bending density in the warp direction was 150 mm or more, while that of the weft direction was 105 mm or more. A fiber fabric having bulky feeling and a hard handle was obtained.

**[0088]** Next, a bag was sewn using the obtained fabric.

Then, the bag was dyed red with an acid dye (at 105 degrees Celsius for 30 minutes), and underwent fixing processing using a synthetic tannin, followed by being dried at 120 degrees Celsius. The obtained bag was able to maintain a three-dimensional shape only with the fiber fabric without using an interlining, and had excellent appearance.

#### Comparative example 3

**[0089]** Next, Comparative example 3 is described. In Comparative example 3, a fiber fabric and a bag were obtained in the same manner with that in Example 3 except that neither the treatment using the treatment liquid containing the benzyl alcohol nor dyeing processing after sewing was performed (no processing using a jet dyeing machine).

**[0090]** The density of the obtained fiber fabric was such that the warp density x the weft density = 96 yarns / 2.54 cm x 45 yarns / 2.54 cm.

**[0091]** Upon measuring the bending resistance, the bending resistance in the warp direction was 56 mm while that in the weft direction was 45 mm. Thus, a fiber fabric having a soft handle was obtained.

**[0092]** The obtained bag was not able to maintain a three-dimensional shape thereof without using an interlining.

#### Example 4

**[0093]** Next, Example 4 is described. In Example 4, a woven fabric made from nylon fibers (twill, 6-nylon was used for warp and weft at 100 %, in which the warp was 355 dtex / 192 filament, while the weft was 355 dtex / 192 filament. The weaving density was such that the warp density x weft density = 91 yarns / 2.54 cm x 62 yarns / 2.54 cm) was used.

**[0094]** After the woven fabric was scoured, the scoured woven fabric was soaked in a treatment liquid containing 40 grams of benzyl alcohol per liter of the treatment liquid, which was prepared by injecting emulsified dispersion liquid of the benzyl alcohol into water. A temperature of the treatment liquid was raised from a room temperature to 105 degrees Celsius taking 50 minutes using a jet dyeing machine, and treatment was performed for 20 minutes with maintaining 105 degrees Celsius (rope form).

**[0095]** Then, the fabric was washed, as soaping, with hot water to which soda ash and surfactant were added, at a temperature of 90 degrees Celsius for 10 minutes, followed by being washed only with water and dried.

**[0096]** The density of the obtained fiber fabric was such that the warp density x the weft density = 120 yarns / 2.54 cm x 85 yarns / 2.54 cm.

**[0097]** Upon measuring the bending resistance, the bending density in the warp direction was 150 mm or more, while that of the weft direction was 116 mm or more. A fiber fabric having bulky feeling and a hard han-

dle was obtained.

**[0098]** Next, headwear was sewn using the obtained fabric. Then, the headwear was dyed navy with an acid dye (at 105 degrees Celsius for 30 minutes), and underwent fixing processing using a synthetic tannin, followed by being dried at 120 degrees Celsius. The obtained bag was able to maintain a three-dimensional shape only with the fiber fabric without using an interlining, and had excellent appearance.

#### Comparative example 4

**[0099]** Next, Comparative example 4 is described. In Comparative example 4, a fiber fabric was obtained in the same manner (including processing using a jet dyeing machine) with that in Example 4 except that emulsified dispersion liquid containing the benzyl alcohol was not injected.

**[0100]** The density of the obtained fiber fabric was such that the warp density x the weft density = 102 yarns / 2.54 cm x 72 yarns / 2.54 cm.

**[0101]** Upon measuring the bending resistance, the bending resistance in the warp direction was 40 mm while that in the weft direction was 30 mm. Thus, a fiber fabric having a soft handle was obtained.

**[0102]** The obtained fiber fabric was used to produce headwear. The obtained headwear was not able to maintain a three-dimensional shape thereof without using an interlining.

#### [Industrial Applicability]

**[0103]** The present invention is widely usable for textile products using a fiber fabric. The textile products includes clothing, such as a coat, shoes, storage tools, such as a bag and a clothing case, or other products.

