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(54) **Chenille yarn and woven fabric**

(57) The invention is related to a chenille yarn that has excellent fire resisting features, and that at the same time provides the woven fabric produced with this yarn with its excellent abrasion resistance and its shiny aspect. Preferably, the yarn includes a pile consisting of an intimate mixture of acrylic and modacrylic fibres, wherein

the portion of modacrylic fibres is situated between 50% and 85%.

The invention also relates to a pile woven fabric created using pile yarn that preferably consists of a mixture of acrylic and modacrylic fibres.

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Description

Field of the invention

[0001] The present invention is related to chenille yarn and woven fabric. These are provided with a so-called pile, i.e. upright fibres offering the fabric its velvety appearance. The invention is related to a specific kind of pile yarn meant for the manufacture of such woven fabric as well as the woven fabric itself.

State of the art

[0002] Furniture fabrics are woven or knitted textiles that are used for the upholstery of seating furniture. A distinction can be made between velvet woven fabrics and flat furniture fabrics. Velvet woven fabrics are produced on wire looms, face-to-face weaving looms or by alternative processes, such as flock. Flat woven fabrics, however, are accomplished through classic weaving looms.

[0003] As compared to velvet woven fabrics, the majority of flat furniture fabrics have a limited wear-resistance. The furniture fabrics' wear-resistance is usually tested according to the EN 14465 or BS2543 standard and is expressed in a number of cycles "martindale".

[0004] Chenille furniture fabrics are flat furniture fabrics, for which chenille yarns are used as wefts. A chenille yarn consists of a core yarn that, in its turn, consists of at least two yarns, which are twined around each other and in between which a chenille pile, i.e. a short pile yarn, is jammed. This chenille pile is obtained by winding a yarn around a flat two part body, between which a circular rotating blade revolves. By means of drive wheels to the body's left and right, the yarn is driven onto the circular rotating blade, so that a pile layer arises at both sides of the body. At the pile layer's left and right sides, a core thread is carried along, which is twined as soon as the pile is cut. The twining of the core yarns anchors the pile and thus the chenille yarn is created.

[0005] Frequently used textile fibres in the chenille yarns' chenille pile consist of acrylic, viscose, cotton, polyester or polypropylene fibres. Hence, these chenille yarns are pile yarns that provide the flat woven fabric with its pile character. The use of chenille yarns in flat woven fabrics generally has a positive influence on their wear resistance.

[0006] So as to obtain furniture fabrics with a shiny aspect, chenille yarns of which the pile consists of either acrylic or viscose are generally used.

[0007] With respect to flammability, a distinction has to be made between the usual dry spun acrylic, being a copolymer that consists of acrylonitrile for at least 85%, and modacrylic, which comprises between 85 and 35% of acrylonitrile. Modacrylic also includes a substantial amount of halogenic compounds. Adding an Antimony Compound to modacrylic can further improve its fire resistance. Chenille yarns with a pile made of plain acrylic,

however, do not sufficiently resist fire (no fire retarding). The LOI index, being a measure for a material's fire resistance, is situated between 18 and 20 for plain acrylic, between 25 and 30 for modacrylic, and modacrylic with antimony has a LOI value situated between 28 and 36. PVC fibres have an even higher LOI value, namely 35 - 40, but they are hard to dye and weave.

[0008] Textile materials containing a sufficient amount of modacrylic combined with a certain amount of cellulose fibres (cotton or viscose fibres) do have excellent fire resisting features and meet the current fire standards. They have, nevertheless, a weak abrasion resistance and additionally reveal a lifeless and dull aspect when compared to dry spun acrylic.

[0009] For specific markets, mainly the British market, furniture fabrics for residential use have to meet certain fire behaviour requirements for seating furniture (cfr. British BS 5852 part 1 standard; ignition sources 0 & 1 - cigarette & match), and are therefore always tested in combination with a foam. An adequate fire resistance (fire retarding feature) can, amongst others, be obtained through:

- the combined use of a non-fire resistant furniture fabric with a fire resistant interliner; this interliner may either be laminated with the furniture fabric or not. Such fabric must contain at least 75% of natural materials or viscose.
- the use of a fire resistant furniture fabric of which the fire retarding effect is obtained through a fire resistant coating being applied at the back of the furniture fabric. Frequently used coatings are foamed acrylates to which substantial amounts of fire retarding additives have been added.
- the use of a fire resistant furniture fabric for which fire retarding textile fibres are used.

Option 1 is significantly more expensive than the other options due to the use of both a woven fabric and an interliner. Additionally, the requirement as to composition prevents many furniture fabric constructions from being applied. Consequently, this solution is rarely applied in practice.

Option 2 has as a disadvantage that, due to the FR coating layer being applied, the furniture fabric loses, to a considerable degree, both its elasticity and the comfort linked thereto.

