



(11) **EP 3 721 001 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.01.2022 Bulletin 2022/03

(21) Application number: **17922911.7**

(22) Date of filing: **27.12.2017**

(51) International Patent Classification (IPC):
D04B 1/02 (2006.01) D04B 1/04 (2006.01)

(52) Cooperative Patent Classification (CPC):
D04B 1/02; D04B 1/04

(86) International application number:
PCT/TR2017/050705

(87) International publication number:
WO 2019/112528 (13.06.2019 Gazette 2019/24)

(54) **VELVET FABRIC KNITTING METHOD**

VERFAHREN ZUM STRICKEN VON SAMTGEWEBE

PROCÉDÉ DE TRICOTAGE DE TISSU VELOURS

(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: **06.12.2017 TR 201719729**

(43) Date of publication of application:
14.10.2020 Bulletin 2020/42

(73) Proprietor: **Sanko Tekstil İşletmeleri Sanayi Ve Ticaret Anonim Şirketi Gaziantep (TR)**

(72) Inventors:
• **KONUKOĞLU, Hakan**
83209 Gaziantep (TR)
• **AYDIN, Ahmet Gokhan**
83304 Gaziantep (TR)

(74) Representative: **Dericioglu, E. Korhan**
Ankara Patent Bureau
Kavaklıdere Mahallesi Bestekar Caddesi No: 10
06680 Cankaya, Ankara (TR)

(56) References cited:
WO-A2-2009/049199 WO-A2-2014/106858
US-A- 2 232 532 US-A1- 2008 263 802

EP 3 721 001 B1

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

Description

Field of the Invention

[0001] The present invention relates to a method of producing (pile) velveteen (plush) knitted fabric which is produced in circular knitting machines by terry-cloth fabric technique and which is then processed to appear like velvet.

Background of the Invention

[0002] A fabric is a covering surface constructed by linking yarns via various methods. It is obtained from yarns made of natural textile fibers such as cotton, wool, silk, linen, etc. and synthetic, regenerated textile fibers or a mixture thereof. Fabrics are constructed by passing yarns which are perpendicular and parallel to each other from under and above each other.

[0003] Nowadays, in the circular knitting machines, the needles are arranged next to each other into the needle grooves provided in the circular (tubular) needle plates. They are machines which carry out knitting by moving the needles that move in the grooves during the circular movement of the needle plate independently with the help of the locking mechanisms that are immobile on the needle plate and grooves and that give movement to the needles and by fixed yarn lay-in suitable thereto. The knitting operation is carried out by the needles that are arranged at certain intervals around the needle plate making circular movements all together while receiving suitable movement from the fixed locking systems and forming loops by pulling the yarns laid on them.

[0004] One of the types of fabric produced is the pile plush which is produced by using the terry-cloth fabric production technique in circular knitting machines and then sheared to have a smooth surface with fine piles giving a velvet appearance.

[0005] In the state of the art applications, the light effects and surface patterns are obtained in some nylon velvet fabrics, although rare; however they are provided to some extent with a synthetic material (nylon, etc.). Artificial textile fibers are required to achieve such an effect. Processes of patterning and creating effects in velvet fabrics cannot be achieved by using single yarn in plain circular knitting machines.

[0006] International patent application WO2014106858 discloses a process for making a fabric comprising; blending or mixing wool with one or more other textile fibers to form yarn; weaving or knitting using the yarn obtained as at least one of the components; and removing wool by dissolving to form air voids. The said application does not provide a means for producing velvet fabric.

[0007] However in the state of the art applications, jacquard terry-cloth machines are used to produce patterns on velvet fabric and the colors obtained in this production method cannot reflect light from different angles.

Problems Solved by the Invention

[0008] The object of the present invention is to provide a method of producing velvet fabric having a mixture of materials and reflection effect by performing a different shearing method on the roving (roving of velvet/terry-cloth fabric instead of terry-cloth) without making changes in the construction of the fabric. In order to do this, two different yarns are required to be knitted in terry-cloth construction in a double plated circular knitting machine. Following a terry-cloth knitting process carried out by different yarns, the surface is converted to velvet fabric by shearing process. By means of the present invention, light effects and episodic patterning are achieved without applying any printing process and/or using jacquard circular knitting machines. The said progress is achieved by producing ring-spun yarn from different material mixtures and using them as pile yarn in production of velvet fabric.

