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(54) **PILE FABRIC AND PROCESS FOR PRODUCING SAME**

(57) Provided are a pile fabric whose pile fibers are inhibited from falling off without impairing the texture by fusing only a specific area of the pile fabric, and a method of producing the same.

A pile fabric of the present invention is a pile fabric 5, including: a ground structure; and pile fibers 2 that are intertwined with ground yarns 1 constituting the ground structure and napped on a front surface of the ground structure, wherein the pile fibers 2 comprise at least one selected from the group consisting of acrylic fibers and acrylic-based fibers and have a softening point lower than a softening point of fibers constituting the ground structure. Among the pile fibers 2 intertwined with the ground yarns 1 constituting the ground structure, at least part of the pile fibers 2 located outside of the ground yarns 1 constituting the ground structure are fused but the pile fibers 2 napped on the front surface of the ground structure are not fused. Further, a method of producing a pile fabric of the present invention includes a process of performing a contact heating/pressurization at a temperature equal to or higher than the softening point of the pile fibers 2 and lower than the softening point of the fibers constituting the ground structure from a back surface side of the ground structure.

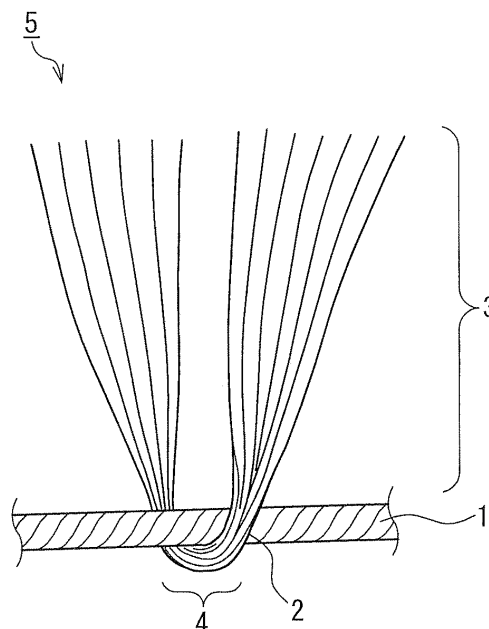


FIG. 1

Description

Technical Field

5 **[0001]** The present invention relates to a pile fabric whose pile fibers are inhibited from falling off, and a method of producing the same.

Background Art

10 **[0002]** Conventionally, pile fabrics have been known under the names of imitation furs or fake furs, boas, etc., as fabrics designed to resemble appearances of furs. These are produced from pile knits and pile weaves. In the case of knitted piles, a seal-fraise knitting machine or a sliver knitting machine (circular knitting machine) is used mainly for knitting, and piles are cut in both cases. When a double Russell machine (warp knitting machine) is used for knitting, piles are knitted by forming a double ground structure while intertwining the double ground structure with a binder yarn, and cutting the middle of the binder yarn. In a weaving method, a velvet loom or a moquette loom is used to intertwine an upper and a lower ground structure and the middle of the ground structures with a binder yarn, and cut the middle of an upper and a lower base fabrics using a knife, whereby two weaves are obtained simultaneously (Non-Patent Document 1). However, these weaves and knits have the same problem, which is a large amount of pile fiber loss. As many pile fibers fall off, they attach to an inner wear or are dropped on the floor, resulting in a poor appearance and poor hygienic conditions.

20 **[0003]** In order to prevent such pile fiber loss, there has been a proposal of mixing low-melting fibers into pile fibers (Patent Document 1), and a proposal of mixing low-melting fibers into ground yarns constituting a ground structure (Patent Documents 2-3), etc. However, in these proposals, because the whole fabric is heated at a temperature equal to or higher than a melting point of the low-melting fibers, the entire ground structure or the pile fibers are also fused, resulting in a coarse texture.

Prior Art Document

Patent Document

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[0004]

Patent Document 1: JP 06(1994)-081248 A

Patent Document 2: JP 2000-314048 A

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Patent Document 3: JP 07(1995)-048765 A

Non-Patent Document

40 **[0005]** Non-Patent Document 1: "Fiber Handbook third edition", page 341-342, edited by The Society of Fiber Science and Technology, Japan, published by Maruzen, issued on December 15, 2004

Disclosure of Invention

Problem to be Solved by the Invention

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[0006] In order to solve the above conventional problem, the present invention provides a pile fabric whose pile fibers are inhibited from falling off without impairing the texture by fusing only a specific area of the pile fabric, and a method of producing the same.

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Means for Solving Problem

[0007] A pile fabric of the present invention is a pile fabric that includes: a ground structure; and pile fibers that are intertwined with ground yarns constituting the ground structure and napped on a front surface of the ground structure, wherein the pile fibers include at least one selected from the group consisting of acrylic fibers and acrylic-based fibers and have a softening point lower than a softening point of fibers constituting the ground structure, and wherein among the pile fibers intertwined with the ground yarns constituting the ground structure, at least part of the pile fibers located outside of the ground yarns constituting the ground structure are fused but the pile fibers napped on the front surface of the ground structure are not fused.

[0008] A method of producing a pile fabric of the present invention is a method of producing a pile fabric, the pile fabric including: a ground structure; and pile fibers that are intertwined with ground yarns constituting the ground structure and napped on a front surface of the ground structure, wherein the pile fibers include at least one selected from the group consisting of acrylic fibers and acrylic-based fibers and have a softening point lower than a softening point of fibers constituting the ground structure, and a contact heating/pressurization is performed at a temperature equal to or higher than the softening point of the pile fibers and lower than the softening point of the fibers constituting the ground structure from a back surface side of the ground structure, whereby among the pile fibers intertwined with the ground yarns constituting the ground structure, at least part of the pile fibers located outside of the ground yarns constituting the ground structure are fused but the pile fibers napped on the front surface of the ground structure are not fused.

Effect of the Invention

[0009] In the pile fabric of the present invention, the pile fibers include at least one selected from the group consisting of acrylic fibers and acrylic-based fibers, and at least part of the pile fibers located outside of the ground yarns constituting the ground structure are fused but the pile fibers napped on the front surface of the ground structure are not fused. Thereby, the pile fibers can be prevented from falling off without impairing the texture. Further, in the method of producing a pile fabric of the present invention, a contact heating/pressurization is performed at a temperature equal to or higher than the softening point of the pile fibers but lower than the softening point of the fibers constituting the ground structure from a back surface side of the ground structure, whereby only a limited area of the pile fibers located outside of the ground yarns constituting the ground structure is fused but the pile fibers napped on the front surface of the ground structure are not fused. Thereby, the pile fibers can be prevented from falling off without impairing the texture.

Brief Description of Drawings

[0010]

FIG. 1 is a schematic perspective view of a pile fabric in one example of the present invention.

FIG. 2 is a knitting diagram of a boa knit in one example of the present invention.

FIG. 3 is a knitting diagram of a sliver knit in one example of the present invention.

FIG. 4 shows a production process in one example of the present invention.

FIG. 5 is a table that includes photographs (50x magnification) taken by a scanning electron microscope (SEM) that show a thickness of pile fibers located outside of ground yarns constituting a ground structure in one example of the present invention.

FIG. 6 is a graph showing a relationship between the thickness of pile fibers located outside of ground yarns constituting a ground structure and an amount of pile fiber loss in one example of the present invention.

Description of the Invention

[0011] A pile fabric of the present invention is a pile fabric that includes: a ground structure; and pile fibers that are intertwined with ground yarns constituting the ground structure (hereinafter, also referred to as "ground yarn" simply) and napped on a front surface of the ground structure. The pile fabric can be manufactured using a seal-fraise knitting machine, a sliver knitting machine (circular knitting machine), a boa machine (circular knitting machine), a double Russell machine, a velvet loom, a moquette loom, etc. Although the pile fabric of the present invention is not limited particularly, it may be a high pile fabric, a boa pile fabric, a tufted carpet, etc. The pile fabric is preferably a high pile fabric or a boa pile fabric, and more preferably a high pile fabric.

[0012] The pile fibers have a softening point lower than a softening point of fibers constituting the ground structure (hereinafter, also referred to as "ground structure constituent fibers", simply). Among the pile fibers intertwined with the ground yarns, at least part of the pile fibers located outside of the ground yarns are fused but the pile fibers napped on the front surface of the ground structure are not fused. Although the means for the fusion is not limited as long as at least part of the pile fibers located outside of the ground yarns can be fused, it is preferable to perform a contact heating/pressurization at a temperature equal to or higher than the softening point of the pile fibers and lower than the softening point of the ground structure constituent fibers from a back surface side of the ground structure, i.e., a back surface side of the pile fabric.

[0013] In the present invention, "outside of the ground yarns constituting the ground structure" refers to the back surface side of the pile fabric when a surface thereof with napped pile fibers is defined as a front surface, and an outer side of the ground yarns. Further, there is a case where part of the pile fibers intertwined with the ground yarns are stitched into ground yarns. If the remaining parts of such fibers are present outside of ground yarns, they are considered as being located outside of the ground yarns.

