

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 756 030 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

22.01.2003 Bulletin 2003/04

(51) Int Cl.7: **D04B 21/02**

(21) Application number: **95305933.4**

(22) Date of filing: **24.08.1995**

(54) **Method for constructing a double face fabric**

Verfahren zur Herstellung von einem doppelseitigen Stoff

Procédé pour la fabrication d'un étoffe double face

(84) Designated Contracting States:
**AT BE CH DE DK ES FR GB GR IE IT LI LU NL PT
SE**

(30) Priority: **26.07.1995 US 507800**

(43) Date of publication of application:
29.01.1997 Bulletin 1997/05

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(56) References cited:
EP-A- 0 627 517 DE-A- 2 857 400
FR-A- 1 507 442 FR-A- 2 211 019
US-A- 3 855 820 US-A- 4 712 281

• **PETER M., ROUETTE H.K.: 'Grundlagen der
Textilveredlung', 1989, DEUTSCHER
FACHVERLAG, FRANKFURT A.M.**

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Description

Background Of The Invention

[0001] This invention relates to a fabric that has a raised surface on both faces or sides, and more particularly to a method for making such fabric by utilizing a double needle bar warp knitting machine.

[0002] It is well known in the fabric field to use a warp knitting machine in the manufacture of velvet. A three-dimensional knit fabric is knit on a machine having two needle beds with multiple guide bars. Two warp knit fabrics with yarn connecting the two fabrics are formed (see U.S. Patent No. 3,855,820). After knitting, the fabrics are split into two pile fabrics by cutting the yarn connecting them. Each of the two fabrics has a flat warp knit side and a pile side. The flat side is known as the technical back and the pile side is known as the technical face of the fabric (Raz, Dr. S.: "Warp Knitting Production," Verlag Melliand Textilberichte GmbH, Heidelberg).

[0003] Typically, the technical face is brushed to separate the individual fibers in each yarn bundle and create a face finished fabric often referred to as velvet. The flat side, the technical back, is typically not processed and remains in the as-knit state.

[0004] Because only one side of the fabric is face finished, its use is limited to applications in which the technical back is unexposed. As an example, garments made with single sided face finished fabric with the pile to the outside must be lined to avoid contact of the harsher technical back with the wearer's skin.

[0005] It is generally understood in the textile community that double faced fabrics overcome the inherent disadvantages of single faced fabrics for end uses in which both sides are utilized.

[0006] Warp knit fabrics provide inherent technical features. For example, they can be engineered to have as high a degree of dimensional stability and durability as woven fabrics, properties that are desirable in many end uses and that are not available in weft knit fabrics. Because the velvet on the pile side consists of individual fibers of yarn bundles that are anchored in the warp knit fabric, the velvet is more resilient than other pile fabrics in which the surface is raised by simply tearing fibers out of the stitch. This resilience is maintained, even after, repeated laundering, with the result that the velvet look is maintained and fiber clumps are not formed. Warp knit fabrics made on double needle bar machines have the added benefit of providing enhanced thermal properties by control of fabric thickness and density.

[0007] DE 28 57 400 discloses a method of manufacturing two webs of pile fabric on a warp-knitting machine with two needle bars, wherein the pile threads are threaded backwards and forwards between the needles of the two needle bars and joined alternately to backing fabrics formed on two needle bars. The pile threads are cut to form two fabric layers having a technical face comprised of a raised pile and a technical back comprising

a looped pile. Warp knit fabrics made on tricot machines (see U.S. Patent No. 4,712,281) can also be face finished on both sides, but do not provide the range of thermal properties or resilience possible on double needle bar equipment.

[0008] Accordingly, it is desirable to provide fabric which overcomes the above disadvantages.