Detailed Description of the Invention

[0009] Velvet fabric knitting production method developed to fulfill the objective of the present invention is illustrated in the accompanying figure, in which;

[0010] Figure 1 is a schematic view of the velvet fabric knitting method.

[0011] The steps in the figures are given reference numbers as follows:

100. Velvet fabric knitting method

101. Mixing the (commercially available) fibers comprising neps used in pile yarn with a textile fiber comprised of natural, synthetic, regenerated fibers or a mixture thereof and making them into slivers upon processing them in the carding machine,

102. Eliminating roughness of the slivers coming from the carding machine and splicing the sliver cotton pieces with the sliver neps and activating the draw frame for mixing them into the main material,

103. Activating the roving frame for thinning the draw frame sliver cotton and nep mixture coming from the draw frame and subjecting it to false twist process,

104. Activating the ring machine for obtaining yarn by thinning the cords coming from the cotton and nep mixture from the roving machine via drawing and winding the yarn onto the cops,

105. Knitting the greige fabric by the needles which are turning upon upwards-downwards movement of the knitting needles provided in the double plated circular knitting machine,

106. Knitting the pile yarn and the ground yarn by passing them through the needles in different plates,

107. Placing the pile yarn on the fabric backcloth for shearing and then shearing thereof,

108. Activating the fixing machine for fixing the produced yarn and stretching the terry cloth fabric under hot air to prevent electrostatic generation,

109. Dyeing the terry-cloth fabric,

110. Activating the centrifugal drying machine for drying the terry-cloth fabric by contacting heated air,

111. Rotating the dyed fabric at least 4550 revolutions in order to prevent sinking of the nep effects in the terry-cloth tolon machine,

112. Shearing the pile yarns of the terry-cloth fabric in order to turn it to a velvet fabric by making the closed loops open-end from a blade distance of at least 1.8 mm,

113. Passing the dyed and sheared velvet fabric through the stenter for drying thereof.

[0012] In the velvet fabric knitting method (100) of the present invention, the neppy sliver fibers (fiber bundles which may include fibers of different thicknesses and lengths and which can create a 3 dimensional effect on the main fiber sliver or yarn to which they are incorporated as they stand together) used in pile yarn are mixed with staple fibers and made it into slivers upon being processed in the carding machine (101), and the carding machine is the machine wherein the cotton fiber is made into thick slivers upon being passed through rotary cylinders with needles.

[0013] The neppy fibers used in pile yarn are mixed with textile fibers comprised of natural, synthetic, regenerated fibers such as cotton, wool, silk, linen, etc. or a mixture thereof and they are made into slivers by being processed in the carding machine.

[0014] In order to obtain the yarn with nep effects used in pile yarn, the neppy fibers are mixed with the main fiber and made into slivers by being processed in the carding machine and the nep carding slivers of the yarn with nep effects with the staple fibers in the draw frame.

[0015] The draw frame is used for eliminating roughness of the slivers coming from the carding machine and splicing the sliver cotton pieces leaving the carding machine transversely with the sliver neps and mixing them into the main material (102). The neps are mixed into the main material as injection or double material feed during the yarn process, nep carding process, draw frame process or yarn spinning process.

[0016] The roving frame is activated for thinning the draw frame sliver cotton and nep mixture coming from the draw frame and subjecting it to twisting process (103). After the draw frame process, the cotton and nep mixture is given its thinnest sliver form in the roving machine. These thin slivers are spun in the ring machine. The said ring machine is activated to obtain yarn by thinning the cords coming from the cotton and nep mixture from the roving machine via drawing and to wind the yarn onto the cops (104). Thus the main material is subjected to carding process and the process of mixing with the neppy sliver is performed in the draw frame. The mixing is enabled during the drawing process.

[0017] The draw frame is activated in order to obtain a homogenous sliver by splicing the yarn slivers transversely by means of doubling for cleaning the flies formed

during the drawing process.

[0018] The greige (circular terry-cloth knitted) fabric, which is comprised of pile yarn and ground yarn, is knitted by the needles which are turning upon upwards-downwards movement of the knitting needles provided in the double plated circular knitting machine.

[0019] The pile yarn and the ground yarn are knitted by being passed through the needles in different plates (106). The filament yarn or staple yarn, which ensures strength of the fabric backcloth, is used. (filament yarn; continuous yarns comprised of natural, synthetic, regenerated yarns or mixtures thereof or ring yarns comprised of staple fibers or open-end yarns comprised of staple fibers or air-jet yarns comprised of staple fibers).