[0014] The pile fibers are at least one selected from the group consisting of acrylic fibers and acrylic-based fibers. Thereby, it is possible to obtain a pile fabric with an excellent texture. If thermoplastic fibers are used as the pile fibers and a polishing process is performed at a temperature equal to or higher than a melting point of the thermoplastic fibers, generally the pile fibers on the front surface of the pile fabric melt, such that a pile fabric with a favorable appearance and texture is not obtained. Further, when the polishing process is performed at a temperature equal to or lower than the melting point of the thermoplastic fibers, crimps of the pile fibers on the front surface of the pile fabric are not straightened, such that a pile fabric with a favorable appearance and texture is not obtained. On the other hand, crimps of acrylic fibers and acrylic-based fibers can be straightened at temperatures equal to or lower than their softening points. Because of this, when at least one fiber selected from the group consisting of acrylic fibers and acrylic-based fibers is used as the pile fibers, the polishing process can be performed at a temperature equal to or lower than its softening point, (i.e., 150-160°C). Therefore, when at least one fiber selected from the group consisting of acrylic fibers and acrylic-based fibers is used as the pile fibers, the pile fibers on the front surface of the pile fabric are not fused in the polishing process, such that a pile fabric with a favorable appearance and texture is obtained. Moreover, if the pile fibers contain fibers other than acrylic fibers and acrylic-based fibers, such as thermoplastic fibers having a softening point of 160°C or lower (i.e., low-melting polyester fibers having a softening point of 160°C or lower, etc.), these low-melting polyester fibers on the front surface of the pile fabric melt in the polishing process at 150-160°C, which makes it difficult to obtain a pile fabric with a favorable appearance and texture.

[0015] The pile fibers are not limited particularly as long as the softening point is lower than the softening point of the fibers constituting the ground structure. A difference between the softening point of the ground structure constituent fibers and the softening point of the pile fibers is preferably 10°C or more, more preferably 20°C or more, and particularly preferably 30°C or more. The difference of 10°C or more makes it easier to cause only at least part of the fibers located outside of the ground yarns constituting the ground structure to be fused and not to cause the pile fibers napped on the front surface of the ground structure to be fused.

[0016] The pile fibers may be fibers that are softened altogether at a predetermined temperature, or mixed fibers composed of fibers that are softened in different temperatures. When the pile fibers are mixed fibers composed of fibers softened at different temperatures, it is preferable that fibers to be softened at a relatively lower temperature are mixed at a ratio of 20% by weight (wt%) or more so that the fibers to be softened at a relatively lower temperature are fused.

[0017] In the present invention, a softening point is a softening temperature before fusion or decomposition. For example, a softening point of acrylic fibers is 190-232°C, and a softening point of acrylic-based fibers is 150-220°C ("Encyclopaedia Chimica", page 727-729, published by Kyoritsu Shuppan Co., Ltd., on June 1, 1993; hereinafter, referred to as "literature value"). An acrylic fiber refers to a fiber containing 85 wt% or more of acrylonitrile. Further, an acrylic-based fiber refers to a fiber composed of a polymer containing 35 wt% or more and less than 85 wt% of acrylonitrile and 15 wt% or more and 65 wt% or less of other copolymerizable monomers. Here, examples of other copolymerizable monomers include: vinyl halides and vinylidene halides represented by vinyl chloride, vinylidene chloride, vinyl bromide, and vinylidene bromide; sulfonic acid-containing monomers represented by allylsulfonic acid, methallylsulfonic acid, styrenesulfonic acid, isoprenesulfonic acid, 2-acrylamido-2-methylpropanesulfonic acid, and their metal salts and amine salts; acrylic acid and methacrylic acid, and their lower alkyl esters, N- or N,N-alkyl substituted aminoalkyl esters and glycidyl esters; acrylamide and methacrylamide, and their N- or N,N-alkyl substituted products; anionic vinyl monomers such as carboxyl group-containing vinyl monomers represented by acrylic acid, methacrylic acid and itaconic acid and their sodium, potassium or ammonium salts; cationic vinyl monomers represented by quaternary aminoalkyl esters of acrylic acid and methacrylic acid; vinyl group-containing lower alkyl ethers; vinyl group-containing lower carboxylic acid esters represented by vinyl acetate; and styrene. These monomers may be used alone or as a mixture of two or more kinds. Among these, it is preferable to use one or more kinds of monomers selected from the group consisting of vinyl halides, vinylidene halides, and metal salts of sulfonic acid-containing monomers, and more preferable to use one or more kinds of monomers selected from the group consisting of vinyl chloride, vinylidene chloride, and sodium styrenesulfonate. Preferably, modacrylic fibers are used as the acrylic-based fibers. A modacrylic fiber refers to a fiber composed of a polymer containing 35 wt% or more and less than 85 wt% of acrylonitrile, and 15 wt% or more and 65 wt% or less, in total, of one or more kinds of monomers selected from the group consisting of vinyl chloride and vinylidene chloride as well as other copolymerizable monomers.

[0018] In the pile fabric of the present invention, at least part of the pile fibers located outside of the ground yarns are fused and pressure-bonded. Here, "pressure-bonded" refers to, for example, a state in which respective pile fibers are fused and bonded, or a state in which respective pile fibers are gathered into a mass and flattened, as shown in SEM photographs (FIG. 5) of pile fabrics of Production Examples 5, 11 and 17 after a contact heating/pressurization treatment. Further, in the pile fabric of the present invention, it is preferable that all the pile fibers located outside of the ground yarns are fused and pressure-bonded, because a more superior effect of preventing pile fiber loss can be obtained.

[0019] The thickness of the fused and pressure-bonded pile fibers located outside of the ground yarns is preferably 300 μm or less, more preferably 250 μm or less, and particularly preferably 200 μm or less. If the thickness of the pile fibers located outside of the ground yarns is 300 μm or less, the pile fibers are fused and fixed to each other with sufficient

strength. In the present invention, the thickness of the pile fibers located outside of the ground yarns is measured in the following manner, for example. First, in order to maintain the shape of piles at the time of cutting a pile fabric, only front portions of the piles are fixed using an adhesive, and then the pile fabric is cut vertically to a knitting direction of the ground yarns. The cutting line is set so as to traverse loops of the ground yarns, and indicated by a line I-I in FIG. 3, for example. Next, a back surface of the ground structure is made to face upward (turned upside down from a state of FIG. 1) for observing the cross section at 50x magnification using a scanning electron microscope (SEM). For example, a thickness indicated by a shortest distance between parallel lines 19a and 19b in FIG. 5 is measured. An average value of ten measured points is defined as the thickness.

[0020] If during the measurement of the thickness it is difficult to distinguish between the ground yarns and the pile fibers using a scanning electron microscope (SEM), an optical microscope, a laser microscope or the like that allows observation at 50x or more magnification may be used for distinguishing between the ground yarns and the pile fibers.

[0021] In the present invention, it is preferable that a back surface of the pile fabric is impregnated with a backing resin. If the back surface is impregnated with a backing resin, the napped pile fibers can be aligned before the process of performing a contact heating/pressurization from the back surface side of the ground structure, i.e., the back surface side of the pile fabric.

[0022] As the backing resin, it is possible to use a latex, an emulsion, a dispersion, etc., of acrylic ester-based resin, polyurethane-based resin, etc. For preventing pile fiber loss, the amount of the impregnation backing resin generally is, for example, about 50 g/m² at the concentration of solid resin. However, since the present invention has an effect of preventing pile fiber loss by fusing a specific area of the pile fibers, the amount of the impregnation backing resin may be about 1/2 to 1/3 of the above-described general amount. In other words, the back surface may be impregnated with the backing resin at the concentration of solid resin of about 17-25 g/m². Any polishing process of pile fibers is performed before fusing a specific area of the pile fibers, and the pile fibers can be fixed temporarily using a backing resin to prevent the fibers from falling off. For this process, the amount of the resin impregnation need not be high.

[0023] Next, a method of producing a pile fabric of the present invention will be described. The method of producing a pile fabric of the present invention includes performing a contact heating/pressurization at a temperature equal to or higher than a softening point of the pile fibers and lower than a softening point of the ground structure constituent fibers from the back surface side of the ground structure. Thereby, among the pile fibers intertwined with the ground yarns, at least part of the pile fibers located outside of the ground yarns are fused and pressure-bonded. Preferably, the contact heating/pressurization is performed using a heating roller or a hot plate. The use of a heating roller or a hot plate shortens the time of the contact heating treatment, and allows only at least part of the pile fibers located outside of the ground yarns to be fused and pressure-bonded. Further, since the temperature of the heating is not so high as to melt the pile fibers on the front surface of the pile fabric, the pile fibers napped on the front surface of the ground structure are not fused.