Option 3 can only be applied by putting in certain specific fibres such as modacrylic or PVC. These fire retarding fibres, however, have only a limited wear resistance and lend a lifeless aspect to the furniture fabric.

[0010] Furniture fabrics for public use must meet other, more rigid standards. In Great-Britain BS5852 Part 2 is applicable to this end, a standard that is often used in other countries as well. So as to meet this standard, many fabrics are often coated with fire resistant latex. The

standard is, however, so rigid that a considerable number of fabrics cannot be treated, or that the treatment will not guarantee that they will meet the standard repeatedly. As these fabrics have to comply with very strict criteria as to their abrasion resistance, the use of 100% modacrylic as pile yarn (as well in chenille woven fabric as in pile woven fabric) is subject to many restrictions and non-optimal.

[0011] Patent US6107218A relates to a chenille yarn and a method for producing such chenille yarn. This chenille yarn is equipped with a core yarn consisting of at least two components, namely a low-melting and a high-melting core yarn. During the production process, the low-melting core yarn is melted and thus anchors the chenille pile in the yarn. This type of solution has the advantage that the pile is anchored in a better way, but it does not render the pile yarn itself any stronger. Additionally, this solution requires the use of an expensive melt yarn.

Aim of the invention

[0012] The aim of the invention is to produce a pile woven fabric, which meets specific standards as to fire behaviour, wear-resistance, and which, in addition, has an aspect that is both lively and full.

Summary of the invention

[0013] The invention concerns a chenille yarn and a chenille woven fabric, as is described in the appended claims.

[0014] The present invention hence in the first instance relates to a chenille yarn, of which the pile consists of an intimate mixture of two kinds of fibres, one kind of fibre having fire-resisting properties. This type of chenille pile (i.e. the short pile yarn being jammed between the core yarns during the production of chenille yarn) is obtained by mixing both components when opening the fibres before spinning takes place, this being the first stage of the spinning process in which the fibres of various bales are brought together and in which the rather compact piling of the fibres is rendered lighter. A second possibility consists in mixing the different components during the processing of the slivers on the drawing frames. During this process the fibres are stretched and more thoroughly mixed, and the slivers' width is adjusted for spinning.

[0015] According to the invention, the pile of the chenille thread consists of an intimate mixture of acrylic as a non fire-resistant material and modacrylic as fire-resistant material, the portion of modacrylic in the pole being situated between 50% and 85%. If the portion of modacrylic is smaller than 50%, the pile yarn's fire-resistance capacity is insufficient. When the modacrylic portion exceeds 85%, the wear-resistance is insufficient, and the woven fabric will have an insufficiently lively aspect. The core yarns that jam the chenille pile can either consist of 100% fire resistant, non-fire resistant or a mixture of both

in any proportion. The core yarns can be made of the same material as the pile yarn, i.e. of the same mix of acrylic/modacrylic, the modacrylic portion being situated between 50% and 85%. Alternatively, the core yarns exclusively consist of modacrylic. According to a particular embodiment, the core yarns consist of a non-fire retarding material (e.g. regular acrylic) so as to optimize the final product's construction from a price economic point of view, and since they are anyhow protected by a pile yarn coat around the core yarns. Finally, the core yarns can be made of other materials (e.g. cellulose).

[0016] It was established that a furniture fabric that was produced using this yarn, still meets the BS5852 standard, and, moreover, demonstrates an excellent abrasion resistance as well as a lively aspect. Additionally, the mixture of acrylic and modacrylic fibres in the pile yarn allows a reduction of the cost price.

[0017] The method for producing chenille yarn according to the invention does not differ from the known production methods. It suffices to apply one of these methods while using the above mix of, preferably, modacrylic and acrylic fibres.

[0018] A second production method according to the invention consists in a so-called 'pile woven fabric', which is not made from chenille yarn but by means of a technique characterised by the creation of yarn loops during weaving, the latter being either subsequently cut, thus causing upright fibres that do also form a 'pile' to appear, or not cut, so that a corduroy fabric is created. In this method, the pile or loop yarn is formed by a yarn that consists of a mix of acrylic and modacrylic fibres comprising a portion of modacrylic fibres between 50% and 85%. This type of yarn is obtained by mixing both components while the fibres are opened, before spinning takes place, this being the first stage of the spinning process, which involves bringing together the fibres from various bales, and during which the rather compact piling of fibres is rendered lighter. A second possibility consists in mixing the different components while the fibre ends are treated on the stretch units; this process involves stretching the fibres and mixing them more thoroughly, and adjusting the fibre ends' width for spinning. If the portion of modacrylic fibres is smaller than 50%, then the pile yarn's fire-resistance capacity is insufficient. When the modacrylic portion exceeds 85%, the wear-resistance is insufficient, and the woven fabric will have an insufficiently lively aspect.