[0020] The greige fabric is processed in the AIRO machine, wherein shearing (for opening the closed ends of the pile yarns), pre-fixation, exhaust dyeing, centrifuge (drying), stentering and quality control processes are performed on the greige fabric.

[0021] In the shearing process, the pile yarn is placed on the fabric backcloth for shearing and then it is sheared (107). During velvet fabric production, the pile yarn and ground yarn are knitted by being separately passed through the needles in two different plates. The fabric backcloth, which is also known as rear side of the fabric, is the napless flat surface of the velvet fabric generally comprised of filament yarns (polyester and nylon are often selected for providing strength).

[0022] According to the invention, a fixing machine is activated for fixing the produced yarn and stretching the terry-cloth fabric under hot air to prevent electrostatic generation (108). The terry-cloth fabric is dyed (109) and then the centrifugal drying machine is activated for drying the terry-cloth fabric by contacting heated air (110).

[0023] After the greige fabric is produced in the double plated circular knitting machine, the finishing process begins in terry-cloth fabric construction. The fabric rotates together with warm air in the centrifugal drying machine by a specific number of revolutions and the dyed fabric is rotated at least 4550 revolutions in order to prevent sinking of the nep effects in the terry-cloth centrifugal drying machine (111). The purpose of the increase in the number of revolutions in the tolon machine is to ensure that the neps in the pile yarn remain more upright and brisk.

[0024] 2nd shearing is performed on the pile yarns of the terry-cloth fabric in order to turn it to a velvet fabric by making the closed loops open-end from a blade distance of at least 1.8 mm (112). The velvet circular knitted fabric is a version of terry-cloth circular knitted fabric before the shearing process.

[0025] After the shearing process, the closed loops of the pile yarns are opened and made open-end. The purpose of increasing the distance is to prevent the blades from shearing too deep on the fabric surface.

[0026] Performing shearing by a certain distance difference prevents the nep effects in the fabric from sinking in the centrifugal drying machine.

[0027] The dyed and sheared velvet fabric is passed through the stenter for being dried (113). The constructed velvet fabric is finally subjected to various quality control processes (114).

[0028] The fabric weight (g/m²) varies according to area of use. The ground yarn and pile yarn numbers vary depending on the weight of the fabric.

[0029] By means of this invention, velvet fabric with different material mixture and reflection pattern effect is obtained without making any changes in the fabric construction. A more bulky and softer touch is provided by means of the different material mixtures and compositions used in the invention.

[0030] According to the invention, fiber mixtures comprising natural, synthetic or regenerated fibers such as viscose, cotton, polyester, nylon, linen, wool fibers or mixtures thereof are used.

[0031] A glossy fiber which provides a soft touch can also be used.

[0032] The filament yarn can be produced of synthetic materials enabling high strength such as polyester, nylon, etc.

[0033] Many kinds of needles such as a single butt needle or a 4 butt needle can be used.

[0034] In one embodiment of the invention, when carding process of textile fibers comprised of natural, synthetic, regenerated fibers such as cotton, silk, linen, etc. or mixtures thereof is performed in the carding machine at a low drum rpm (preferably less than 300 rpm) by increasing the distance between the revolving flat and the drum (the starting point is more than 35 mm), similar ones of the sliver nep effects are obtained. The neppy slivers obtained with this method may or may not be mixed with different textile fibers in the draw frame. Thus, decision of making the mixture depends on the desired number of neps in a unit area in the final fabric.

Claims

1. A velvet fabric knitting method (100) **comprising** the steps of:

- mixing commercially available fibers comprising neps used in pile yarn with a textile fiber comprised of natural, synthetic, regenerated fibers or a mixture thereof and making them into slivers upon processing them in a carding machine (101),
- activating a draw frame for eliminating roughness of the slivers coming from the carding machine and for splicing sliver cotton pieces coming out of the carding machine with the sliver neps and mixing them into a main material (102),
- activating a roving frame for thinning the draw frame sliver cotton and nep mixture coming from the draw frame and subjecting it to twisting process, thereby obtaining cords (103),