[0024] Further, when the pile fibers are mixed fibers composed of fibers that are softened in different temperatures, it is preferable to perform the contact heating/pressurization treatment at a temperature equal to or higher than a softening point of pile fibers to be softened at a relatively lower temperature and lower than a softening point of pile fibers to be softened at a relatively higher temperature, so that the pile fibers to be softened at a relatively lower temperature are fused. In this manner, pile fiber loss can be prevented and a pile fabric with an excellent texture can be easily obtained.

[0025] During and/or after performing the contact heating/pressurization step, it is preferable to cool the napped pile fiber side. Further, after performing the contact heating/pressurization step, it is preferable to perform cooling from the back surface side of the ground structure. In the above-described cooling step, it is preferable to cool the surface of the napped pile fibers using a cooling roller through which water of 30°C or lower passes. By performing such cooling, dimensional stability is maintained, and damages to the pile fibers due to heat is reduced.

[0026] Although the ground structure constituent fibers are not particularly limited as long as the softening point is higher than the softening point of the pile fibers, the fibers may be synthetic fibers composed of polyester resin such as polyethylene terephthalate, cotton, etc.

[0027] In the present invention, if using polyethylene terephthalate (PET, softening point about 258°C) fibers as the ground structure constituent fibers for example, it is possible to use one or more fibers selected from the group consisting of acrylic-based fibers and acrylic fibers as the pile fibers. Preferably, the pile fibers are acrylic-based fibers, or mixed fibers of acrylic-based fibers and acrylic fibers. The following fibers can be used as the acrylic-based fibers.

(1) Vinyl chloride-acrylonitrile fiber (e.g., trade name "KANEKALON" manufactured by Kaneka Corporation, softening point 150-220°C, literature value)

(2) vinylidene chloride-acrylonitrile fiber (softening point 150-220°C, literature value)

[0028] In the present invention, if using cotton (no softening point) fibers as the ground structure constituent fibers, for example, acrylic fibers (e.g., trade name "Exlan K691" manufactured by Exlan Co., Ltd., softening point 190-232°C, literature value) can be used as the pile fibers.

[0029] Hereinafter, a description will be made with reference to the drawings. FIG. 1 is a schematic perspective view

of a pile fabric in one example of the present invention. A pile fabric 5 is composed of ground yarns 1, and pile fibers 2 that are intertwined with the ground yarns 1 and opened on a front surface of a ground structure to form napped piles 3. Additionally, in a back surface of the pile fabric 5, at least part of the pile fibers 2 are fused at the outside of the ground yarns 1 to form a fused part 4, and the fused part 4 is pressure-bonded to the ground yarns 1. Further, the back surface of the pile fabric 5 may be impregnated with a backing resin.

[0030] FIG. 2 is a diagram of a boa knit. A pile fabric 25 is composed of ground yarns 21, and pile fibers 22 that are intertwined with the ground yarns 21 and opened on a front surface of a ground structure to form napped piles. FIG. 3 is a knitting diagram of a sliver knit. A pile fabric 35 is composed of ground yarns 31, and pile fibers 32 that are intertwined with the ground yarns 31 and opened on a front surface of a ground structure to form napped piles. When forming both the pile fabric 25 and the pile fabric 35, a contact heating/pressurization treatment is performed on a surface opposite to the napped pile side, i.e., a back surface of the pile fabric, whereby the pile fibers located outside of the ground yarns are fused.

[0031] FIG. 4 shows a production process in one example of the present invention. A processing device 10 to be used in this method includes a heating roller 11 that is coated with a fluorocarbon resin such as polytetrafluoroethylene, a cooling rubber roller 12 through which cooling water of 30°C passes and that applies pressure to the heating roller 11, metal cooling rollers 13, 14 through which cooling water of 30°C passes and that apply pressure to the cooling rubber roller 12, and a guide roller 15. A raw pile fabric 18 is led out from a container 16 and supplied so that a back surface 18b of the raw pile fabric 18 contacts the heating roller and a front surface (napped pile side) 18a thereof contacts the cooling rubber roller 12. The pile fabric 5 after this processing is contained in a container 17. Note that the device for the contact heating/pressurization treatment is not limited to the processing device shown in FIG. 4, but may be a device that is partially modified from the processing device shown in FIG. 4, a hot plate, or other device. During the contact heating/pressurization treatment, the heating temperature may be equal to or higher than the softening point of the pile fibers and lower than the softening point of the ground structure constituent fibers, for example. Preferably, the pressure force is 0.01-100 Kgf/cm² in linear pressure, the supply rate of the raw pile fabric is 0.1-20 m/minutes, and the contact time with the heater is 1-60 seconds. More preferably, the pressure force is 0.05-7 Kgf/cm² in linear pressure, and the contact time with the heater is 2-10 seconds, in order to reduce damage on the front surface of the pile fabric.

[0032] An amount of pile fiber loss of the pile fabric according to the present invention is preferably 0.6 g/m² or less, and more preferably 0.3 g/m² or less. In the present invention, the amount of pile fiber loss is measured by: rubbing a front surface of a pile fabric ten times in a forward direction and ten times in a reverse direction of piles with a stroke width of 30 cm while applying a constant load of 600 g (14.3 kg/cm²) using a rubber brush (trade name "prescale mat" 5 mm (particle diameter), length 4 cm, width 10.5 cm, manufactured by FUJIFILM Corporation); collecting fallen pile fibers by an adhesive tape; and converting the weight into per 1m².

Examples

[0033] Hereinafter, the present invention will be described more specifically by way of examples. Note that the present invention is not limited to the examples below.

<Measurement method>

1. Amount of pile fiber loss

[0034] A rubber brush (trade name "prescale mat" 5 mm (particle diameter), length 4 cm, width 10.5 cm, manufactured by FUJIFILM Corporation) was used to rub a front surface of a pile fabric ten times in a forward direction and ten times in a reverse direction of piles with a stroke width of 30 cm while applying a constant load of 600 g (14.3 kg/cm²). Thereafter, fallen pile fibers were collected using an adhesive tape, and the weight was converted into per 1m², which was defined as the amount of pile fiber loss.

2. Evaluation of pile fiber loss

[0035] The pile fiber loss of a pile fabric was ranked on a scale of A to D as below:

A: 0.3 g/m² or less (very favorable level)

B: More than 0.3 g/m² and not more than 0.6 g/m² (favorable level)

C: More than 0.6 g/m² and not more than 1.0 g/m² (slightly poor level)

D: More than 1.0 g/m² (poor level)

3. Softening point

[0036] 1g of each of fibers used in the following Production Examples was opened, placed on a hot plate heated to a predetermined temperature, and pressurized at 0.07 Kgf/cm² for 3 seconds. The temperature at which surfaces of single fibers in contact with the hot plate softened, bonded to each other and formed into a plate shape was defined as the softening point of the fibers.

4. Thickness of pile fibers located outside of the ground yarns constituting the ground structure

[0037] In order to maintain the shape of piles at the time of cutting a pile fabric, only front portions of the piles were fixed using an adhesive, and then the pile fabric was cut vertically to a knitting direction of the ground yarns. The cutting line was set so as to traverse loops of the ground yarns, and indicated by line I-I in FIG. 3, for example. Next, a back surface of the ground structure was made to face upward (turned upside down from a state of FIG. 1) for observing the cross section at 50x magnification using a scanning electron microscope (SEM). For example, a thickness indicated by a shortest distance between parallel lines 19a and 19b in FIG. 5 was measured. An average value of ten measured points is defined as the thickness.

5. Texture

[0038] The texture was ranked on a scale of A to D as below:

A: No fusion was found in the napped pile fibers on the front surface of the ground structure; equivalent level to pile fabrics without heat treatment

B: Slightly inferior as compared with rank A, but no fusion was found in napped pile fibers on the front surface of the ground structure; no problem in practical use

C: Slightly coarse, with problems in practical use (failure)

D: Extremely coarse, and unpractical (failure)

<Fibers used in Production Examples>

1. Pile fibers

[0039]

(1) Trade name "KANEKALONAH" (hereinafter, referred to as AH, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 3.3 deci tex (hereinafter, referred to as dtex)

(2) Trade name "KANEKALON FHS" (hereinafter, referred to as FHS, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 2.2 dtex

(3) Trade name "KANEKALON RMK (801)" (hereinafter, referred to as RMK (801), simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 12 dtex

(4) Trade name "KANEKALON SL" (hereinafter, referred to as SL, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 3.3 dtex

(5) Trade name "K691", manufactured by Exlan Co., Ltd. Acrylic fiber, softening point 250-260°C, fineness: 3.3 dtex

(6) Trade name "KANEKALON CC" (hereinafter, referred to as CC, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 3.3 dtex

(7) Trade name "KANEKALON fmu" (hereinafter, referred to as fmu, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 1.5 dtex

(8) Trade name "KANEKALON MS" (hereinafter, referred to as MS, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 5.0 dtex

(9) Trade name "KANEKALON MCS" (hereinafter, referred to as MCS, simply), manufactured by Kaneka Corporation Acrylic-based fiber (vinyl chloride-acrylonitrile fiber), softening point 180-190°C, fineness: 2.2 dtex

(10) Trade name "Tetoron SD", manufactured by TEIJIN Polyester composite fiber, softening point 90-100°C, fineness: 4.4 dtex

(11) Trade name "UNITIKA 1680", manufactured by UNITIKA LTD. Polyester composite fiber, softening point 220°C, fineness: 3.3 dtex

2. Ground structure constituent fiber (ground yarn)

(1) Polyester fiber yarn

- 5 **[0040]** A multifilament with a total fineness of 334 dtex (a fiber yarn composed of two filaments, each filament having a fineness of 167 dtex and being composed of 50 polyester single fibers) was used. The softening point is 258°C.