#### Claims

1. A method for manufacturing a fiber fabric, comprising performing treatment on a fabric mainly including nylon fibers with a treatment liquid containing benzyl alcohol.
2. The method for manufacturing a fiber fabric according to Claim 1, wherein the treatment with the treatment liquid is performed so that the fiber fabric has a bending resistance of 100 mm or higher in at least one of a warp direction and a weft direction as measured according to a 45-degree cantilever method specified in JIS L 1096.
3. The method for manufacturing a fiber fabric according to Claim 1 or 2, wherein the treatment liquid contains water and 10 grams or more of the benzyl alcohol per liter of the

treatment liquid.

4. The method for manufacturing a fiber fabric according to any one of Claims 1 to 3,  
wherein the fabric including the nylon fibers is in rope form, and  
the treatment with the treatment liquid is performed at a temperature from 80 degrees Celsius to 130 degrees Celsius. 5  
10
5. The method for manufacturing a fiber fabric according to any one of Claims 1 to 3,  
wherein the fabric including the nylon fibers is in open width form, and  
the treatment with the treatment liquid is performed at a temperature from 80 degrees Celsius to 130 degrees Celsius. 15
6. The method for manufacturing a fiber fabric according to any one of Claims 1 to 5,  
wherein the fabric made only of the nylon fibers. 20
7. A fiber fabric obtained by performing treatment on a fabric mainly including nylon fibers with a treatment liquid containing benzyl alcohol. 25
8. The fiber fabric according to Claim 7,  
wherein the fiber fabric resulting from the treatment with the treatment liquid has a bending resistance of 100 mm or higher in at least one of a warp direction and a weft direction as measured according to a 45-degree cantilever method specified in JIS L 1096. 30
9. The fiber fabric according to Claim 7 or 8,  
wherein the fabric made only of the nylon fibers. 35
10. A garment including the fiber fabric according to any one of Claims 7 to 9.
11. A storage tool including the fiber fabric according to any one of Claims 7 to 9. 40

45

50

55

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2011/005102

| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>D06M13/144(2006.01)i, A41D31/00(2006.01)i, D03D15/00(2006.01)i, D06M11/00(2006.01)i, D06M11/05(2006.01)i<br><br>According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                            |                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br>D06M13/144, A41D31/00, D03D15/00, D06M11/00, D06M11/05<br><br>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched<br>Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011<br>Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011<br><br>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                            |                                                                                    |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                            |                                                                                    |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document, with indication, where appropriate, of the relevant passages                         | Relevant to claim No.                                                              |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | JP 5-311574 A (Kanebo, Ltd.),<br>22 November 1993 (22.11.1993),<br>0009; examples<br>(Family: none)        | 1, 3-7, 9-10                                                                       |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | JP 6-299465 A (Toray Industries, Inc.),<br>25 October 1994 (25.10.1994),<br>0009 to 0023<br>(Family: none) | 1, 3-7, 9-10                                                                       |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | JP 2-154074 A (Dynic Corp.),<br>13 June 1990 (13.06.1990),<br>entire text<br>(Family: none)                | 1-11                                                                               |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                            |                                                                                    |
| * Special categories of cited documents:<br>“A” document defining the general state of the art which is not considered to be of particular relevance<br>“E” earlier application or patent but published on or after the international filing date<br>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)<br>“O” document referring to an oral disclosure, use, exhibition or other means<br>“P” document published prior to the international filing date but later than the priority date claimed<br>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention<br>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone<br>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art<br>“&” document member of the same patent family |                                                                                                            |                                                                                    |
| Date of the actual completion of the international search<br>14 December, 2011 (14.12.11)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                            | Date of mailing of the international search report<br>27 December, 2011 (27.12.11) |
| Name and mailing address of the ISA/<br>Japanese Patent Office                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                            | Authorized officer<br><br>Telephone No.                                            |

Facsimile No.

Form PCT/ISA/210 (second sheet) (July 2009)

**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**

- JP 7305284 A [0004]