- activating a ring machine for obtaining yarn by thinning the cords coming from the main fiber and nep mixture from the roving machine via drawing and winding the yarn onto cops (104),
- knitting a greige fabric by needles which are turning upon upwards-downwards movement of said needles provided in a double cylinder circular knitting machine (105),
- knitting a pile yarn and a ground yarn by passing them through the needles in different cylinders (106),
- placing the pile yarn on the fabric backcloth for shearing and then shearing thereof, thereby obtaining a pile fabric (107),
- activating a fixing machine for fixing the produced yarn and for stretching the pile fabric under hot air to prevent electrostatic generation (108), and
- dyeing the pile fabric (109), whereby the velvet fabric knitting method (100) is **characterized in that** it further comprises the steps of
 - activating a centrifugal drying machine for drying the pile fabric by contacting heated air (110),
 - rotating the dyed fabric at at least 4550 revolutions per minute in the centrifugal drying machine (111), in order to prevent sinking of the nep effects,
 - shearing the pile yarns of the pile fabric in order to turn it to a velvet fabric by making the closed loops open-end from a blade distance of at least 1.8 mm with respect to the tops of the piles (112), and
 - passing the dyed and sheared velvet fabric through a stenter for drying thereof (113), and thereby obtaining a velvet fabric.

2. A velvet fabric knitting method (100) according to Claim 1, wherein said textile fiber is selected from the group of natural or synthetic or regenerated fibers such as viscose, cotton, polyester, nylon, linen, wool, silk fibers or fiber mixtures comprised of mixtures thereof.

3. A velvet fabric knitting method (100) according to Claim 1, wherein the step of obtaining sliver nep effects when carding process of textile fibers selected from natural, synthetic, regenerated fibers such as cotton, silk, linen, etc. or mixtures thereof is performed in the carding machine at a drum speed less than 300 rpm and the distance between revolving flat and cylinder of the carding machine is more than 35 mm.

Patentansprüche

1. Verfahren zum Stricken von Samtstoffen (100), **umfassend** die Schritte:

- Mischen der handelsüblichen Fasern, die die in Polgarnen verwendeten Nissen umfassen, mit einer Textilfaser, die aus natürlichen, synthetischen, regenerierten Fasern oder einer Mischung davon besteht, und deren Verarbeitung zu Faserbändern in einer Kardiermaschine (101),

- Aktivieren einer Strecke zur Beseitigung der Rauigkeit der aus der Kardiermaschine kommenden Faserbänder und zum Verbinden der aus der Kardiermaschine kommenden Baumwollbandstücke mit den Fasernissen und zum Mischen dieser zu einem Hauptmaterial (102),

- Aktivieren einer Vorspinnmaschine zum Verdünnen des aus der Strecke kommenden Baumwoll- und Nissengemischs und dessen Verdrillung, wodurch Kordeln erhalten werden (103),

- Aktivieren einer Ringmaschine zur Gewinnung von Garn durch Verdünnen der aus der Hauptfaser und der Nissenmischung aus der Rovingmaschine stammenden Stränge durch Verstrecken und Aufwickeln des Garns auf Bullen (104),

- Stricken eines grauen Stoffes durch Nadeln, die sich bei der Aufwärts-/Abwärtsbewegung der in einer Doppelzylinder-Rundstrickmaschine vorgesehenen Nadeln drehen (105),

- Stricken eines Polgarns und eines gemahlten Garns, indem man sie in verschiedenen Zylindern durch die Nadeln führt (106),

- Platzieren des Polgarns auf dem Stoffrückentuch zum Scheren und anschließendes Scheren des Polgarns, wodurch ein Polstoff erhalten wird (107),

- Aktivieren einer Fixiermaschine zum Fixieren des erzeugten Garns und zum Spannen des Polstoffes unter Heißluft, um elektrostatische Aufladung zu verhindern (108), und

- Färben des Polstoffes (109), wobei das Verfahren (100) zum Stricken von Samtstoffen **dadurch gekennzeichnet ist, dass** es ferner die folgenden Schritte umfasst

- Aktivieren einer Zentrifugal Trocknungsmaschine zum Trocknen des Polstoffes durch den Kontakt mit erwärmter Luft (110),

- Rotation des gefärbten Stoffes mit mindestens 4550 Umdrehungen pro Minute in der Zentrifugal Trocknungsmaschine (111), um ein Absinken der Nisseneffekte zu verhindern,

- Scheren der Polgarns des Polstoffes, um es in ein Samtstoffe zu verwandeln, indem die geschlossenen Schlingen ab einem Messerabstand von mindestens 1.8 mm in Bezug auf die Polspitzen geöffnet werden (112), und

- Durchlaufen des gefärbten und geschorenen Samtstoffes durch einen Spannrahmen, um es zu trocknen (113) und so ein Samtstoffe zu erhalten.