(2) Cotton yarn

- 10 **[0041]** A cotton yarn composed of two spun yarns of cotton count 40 was used. Cotton does not have a softening point, and is decomposed at high temperature.

(Production Examples 1-30)

- 15 **[0042]** In Production Examples 1-30, Production Examples 1, 7, 13, 19, 23 and 27 are comparative examples, and the other Production Examples are examples. A sliver knitting machine (circular knitting machine) for manufacturing fake furs was used. The above identified polyester fiber yarns were used as the ground yarns. Pile fabrics of Production Examples 1-30 were knitted by supplying pile fiber slivers (10-14 g/m) composed of acrylic-based fibers respectively shown in Table 1 below. The number of loops in the wales of the ground structure was 16-17/inch, and the number of loops in the course of the ground structure was 22-33/inch. The other conditions are shown in Table 1 below. Next, back surfaces of the pile fabrics were impregnated with a backing resin. As the backing resin, an emulsion copolymer latex composed mainly of acrylic ester was used. The backing resin was an aqueous solution (emulsified solution) with a latex concentration of 40 wt%. The pile fabrics of the examples and the pile fabrics of the comparative examples were impregnated and attached with the backing resin at a solid resin concentration of 25 g/m² and 50 g/m², respectively, and then dried. Next, pile fibers on front surfaces of the pile fabrics were aligned by polishing, brushing and shearing. Specifically, first, they were polished twice at 155°C, brushed twice, polished once at each of 150°C, 145°C, 130°C and 120°C, then sheared twice, and last, polished twice at 100°C. Except for the pile fabrics of the comparative examples, the back surfaces of the pile fabrics were subjected to a contact heating/pressurization treatment using a hot plate. The conditions for the contact heating/pressurization treatment are shown in Table 1 below.

- 30 **[0043]** The same pile fibers and the same ground yarns were used in Production Examples 1-6. Production Example 1 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 2-6 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 7-12. Production Example 7 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 8-12 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 13-18. Production Example 13 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 14-18 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 19-22. Production Example 19 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 20-22 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 23-26. Production Example 23 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 24-26 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 27-30. Production Example 27 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 28-30 are examples in which the contact heating/pressurization treatment was performed differently from each other.

50 (Production Examples 31-40)

- [0044]** Pile fabrics of Production Examples 31-35 were obtained in the same manner as Production Examples 1-30, except that pile fiber slivers composed of acrylic fibers shown in Table 2 below were used, and the contact heating/pressurization treatment was performed under the conditions shown in Table 2 below. Further, pile fabrics of Production Examples 36-40 were obtained in the same manner as Production Examples 1-30, except that the above cotton yarns were used as the ground yarns, pile fiber slivers composed of acrylic fibers shown in Table 2 below were used, and the contact heating/pressurization treatment was performed under the conditions shown in Table 2 below. The same pile fibers and the same ground yarns were used in Production Examples 31-35. Production Example 31 is a comparative

example in which the contact heating/pressurization treatment was not performed. Production Examples 32-34 are comparative examples in which the contact heating/pressurization treatment was performed at a predetermined temperature lower than a softening point of the pile fibers. Production Example 35 is an example in which the contact heating/pressurization treatment was performed at a predetermined temperature equal to or higher than a softening point of the pile fibers. Further, the same pile fibers and the same ground yarns were used in Production Examples 36-40. Production Example 36 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 37-40 are examples in which the contact heating/pressurization treatment was performed differently from each other.

(Production Examples 41-52)

[0045] Pile fabrics of Production Examples 41-52 were obtained in the same manner as Production Examples 1-30, except that pile fiber slivers composed of mixed fibers of acrylic-based fibers and acrylic fibers shown in Table 3 below were used, and the contact heating/pressurization treatment was performed under the conditions shown in Table 3 below. The same pile fibers and the same ground yarns were used in Production Examples 41-44. Production Example 41 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 42-44 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 45-48. Production Example 45 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 46-48 are examples in which the contact heating/pressurization treatment was performed differently from each other. Further, the same pile fibers and the same ground yarns were used in Production Examples 49-52. Production Example 49 is a comparative example in which the contact heating/pressurization treatment was not performed. Production Examples 50-52 are examples in which the contact heating/pressurization treatment was performed differently from each other. In all Examples, the contact heating/pressurization treatments were performed at a temperature equal to or higher than the softening point of acrylic-based fibers and lower than the softening point of acrylic fibers.

[0046] Results of the amount of pile fiber loss, the evaluation of pile fiber loss, the texture, and the thickness of the pile fibers located outside of the ground yarns (hereinafter, also referred to as "thickness" simply) of the pile fabrics of Production Examples 1-52 are shown in Tables 1-3 below. In Tables 1-3, a mark * indicates a comparative example (the same applies to Tables 4-6).

[0047]

[Table 1]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)																					
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kg/cm ²)																									
1* 2 3 4 5 6	AH	3.3	38	100	20	492	- 180 200 200 220 240	- 5 5 2 2 2	- 0.07 0.07 0.07 0.07 0.07	3.48 0.58 0.54 0.55 0.43 0.38	D B B B B B	A A A A A B	326 260 210 182 83 85																					
7* 8 9 10 11 12							AH	3.3	38	100	20	820	- 180 200 200 220 240	- 5 5 3 3 3	- 0.07 0.07 0.07 0.07 0.07	1.64 0.54 0.05 0.16 0.06 0.03	D B A A A A	A A A A A B	618 272 107 96 84 73															
13* 14 15 16 17 18													AH	3.3	38	100	20	1090	- 180 200 200 220 240	- 5 5 2 2 2	- 0.07 0.07 0.07 0.07 0.07	2.13 0.5 0.26 0.57 0.42 0.24	D B A B B A	A A A A A A	521 250 220 198 120 111									
19* 20 21 22																			FHS RMK (801)	2.2	32	80	20	1080	- 180 200 220	- 5 5 5	- 0.07 0.07 0.07	0.59 0.42 0.2 0.15	B B A A	A A A A	378 273 229 134			
23* 24																									SL	3.3	38	80	20	1130	- 180	- 5	- 0.07	0.84 0.49

(continued)

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
25	RMK (801)	12	44	20			200	5	0.07	0.37	B	A	210
26							220	5	0.07	0.02	A	A	178
27*	AH RMK (801)	3.3	38	80	20	1080	-	-	-	0.79	C	A	442
28							180	5	0.07	0.51	B	A	288
29							200	5	0.07	0.24	A	A	295
30							220	5	0.07	0.06	A	A	166

[0048]

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[Table 2]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
31*	K691	3.3	51	100	24	860	-	-	-	1.85	D	A	606
32*							200	5	0.07	1	C	A	333
33*							220	5	0.07	1.07	D	A	367
34*							240	5	0.07	1.26	D	A	410
35							250	5	0.07	0.51	B	B	203
36*	K691	3.3	38	100	20	1130	-	-	-	2.74	D	A	503
37							260	5	0.07	0.39	B	B	205
38							280	5	0.07	0.21	A	B	120
39							300	5	0.07	0.09	A	B	118
40							320	5	0.07	0.09	A	B	110

[0049]

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[Table 3]

Production Example	Pile fiber						' Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
41*	AH K691	3.3	51	25 75	24	820	-	-	-	1.18	D	A	596
42							200	5	0.07	0.23	A	A	234
43							220	5	0.07	0.4	B	A	261
44							240	5	0.07	0.35	B	A	169
45*	AH K691	3.3	51	50 50	24	900	-	-	-	1.49	D	A	594
46							200	5	0.07	0.14	A	A	178
47							220	5	0.07	0.01	A	A	159
48							240	5	0.07	0.05	A	A	137
49*	AH K691	3.3	51	75 25	24	860	-	-	-	1.36	D	A	570
50							200	5	0.07	0.23	A	A	160
51							220	5	0.07	0.09	A	A	159
52							240	5	0.07	0.08	A	B	108

[0050] FIG. 5 shows photographs (50x magnification) of the pile fabrics of Production Example 1 (comparative example), Production Example 5 (example), Production Example 7 (comparative example), Production Example 11 (example), Production Example 13 (comparative example) and Production Example 17 (example), taken by a scanning electron-microscope (SEM). In FIG. 5, reference numbers 19a and 19b indicate a thickness of the pile fibers located outside of the ground yarns. FIG. 5 also indicates the thickness and the amount of pile fiber loss. As can be seen from FIG. 5, by performing the contact heating/pressurization treatment, the thickness of the pile fibers located outside of the ground structure constituent fibers was reduced to a fraction of the thickness without the contact heating/pressurization treatment, and the amount of pile fiber loss was greatly reduced.