Summary Of The Invention

[0009] Generally speaking, in accordance with the invention, a method of constructing a double face fabric is provided. The first step in the method is to knit a three dimensional fabric using a conventional double needle bar warp knitting machine which has a first knit fabric layer, a second knit fabric layer and a plurality of yarns that interconnect the two knit layers. Then, the yarns connecting the two layers are cut, resulting in two pieces of fabric having a pile surface on one side (the technical face, the side that is cut), and a flat knit surface on the other (the technical back). The technical face is brushed to separate the individual fibers in each yarn bundle to create a velvet. The technical back of each fabric is raised by a conventional process such as napping to form two double face fabrics, each with a velvet surface on the technical face and a raised fleece surface on the technical back.

[0010] The double face fabric produced by the inventive method may be used in a variety of applications, including coats, sweaters, blazers, blankets, throws and slippers. Either surface of the fabric may be worn against the skin or undergarment of the wearer. If the connecting yarn is treated to be hydrophilic, the velvet side may be worn on the inside and will wick liquid moisture away from the wearer's skin. If the connecting yarn is treated to be water repellent, the velvet side may be worn on the outside to provide the wearer protection from rain. Alternatively, the double face fabric may be treated for durable water repellency by a conventional padding operation during finishing, in which event, either side may be worn on the outside.

[0011] Accordingly, it is an object of the invention to provide a method for preparing a double face fabric.

[0012] Another object of the invention is to nap the flat side of the fabric made on a double needle bar warp knitting machine in order to form a double face fabric.

[0013] A further object of the invention is to provide a double face fabric for enhancing the transport of moisture away from the wearer's skin.

[0014] Still another object of the invention is to provide a double face fabric having durable water repellency.

[0015] Yet a further object of the invention is to provide a double face fabric having thermal and insulative properties.

[0016] Yet another object of the invention is to provide a double face fabric having a velvet surface whose appearance is unaltered even after repeated laundering.

[0017] Still other objects and advantages of the inven-

tion will in part be obvious, and will in part be apparent from the following description.

[0018] The invention accordingly comprises the several steps and the relation of one or more steps with respect to each of the others, and the material or materials having the features, properties, and relation of constituents which are exemplified in the following detailed disclosure, and the scope of the invention will be set forth in the claims.

Brief Description of the Drawings

[0019] For a fuller understanding of the invention, reference is made to the following description in connection with the attached drawings, in which:

FIG. 1 is a side view showing the loop structure of a pile fabric produced on a double needle bar warp knitting machine;

FIG. 2 is a side view in which knitting of a double needle bar fabric with six guide bars is shown; and FIG. 3 is a side view in which the splitting of a double needle bar fabric is shown.

Detailed Description of the Preferred Embodiment

[0020] The double face fabric of the invention is prepared by first knitting a three dimensional knit fabric on a double needle bar warp knitting machine commonly used in the manufacture of single faced velvet and well known in the art. The three dimensional knit fabric includes a first fabric layer, a second fabric layer and a plurality of yarn or yarn elements interconnecting the two layers (Figure 1).

[0021] After fabric formation, the fabric may be dyed or printed, or the yarns that are used for the layers as well as to connect the layers may be dyed before fabric formation. The yarns may be either of synthetic material such as polyester, acrylic, nylon or olefin, and may be spun or filament (textured or oriented), or natural fibers such as cotton or wool, or of modified natural materials such as rayon or acetate. Mixtures of yarns of the above materials may also be used. The synthetic yarn to connect the layers should be in the range of 0.3 to 6.0 denier per filament or per staple if spun yarn is used. The yarn connecting the layers may have been rendered hydrophilic if wicking properties are required, or it may have been treated to enhance the fabric finishing. The yarn for the layers may be any commercially available yarn since the layers have virtually no effect on the performance characteristics of the fabric.

[0022] After producing the three dimensional knit, the yarn connecting the two surfaces is cut with a splitter (Figures 2 and 3). The result is two single faced fabrics with a velvet on the technical face and a flat surface on the technical back.

[0023] Thereafter, the technical back of each of the fabric pieces is raised by a conventional process such

as napping, brushing or sanding. Thus, this surface becomes a fleece with those attributes and advantages associated with such fabric.

[0024] Preferably, after raising the flat knit surface of each fabric piece, the raised surface can then be cleaned of loose fibers by additional brushing or napping and sheared to even the height therealong. Each resulting fabric piece thus comprises a velvet fabric surface on one side and a raised fleece surface that is a non-pilling functional velour on the other.