2. Verfahren zum Stricken von Samtstoffen (100) nach Anspruch 1, wobei die Textilfaser aus der Gruppe der natürlichen oder synthetischen oder regenerierten Fasern wie Viskose, Baumwolle, Polyester, Nylon, Leinen, Wolle, Seidenfasern oder Fasermischungen, die aus Mischungen davon bestehen, ausgewählt ist.

3. Verfahren zum Stricken von Samtstoffen (100) nach Anspruch 1, wobei der Schritt des Erzielens von Bandnisseneffekten beim Kardiervorgang von Textilfasern, die aus natürlichen, synthetischen, regenerierten Fasern wie Baumwolle, Seide, Leinen usw. oder Mischungen davon ausgewählt sind, in der Kardiermaschine bei einer Trommeldrehzahl von weniger als 300 U/min durchgeführt wird und der Abstand zwischen dem sich drehenden Deckel und dem Zylinder der Kardiermaschine mehr als 35 mm beträgt.

Revendications

1. Procédé de tricotage (100) d'un tissu en velours **comprenant** les étapes consistant suivantes :

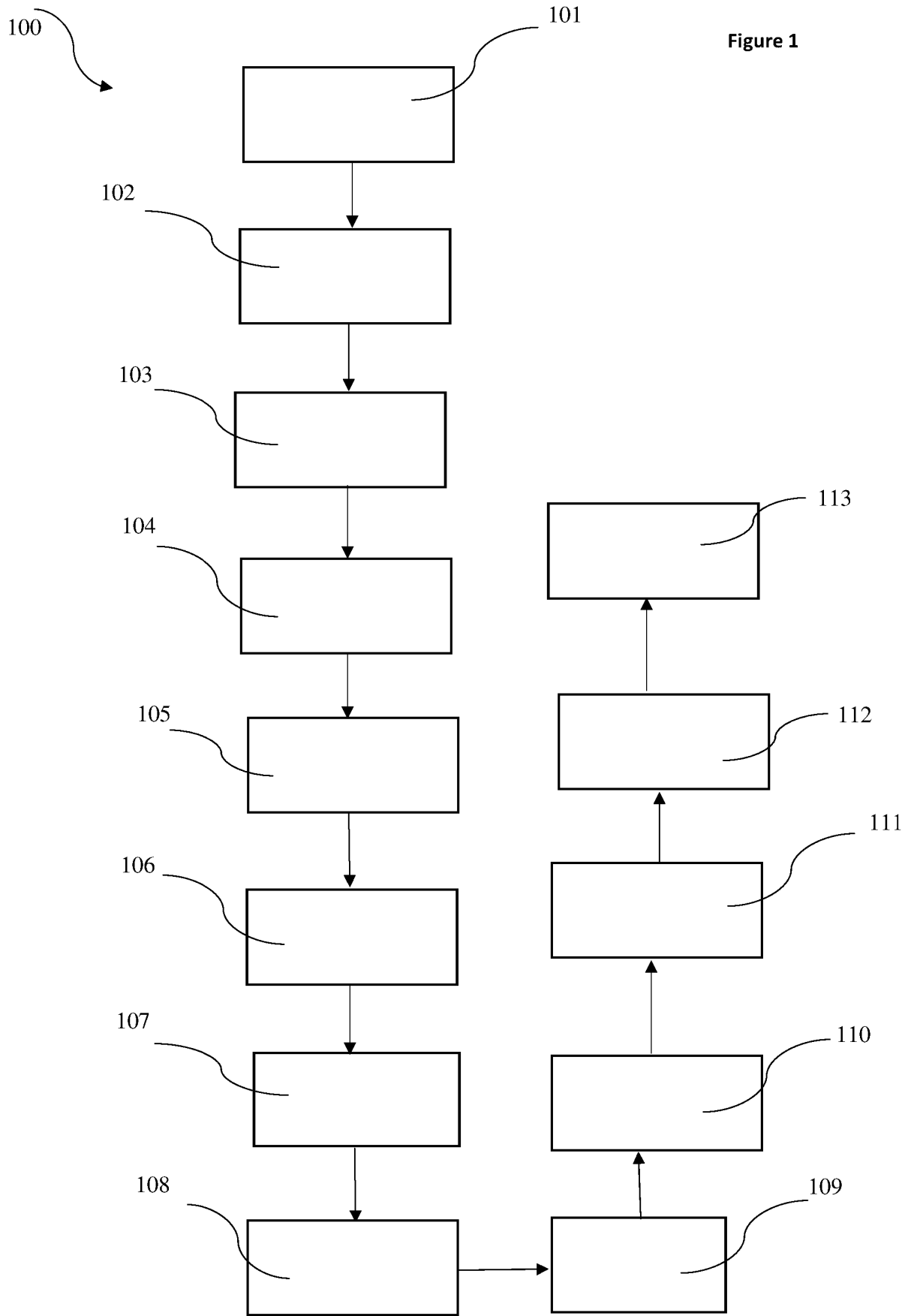
- mélanger des fibres disponibles dans le commerce comprenant des neps utilisés dans le fil de poil avec une fibre textile composée de fibres naturelles, synthétiques, régénérées ou d'un mélange de celles-ci et les transformer en rubans lors de leur traitement dans une machine à carder (101),
- activer un cadre d'étirage pour éliminer la rugosité des rubans provenant de la machine à carder et pour épisser les morceaux de coton des rubans provenant de la machine à carder avec les neps des rubans et les mélanger dans un matériau principal (102),
- activer un cadre de mèche pour amincir le mélange de coton et de nep du cadre de tirage provenant du cadre de tirage et le soumettre à un processus de torsion, obtenant ainsi des cordons (103),
- activer une machine à anneaux pour obtenir du fil en amincissant les cordons provenant de la fibre principale et du mélange de nep provenant du machine de mèche par étirage et enroulement du fil sur des cordons (104),
- tricoter un tissu grège par des aiguilles qui tournent lors d'un mouvement de haut en bas des dites aiguilles prévues dans un métier à tricoter circulaire à double cylindre (105),
- tricoter un fil de poil et un fil de fond en les faisant passer à travers les aiguilles dans des cylindres différents (106),
- placer le fil de poil sur la toile de fond du tissu pour le cisaillement et ensuite le cisailier, obtenant ainsi un tissu de poil (107),