[0051] Further, as can be seen from the results in Tables 1-3, the pile fiber loss was low and the texture was favorable for those examples that underwent the contact heating/pressurization treatment. In these examples, at least part of the pile fibers located outside of the ground structure constituent fibers were fused and pressure-bonded by the contact heating/pressurization treatment at a temperature equal to or higher than the softening point of the pile fibers and lower than the softening point of the ground structure constituent fibers. Further, regarding the examples in which the thickness of the fused and pressure-bonded pile fibers located outside of the ground yarns was 300 μm or less, the pile fiber loss was low and the texture was favorable. Incidentally, it can be confirmed from SEM photographs (50x magnification) such as those shown in FIG. 5 that at least part of the pile fibers located outside of the ground yarns were fused and pressure-bonded.

[0052] Further, a relationship between the thickness of the pile fibers located outside of the ground yarns and the pile fiber loss is summarized from the results in Tables 1-3, and shown by a graph in FIG. 6. As can be seen from FIG. 6, the amount of pile fiber loss is greatly reduced when the thickness of the pile fibers located outside of the ground yarns is 300 μm or less.

(Production Example 53)

[0053] A pile fabric of Production Example 53 was obtained in the same manner as Production Example 26, except that the pile fabric was not impregnated with a backing resin. Results of the amount of pile fiber loss, the evaluation of pile fiber loss, the texture, the thickness, etc., of the pile fabric of Production Example 53 are shown in Table 4 below. The results of Production Example 23 (comparative example) also are shown in Table 4. A comparison between Production Example 23 (comparative example) and Production Example 53 (example) indicates that, even without impregnation with a backing resin, the amount of pile fiber loss was greatly reduced. In other words, only performing the contact heating/pressurization treatment on the back surface of the ground structure greatly reduced the amount of pile fiber loss.

[0054]

[Table 4]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
23* 53	SL RMK (801)	3.3	38	80	20	1130	-	-	-	8.84	D	A	652
		12	44	20			220	5	0.07	0.45	B	A	212

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(Production Examples 54-55)

[0055] Pile fabrics of Production Examples 54-55 were obtained in the same method as a general method of producing
boa piles, using the above polyester fiber yarns as ground yarns and pile fibers composed of mixed fibers of acrylic-
based fibers shown in Table 5 below. Conditions for the contact heating/pressurization treatment on the back surface
of the ground structure of boa piles as well as results of the amount of pile fiber loss, the evaluation of pile fiber loss,
the texture, the thickness, etc., are shown in Table 5 below. The same pile fibers and the same ground yarns were used
in Production Examples 54-55. Production Example 54 is a comparative example in which the contact heating/pressur-
ization treatment was not performed. Production Example 55 is an example in which the contact heating/pressurization
treatment was performed.

[0056]

[Table 5]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
54* 55	CC	3.3	127	15	15	1100	-	-	-	0.29	A	A	217
	FHS	1.5	82~121	15			220	5	0.07	0.05	A	A	72
	MS	5	127	40									
	MCS	2.2	82~121	30									

[0057] As apparent from Table 5, since boa piles are knitted from worsted yarns, the thickness is thin by nature and the amount of pile fiber loss is low. By performing the contact heating/pressurization treatment, the thickness is further reduced and the amount of pile fiber loss tends to be further reduced. Incidentally, all of the Production Examples except Production Examples 54 and 55 are production examples of high piles.

(Production Examples 56-59)

[0058] Pile fabrics of Production Examples 56-59 were obtained in the same manner as Production Example 16, except that the above polyester fiber yarns were used as ground yarns, pile fibers shown in Table 6 below were used, and the contact heating/pressurization treatment was performed using the processing device shown in FIG. 4 under the conditions shown in Table 6 below. Conditions for the contact heating/pressurization treatment as well as results of the amount of pile fiber loss, the evaluation of pile fiber loss, the texture, the thickness, etc., are shown in Table 6 below. The results of Production Example 13 also are shown in Table 6.

[0059]

[Table 6]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
13*	AH	3.3	38	100	20	1090	-	-	-	2.13	D	A	521
56							220	6	0.07	0.52	B	A	203
57							220	6	1	0.26	A	A	163
58							220	6	5	0.12	A	A	123
59							220	6	10	0.03	A	B	97

[0060] As can be seen from the results in Table 6, as the pressure of the contact heating/pressurization treatment increases, an effect of preventing pile fiber loss tends to increase while the texture decreases. Both the effect of preventing pile fiber loss and the texture become excellent when the pressure of the contact heating/pressurization treatment ranges from 0.01 to 100 Kgf/cm².

(Production Examples 60-95)

[0061] Pile fabrics of Production Examples 60-95 were obtained in the same manner as Production Examples 1-30, except that polyester fiber yarns were used as ground yarns, low-melting polyester fibers or mixed fibers of low-melting polyester fibers and acrylic fibers shown in Table 7 below were used as pile fibers, and the contact heating/pressurization treatment was performed under the conditions shown in Table 7 below. Conditions for the contact heating/pressurization treatment as well as results of the amount of pile fiber loss, the evaluation of pile fiber loss, the texture, the thickness, etc., are shown in Table 7 below. All of Production Examples 60-95 are comparative examples.

[0062]

[Table 7]

Production Example	Pile fiber						Heat treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
60	Tetoron SD K691	4.4	51	5	20	970	-	-	-	2.02	D	A	520
61							90	5	0.07	1.95	D	A	480
62							130	5	0.07	1.75	D	A	450
63							150	5	0.07	1.85	D	A	425
64							180	5	0.07	1.26	D	A	362
65							200	5	0.07	1.10	D	A	341
66	Tetoron SD K691	4.4	51	15	20	930	-	-	-	2.26	D	B	498
67							90	5	0.07	1.85	D	B	472
68							130	5	0.07	1.95	D	B	422
69							150	5	0.07	1.65	D	B	352
70							180	5	0.07	1.32	D	B	353
71							200	5	0.07	1.12	D	B	333
72	Tetoron SD K691	4.4	51	25	20	920	-	-	-	2.95	D	C	450
73							90	5	0.07	1.48	D	C	400
74							110	5	0.07	2.04	D	C	350
75							130	5	0.07	2.03	D	C	356
76							150	5	0.07	1.48	D	C	330
77							180	5	0.07	0.23	A	C	250
78							200	5	0.07	0.18	A	C	120
79	Tetoron SD K691	4.4	51	50	20	880	-	-	-	2.16	D	D	425
80							90	5	0.07	1.21	D	D	350
81							110	5	0.07	1.28	D	D	332
82							130	5	0.07	1.05	D	D	340
83							150	5	0.07	0.57	B	D	286

(continued)

Production Example	Pile fiber						Heat treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
84							180	5	0.07	0.16	A	D	230
85							200	5	0.07	0.14	A	D	205
86	Tetoron SD K691	4.4	51	75	20	870	-	-	-	1.73	D	D	430
87							90	5	0.07	1.55	D	D	362
88							110	5	0.07	1.06	D	D	322
89							130	5	0.07	0.55	B	D	215
90							150	5	0.07	0.30	A	D	150
91	Tetoron SD	4.4	51	100	20	930	-	-	-	1.01	D	D	360
92							90	5	0.07	0.95	C	D	355
93							110	5	0.07	0.55	B	D	215
94							130	5	0.07	0.27	A	D	136
95							150	5	0.07	0.20	A	D	123

[0063] As can be seen from Table 7, when a content of low-melting polyester fibers "Tetoron SD" in the pile fibers is less than 25 wt%, the effect of preventing pile fiber loss cannot be obtained even if the contact heating/pressurization treatment is performed at a temperature equal to or higher than the softening point of the low-melting polyester fibers and lower than the softening point of the acrylic fibers. Further, when the content of the low-melting polyester fibers "Tetoron SD" in the pile fibers exceeds 25 wt%, the pile fiber loss tends to be suppressed as the temperature of the contact heating/pressurization treatment increases, but the texture is poor. Further, when the low-melting polyester fibers "Tetoron SD" are contained in the pile fibers, the low-melting polyester fibers melt during the polishing process at the time of producing the pile fabric, resulting in an unfavorable appearance.

(Production Examples 96-107)

[0064] Pile fabrics of Production Examples 96-107 were obtained in the same manner as Production Examples 1-30, except that polyester fiber yarns were used as ground yarns, low-melting polyester fibers or mixed fibers of low-melting polyester fibers and acrylic fibers shown in Table 8 below were used as pile fibers, and the contact heating/pressurization treatment was performed under the conditions shown in Table 8 below. Conditions for the contact heating/pressurization treatment as well as results of the amount of pile fiber loss, the evaluation of pile fiber loss, the texture, the thickness, etc., are shown in Table 8 below. All of Production Examples 96-107 are comparative examples.