[0025] It will thus be seen that the objects set forth above, and those made apparent from the preceding description, are efficiently attained, and since certain changes may be made in both the process and products described above without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

[0026] It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Claims

1. A method of constructing a double face fabric comprising the steps of:

knitting a three dimensional knit fabric on a double bar knitting machine having a first fabric layer, a second fabric layer, and a plurality of yarn fibers interconnecting the two fabric layers; cutting along the plurality of yarn fibers to separate said fabric layers in order to form a pair of fabric pieces each with a first velvet surface defined by said cut yarn fibers and a second opposite flat surface; **characterised by** the additional step of raising the second flat surface in order for said second fabric surface to be fleeced.

2. The method of Claim 1, further including the step of brushing and shearing the fleeced fabric surface of each of the fabric pieces.
3. The method of Claim 1, wherein said fabric is made from synthetic yarn selected from the group consisting of polyester, acrylic, nylon and olefin.
4. The method of Claim 1, wherein said fabric is made from natural yarn selected from the group consisting of wool and cotton.
5. The method of Claim 1, wherein said fabric is made from modified natural materials selected from the group consisting of rayon and acetate.

6. The method of Claim 1, wherein said raising step comprises napping said second flat surface.

Patentansprüche

1. Verfahren zur Herstellung eines doppelseitigen Stoffes mit den folgenden Schritten:

Stricken eines dreidimensionalen Strickstoffes bzw. einer dreidimensionalen Strickstruktur auf einer Doppelband-Strickmaschine mit einer ersten Stoffschicht, einer zweiten Stoffschicht und mehreren Garnfasern, welche die beiden Stoffschichten miteinander verbinden; Schneiden entlang der Vielzahl der Garnfasern, um die Stoffschichten zu trennen, um ein Paar Stoffteile zu bilden, jedes mit einer ersten Samtoberfläche, die durch die geschnittenen Garnfasern definiert wird, und einer zweiten, entgegengesetzten, flachen Oberfläche; **gekennzeichnet durch** den zusätzlichen Schritt des Anhebens der zweiten flachen Oberfläche, damit die zweite Stoffoberfläche gevleht wird.

2. Verfahren nach Anspruch 1, das ferner den Schritt des Bürstens und Scherens der gevlehten Stoffoberfläche jedes der Stoffteile umfasst.

3. Verfahren nach Anspruch 1, bei dem der Stoff aus synthetischem Garn hergestellt ist, der ausgewählt wird aus der Gruppe, die besteht aus: Polyester, Acryl, Nylon und Olefin.

4. Verfahren nach Anspruch 1, bei dem der Stoff aus Naturgarn hergestellt wird, ausgewählt aus der Gruppe, die aus Wolle und Baumwolle besteht.

5. Verfahren nach Anspruch 1, bei dem der Stoff aus modifizierten natürlichen Materialien hergestellt ist, ausgewählt aus der Gruppe, die aus Rayon und Acetat besteht.

6. Verfahren nach Anspruch 1, bei dem der Schritt des Anhebens das Aufrauen der zweiten flachen Oberfläche umfasst.

Revendications

1. Procédé pour la fabrication d'une étoffe double face, comprenant les étapes consistant à :

tricoter un tissu maille tridimensionnel sur un métier à tricoter à double barre présentant une première couche de tissu, une seconde couche de tissu et une pluralité de fibres de filasse reliant entre elles les deux couches de tissu ;

pratiquer un sectionnement le long de la pluralité de fibres de filasse, pour séparer lesdites couches de tissu en vue de former une paire de pièces tissées présentant chacune une première surface veloutée définie par lesdites fibres de filasse sectionnées, et une seconde surface plane opposée ; **caractérisé par** l'étape additionnelle consistant à gratter ladite seconde surface plane, en vue de napper ladite seconde surface du tissu.

2. Procédé selon la revendication 1,- englobant en outre l'étape consistant à brosser et à rebrousser la surface de tissu nappé de chacune des pièces tissées.