- activer une machine de fixation pour fixer le fil produit et pour étirer le tissu de poil sous air chaud pour empêcher la génération électrostatique (108), et
 - teindre le tissu de poil (109), dans lequel le procédé de tricotage de tissu en velours (100) est **caractérisé en ce qu'il** comprend en outre les étapes suivantes:
 - activer une machine de séchage centrifuge pour sécher le tissu de poil par contact avec de l'air chauffé (110),
 - faire tourner le tissu teint à au moins 4550 tours par minute dans la machine de séchage centrifuge (111), afin d'empêcher l'enfoncement des effets de nep,
 - cisailer les fils de poil du tissu de poil afin de le transformer en un tissu en velours en rendant les boucles fermées ouvertes à partir d'une distance de lame d'au moins 1.8 mm par rapport aux sommets des poils (112), et
 - faire passer le tissu en velours teint et cisailé dans une rame pour le sécher (113), et obtenir ainsi un tissu en velours.
2. Procédé de tricotage (100) d'un tissu en velours selon la revendication 1, dans lequel ladite fibre textile est choisie dans le groupe des fibres naturelles ou synthétiques ou régénérées telles que les fibres de viscosse, de coton, de polyester, de nylon, de lin, de laine, de soie ou les mélanges de fibres constitués de leurs mélanges.
3. Procédé de tricotage (100) d'un tissu en velours selon la revendication 1, dans lequel l'étape d'obtention d'effets de nep de ruban lorsque le processus de cardage de fibres textiles choisies parmi les fibres naturelles, synthétiques, régénérées telles que le coton, la soie, le lin, etc. ou des mélanges de celles-ci est effectué dans la machine à carder à une vitesse de tambour inférieure à 300 tr/min et la distance entre le plateau tournant et le cylindre de la machine à carder est supérieure à 35 mm.

45

50

55



REFERENCES CITED IN THE DESCRIPTION

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

Patent documents cited in the description

- WO 2014106858 A [0006]