[0065]

[Table 8]

Production Example	Pile fiber						Contact heating/pressurization treatment			Amount of pile fiber loss (g/m ²)	Evaluation of pile fiber loss	Texture	Thickness (μm)
	Kind	Fineness (dtex)	Cut length (mm)	Mixed ratio (wt%)	Pile length (mm)	Weight per unit area (g/m ²)	Temperature (°C)	Time (second)	Pressure (Kgf/cm ²)				
96	UNITIKA 1680	3.3	64	5			-	-	-	2.18	D	B	583
97	K691	3.3	38	95	20	904	200	5	0.07	1.43	D	B	472
98							240	5	0.07	1.11	D	B	433
99	UNITIKA 1680	3.3	64	10			-	-	-	2.15	D	B	650
100	K691	3.3	38	90	20	853	200	5	0.07	1.26	D	B	452
101							240	5	0.07	0.85	C	B	432
102	UNITIKA 1680	3.3	64	15			-	-	-	1.84	D	B	623
103	K691	3.3	38	85	20	848	200	5	0.07	1.39	D	B	423
104							240	5	0.07	0.72	C	B	376
105	UNITIKA 1680	3.3	64	20			-	-	-	1.85	D	C	550
106	K691	3.3	38	80	20	818	200	5	0.07	1.3	D	C	426
107							240	5	0.07	0.65	C	C	382

[0066] As can be seen from Table 8, when a content of low-melting polyester fibers "UNITIKA 1680" in the pile fibers is 20 wt% or less, no remarkable effect of preventing pile fiber loss is obtained even though the contact heating/presurization treatment is performed at a temperature equal to or higher than the softening point of the low-melting polyester fibers and lower than the softening point of the acrylic fibers.

(Production Example 108)

[0067] Although a pile fabric of Production Example 108 was attempted to be produced using polyester fiber yarns as ground yarns and mixed fibers of low-melting polyester fibers "UNITIKA 1680" and acrylic fibers "K691" as pile fibers with the content of the low-melting polyester fibers "UNITIKA 1680" exceeding 20 wt%, they could not be processed into a pile fabric. The reason for this may be as follows. When compared to acrylic fibers and acrylic-based fibers, the low-melting polyester fibers "UNITIKA 1680" have a strong resilience (i.e., an elasticity of staple fibers is strong), have a strong crimp and are voluminous, and they are difficult to be processed into a pile fabric when the content of the low-melting polyester fibers "UNITIKA 1680" in the pile fibers exceeds 20 wt%. Further, since crimps of the low-melting polyester fibers "UNITIKA 1680" are not straightened in the polishing process, problems of high resistance, an occurrence of twines, etc., are caused in the next brushing process if the content of the low-melting polyester fibers "UNITIKA 1680" in the pile fibers exceeds 20 wt%, resulting in the poor processing into a pile fabric.

Industrial Applicability

[0068] The present invention provides a pile fabric whose pile fibers are inhibited from falling off while having an excellent texture, and can be applied to general pile fabrics, such as fake furs, boa piles, car sheets and carpets.

Description of Reference Numerals

[0069]

1, 21, 31	ground yarn
2, 22, 32	pile fiber
3	napped pile
4	fused part
5, 25, 35	pile fabric
10	processing device
11	heating roller
12	cooling rubber roller
13, 14	metal cooling roller
15	guide roller
16, 17	container
18	raw pile fabric
18a	front surface of raw pile fabric
18b	back surface of raw pile fabric

Claims

1. A pile fabric, comprising:

a ground structure; and
 pile fibers that are intertwined with ground yarns constituting the ground structure and napped on a front surface of the ground structure,
 wherein the pile fibers comprise at least one selected from the group consisting of acrylic fibers and acrylic-based fibers and have a softening point lower than a softening point of fibers constituting the ground structure, and
 wherein among the pile fibers intertwined with the ground yarns constituting the ground structure, at least part of the pile fibers located outside of the ground yarns constituting the ground structure are fused but the pile fibers napped on the front surface of the ground structure are not fused.

2. The pile fabric according to claim 1,
 wherein the fused pile fibers located outside of the ground yarns constituting the ground structure are pressure-

bonded, and

a thickness of the fused and pressure-bonded pile fibers located outside of the ground yarns constituting the ground structure is 300 μm or less.

- 5 **3.** The pile fabric according to claim 1 or 2, wherein the pile fibers are prevented from falling off.
- 4.** The pile fabric according to any one of claims 1 to 3, wherein a back surface of the pile fabric is impregnated with a backing resin.
- 10 **5.** The pile fabric according to any one of claims 1 to 4, wherein the pile fabric is a high pile fabric or a boa pile fabric.
- 6.** A method of producing a pile fabric, the pile fabric comprising: a ground structure; and pile fibers that are intertwined with ground yarns constituting the ground structure and napped on a front surface of the ground structure, wherein the pile fibers comprise at least one selected from the group consisting of acrylic fibers and acrylic-based
15 fibers and have a softening point lower than a softening point of fibers constituting the ground structure, and a contact heating/pressurization is performed at a temperature equal to or higher than the softening point of the pile fibers and lower than the softening point of the fibers constituting the ground structure from a back surface side of the ground structure, whereby among the pile fibers intertwined with the ground yarns constituting the ground structure, at least part of the pile fibers located outside of the ground yarns constituting the ground structure are fused but the pile fibers napped on the front surface of the ground structure are not fused.
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- 7.** The method of producing a pile fabric according to claim 6, wherein the contact heating/pressurization is performed by a heating roller or a hot plate.
- 25 **8.** The method of producing a pile fabric according to claim 6 or 7, wherein, during and/or after the contact heating/pressurization is performed from the back surface side of the ground structure, a side thereof with the napped pile fibers is cooled.
- 9.** The method of producing a pile fabric according to any one of claims 6 to 8, wherein, after the contact heating/pressurization is performed from the back surface side of the ground structure, cooling is performed from the back
30 surface side of the ground structure.
- 10.** The method of producing a pile fabric according to any one of claims 6 to 9, wherein, after a back surface of the pile fabric is impregnated with a backing resin and the pile fibers are opened and aligned, the contact heating/pressurization is performed from the back surface side of the ground structure.
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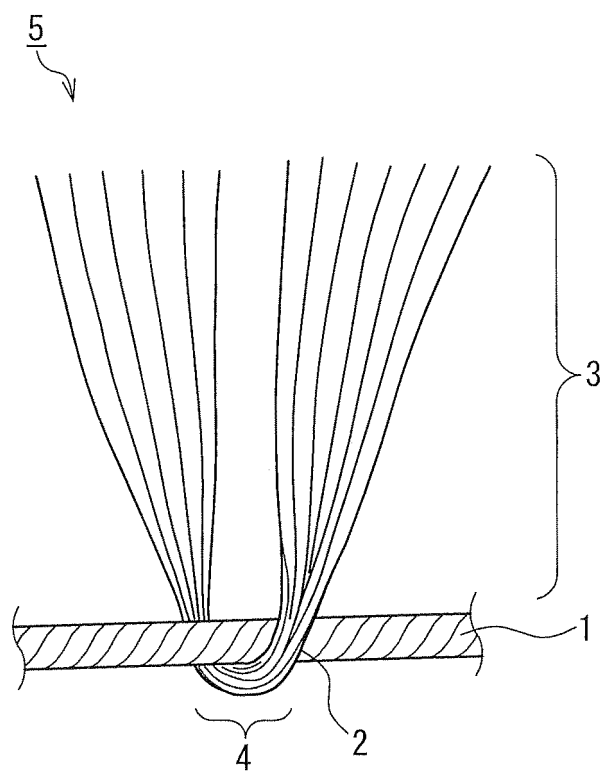