3. Procédé selon la revendication 1, dans lequel ledit tissu est fabriqué à partir d'un fil synthétique choisi au sein du groupe comprenant un polyester, un acrylique, du Nylon et une oléfine.

4. Procédé selon la revendication 1, dans lequel ledit tissu est fabriqué à partir d'un fil naturel choisi au sein du groupe comprenant de la laine et du coton.

5. Procédé selon la revendication 1, dans lequel ledit tissu est fabriqué à partir de matériaux naturels modifiés, choisis au sein du groupe comprenant de la rayonne et un acétate.

6. Procédé selon la revendication 1, dans lequel ladite étape de grattage comprend un lainage de ladite seconde surface plane.

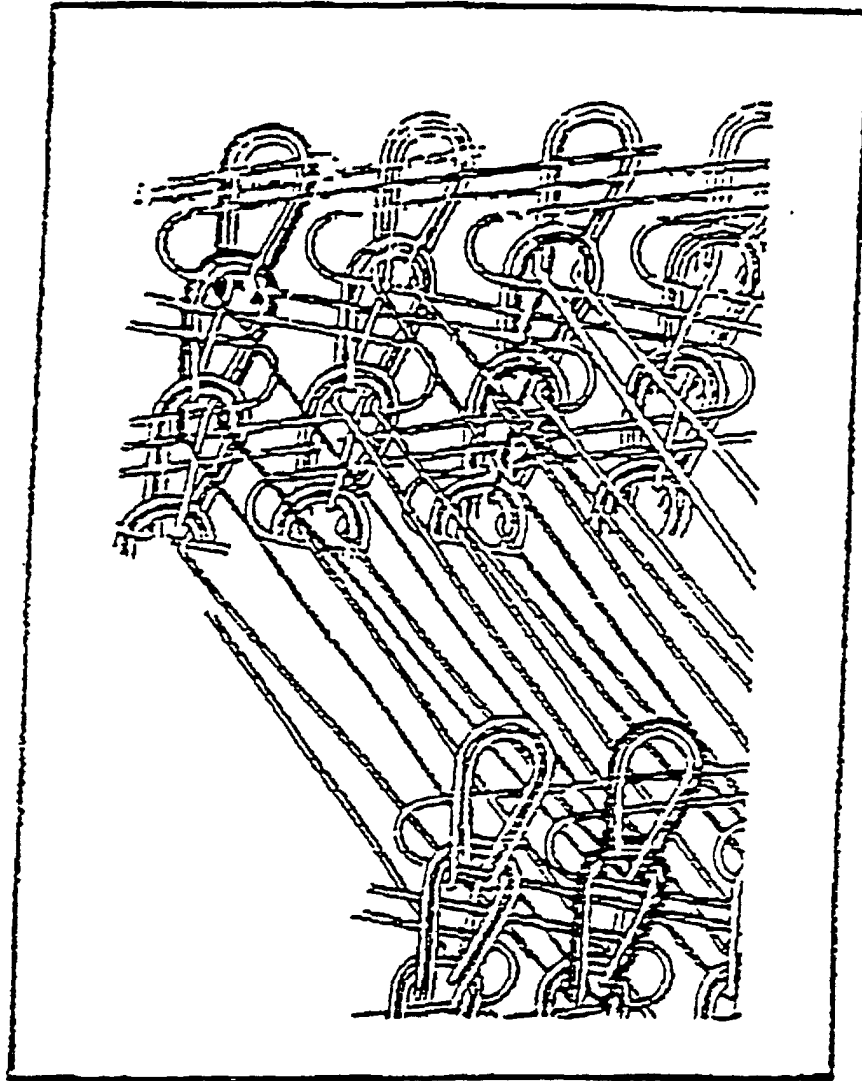


FIG. 1

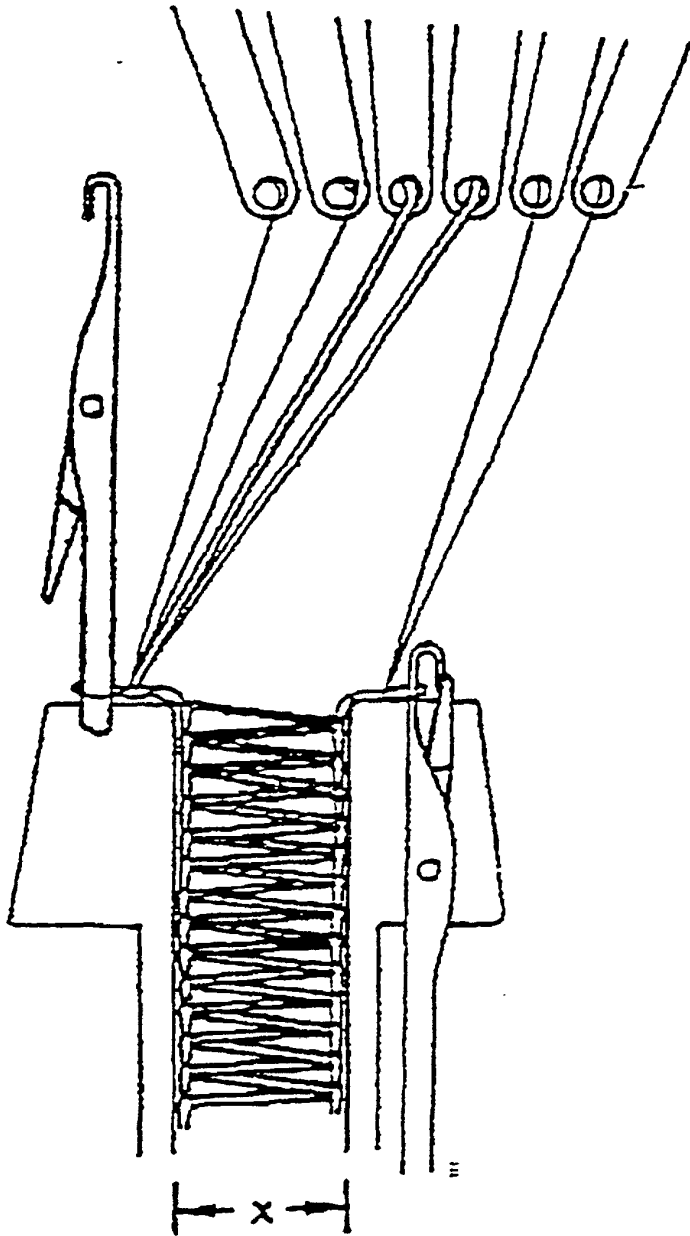


FIG. 2

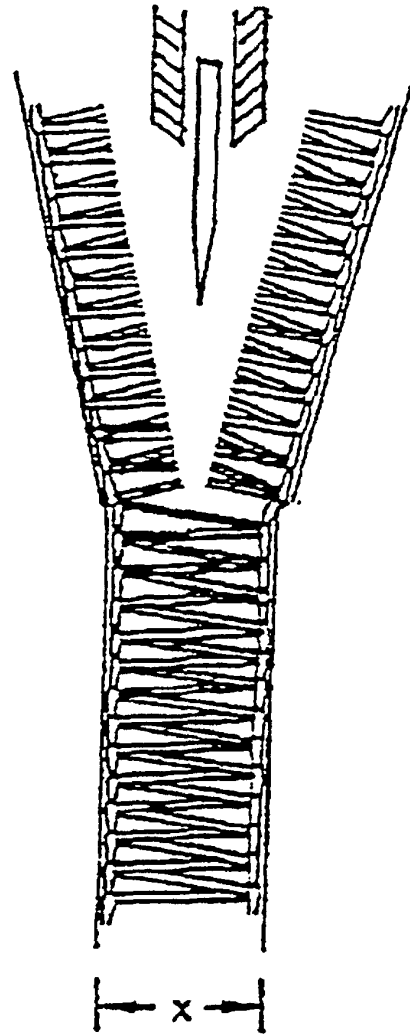


FIG. 3