FIG. 1

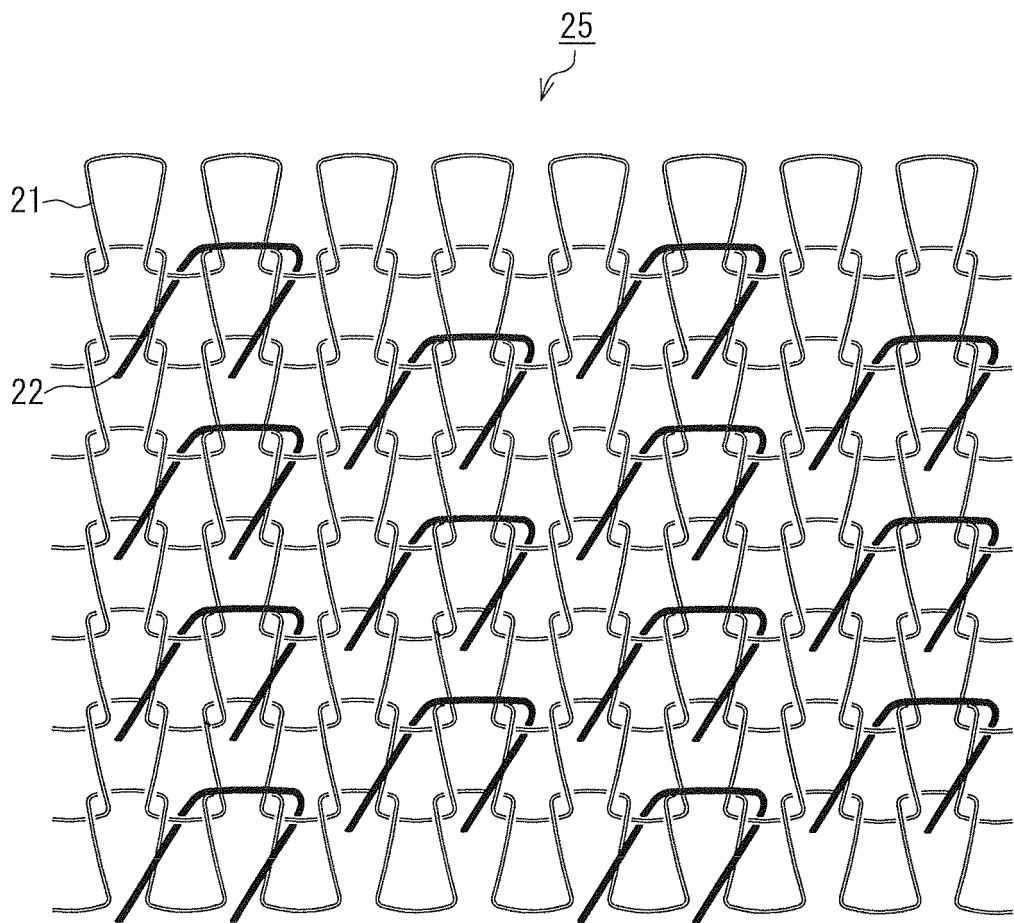


FIG. 2

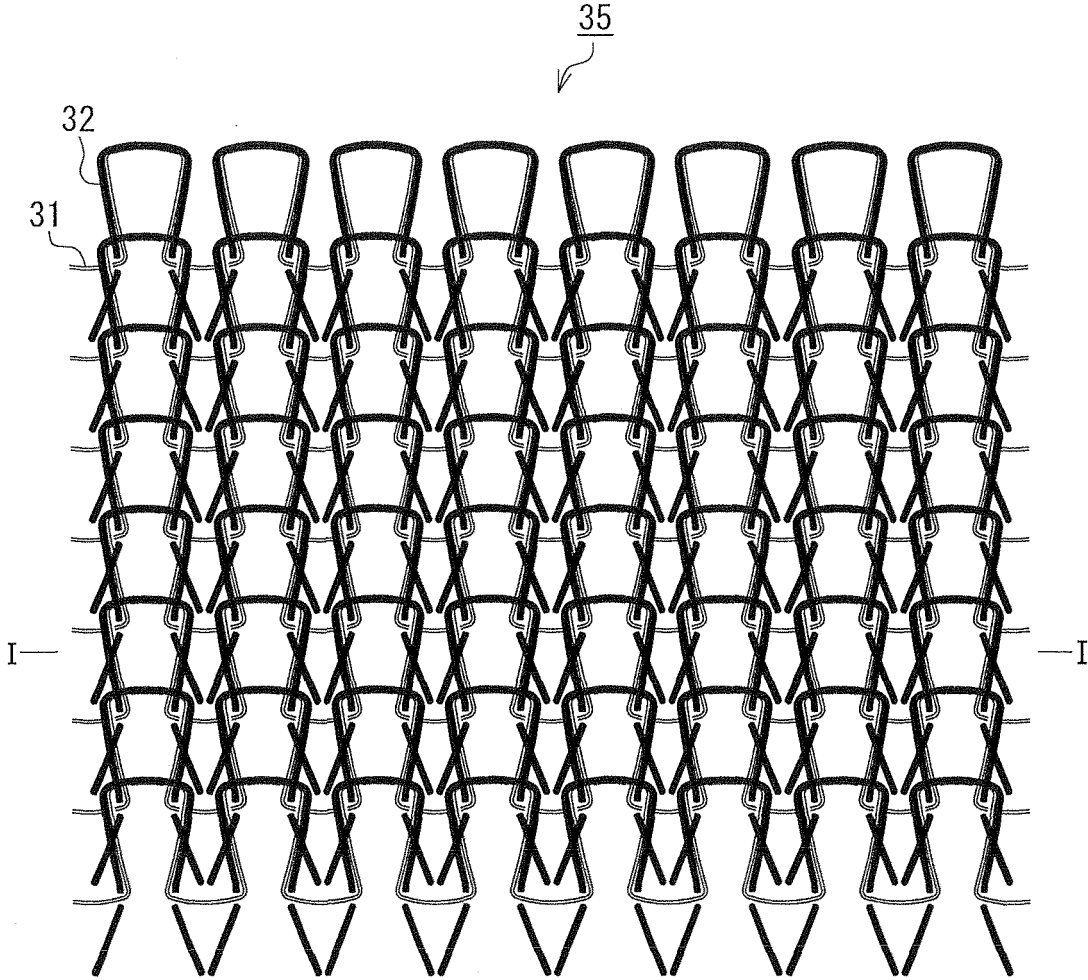


FIG. 3

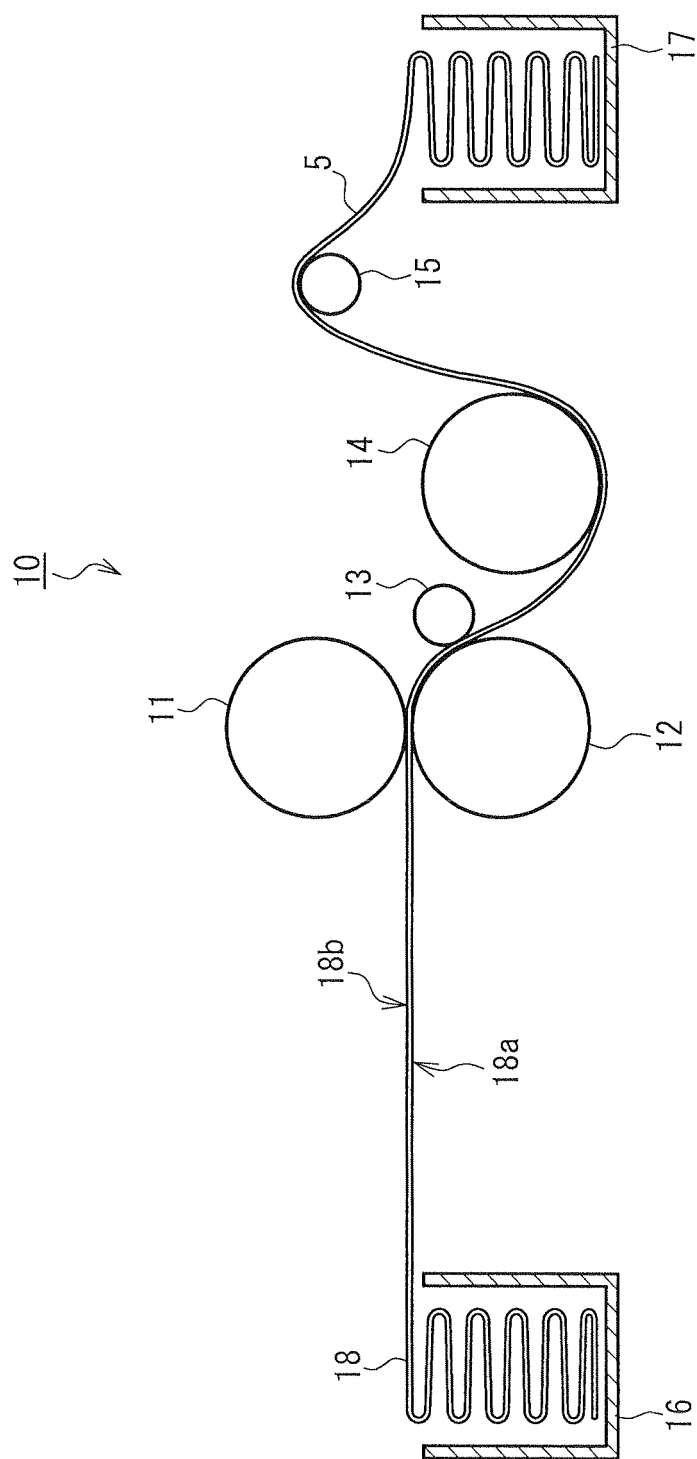


FIG. 4

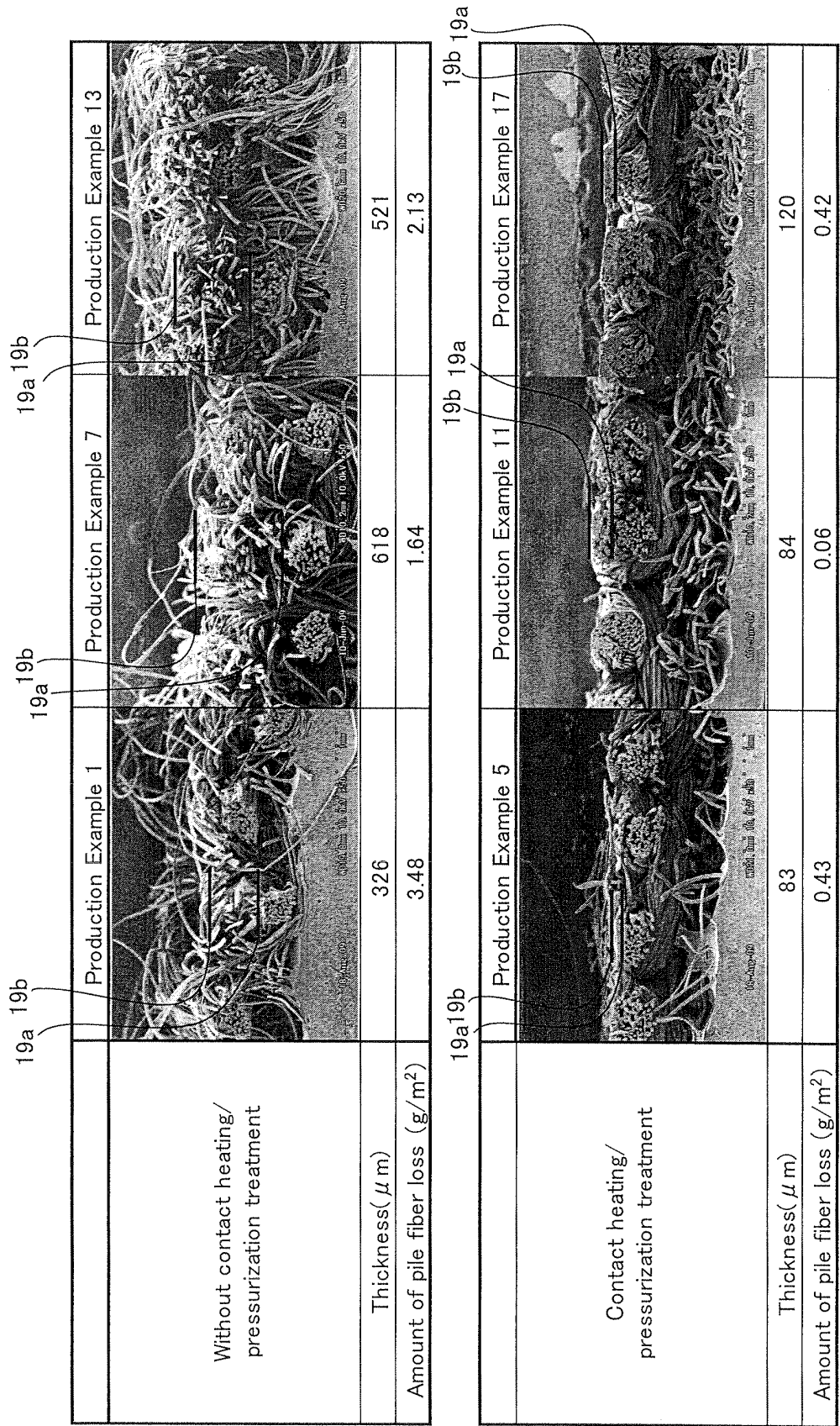


FIG. 5

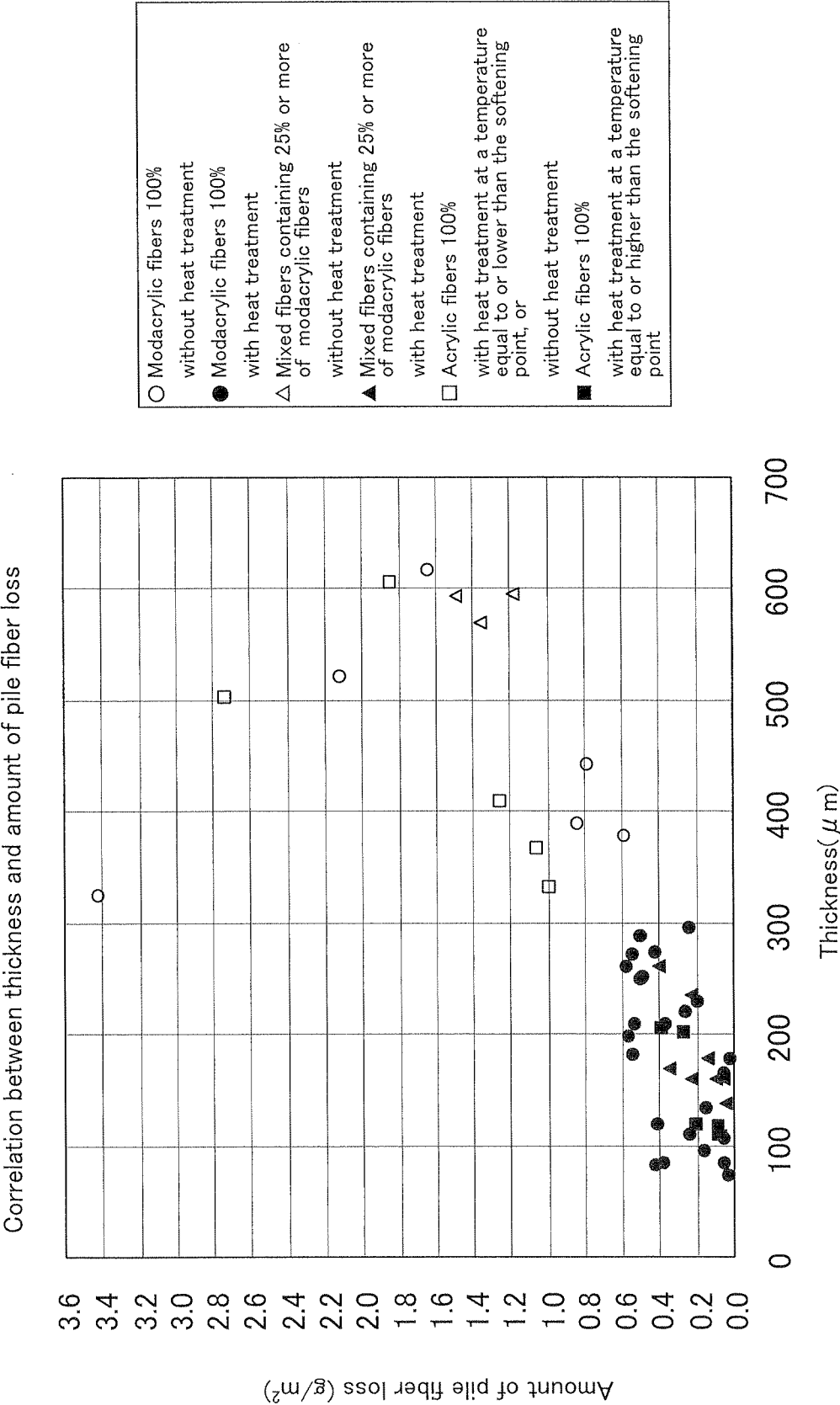


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/069054

A. CLASSIFICATION OF SUBJECT MATTER

D04B1/16(2006.01) i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D04B1/00-1/28, D04B21/00-21/20, D06M13/00-16/00, D06M19/00-23/18, B32B1/00-43/00

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2010
Kokai Jitsuyo Shinan Koho	1971-2010	Toroku Jitsuyo Shinan Koho	1994-2010

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

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 09-324347 A (Kanebo, Ltd.), 16 December 1997 (16.12.1997), claims (Family: none)	1-10
A	JP 06-128840 A (Unitika Ltd.), 10 May 1994 (10.05.1994), claims (Family: none)	1-10
A	JP 09-268457 A (Mitsubishi Rayon Co., Ltd.), 14 October 1997 (14.10.1997), claims (Family: none)	1-10

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search
02 February, 2010 (02.02.10)Date of mailing of the international search report
16 February, 2010 (16.02.10)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/069054

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 06-081248 A (Kaneka Corp.), 22 March 1994 (22.03.1994), claims (Family: none)	1-10
A	JP 07-048765 A (Toyobo Co., Ltd.), 21 February 1995 (21.02.1995), claims (Family: none)	1-10

Form PCT/ISA/210 (continuation of second sheet) (April 2007)

REFERENCES CITED IN THE DESCRIPTION

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- JP 6081248 A [0004]
- JP 2000314048 A [0004]
- JP 7048765 A [0004]

Non-patent literature cited in the description

- Fiber Handbook. Maruzen, 15 December 2004, 341-342 [0005]
- Encyclopaedia Chimica. Kyoritsu Shuppan Co., Ltd, 01 June 1993, 727-729 [0017]