Detailed description of a specific use of the invention

[0019] One of the articles produced by the applicant according to the invention, is woven on a polyester chain (PES ring spun Ne 20/2 with 37 threads per cm) and uses 700 wefts of acrylic chenille (Nm 4.85) a meter, 700 wefts open end spun cotton (Ne 6A/l) a meter and 700 wefts polyester continuous filament (2*167dtex) a meter. In order to render the article fireproof in accordance to

BS5852 Part 1, the fabric has to be treated with fire retarding latex.

[0020] However, if the chenille is replaced by a chenille thread of which the pile consists of an intimate mixture of acrylic and modacrylic in a proportion of 1/3, 2/3 with an Nm 3.75, and half of the open end spun cotton by a Modacrylic thread Nm 10/1, then a woven fabric containing a sufficiently high abrasion, which is fire resistant according to BS5852 Part 1; Ignition sources 0 & 1 (cigarette and match) and which has a lively and attractive aspect.

[0021] Comparative tests have been carried out on furniture fabric of the invention quality with respect to the regular BS 2543 standard for abrasion resistance of woven fabrics. According to this standard, the fabric must withstand at least 20000 'Martindale' cycles. The fabric of which the chenille pile consists of 100% modacrylic failed after 16000 cycles. The one of which the chenille pile consists of a mixture of modacrylic and acrylic, according to the invention, withstood the required 20000 cycles.

[0022] The invention variant's fire resistance was also measured in relation to the BS5852; part 1, ignition source 0 and 1 standard.

Source 0 relates to burns by a cigarette. For each tested Invention variant consisting, according to the invention, of a mixture of acrylic and modacrylic fibres in the pile, the following results were achieved:

Source 0 (cigarette): damage is limited to scorch marks limited to the locations where the cigarette had touched. The cigarette was extinguished after \pm 21 minutes. The fabric did neither show any progressive inflammation nor did it show any smouldering.

Source 1 (Butane gas flowing at 45ml/min at 25°C): burning stopped 1 second after the burner had been turned down. No progressive smouldering was established.

Conclusion: the furniture fabric consisting of a chenille pile according to the invention, does indeed meet the fire resistance requirements, despite its lower modacrylic fibre content. As, with respect to Source 1, the standard requires burning to stop within 120 seconds, the 1 second continued burning time is a very reliable result.

In relation to Source 0, the applicable continued burning time according the standard is one hour. For this case, the standard is amply met as well.

Claims

1. Chenille yarn created from two or more core threads with a pile yarn jammed in between, the pile yarn consisting of a mixture of acrylic and modacrylic fibres, **characterised in that** the mixture's portion of modacrylic fibres is situated between 50% and 85%.

2. Chenille yarn according to claim 1, **characterised in that** the core threads are either 100% fire resistant, non-fire resistant, or composed of a mixture of both.

3. Chenille yarn according to claim 2, **characterised in that** the core threads consist of the same mixture of acrylic and modacrylic fibres as the pile yarn.

4. Chenille yarn according to claim 2, **characterised in that** the core threads consist completely of modacrylic fibres.

5. Chenille yarn according to claim 2, **characterised in that** the core threads consist completely of acrylic fibres.

6. Chenille yarn according to claim 2, **characterised in that** the core threads consist of cellulose.

7. Woven fabric created using chenille yarn according to one of the claims 1 to 6.

8. Furniture woven fabric created using chenille yarn according to one of the claims 1 to 6.

9. Pile woven fabric created using a pile yarn, which is comprised of a mixture of acrylic and modacrylic fibres, **characterised in that** the mixture's portion of modacrylic fibres is situated between 50% and 85%.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 1 369 509 A (RAGOLLE NV) 10 December 2003 (2003-12-10) * claims 1,3,4,8 *	1,2,4,5, 7-9	D02G3/42 D02G3/44
A	----- GB 988 072 A (MORTON SUNDOUR FABRICS LIMITED) 7 April 1965 (1965-04-07) * claim 1 *	6	
A	----- DE 74 36 681 U (GIRMES-WERKE AG, 4155 GREFRATH) 6 May 1976 (1976-05-06) * claims 1,4 *	9	
A	----- US 5 718 129 A (MAKIYAMA ET AL) 17 February 1998 (1998-02-17) * claims 1-3 *	9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			D02G D04D D03D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 October 2005	Examiner D'Souza, J
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 44 7096

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-10-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1369509	A	10-12-2003	BE 1014866 A5	04-05-2004
GB 988072	A	07-04-1965	NONE	
DE 7436681	U	06-05-1976	NONE	
US 5718129	A	17-02-1998	CN 1136609 A	27-11-1996
			JP 8209508 A	13-08-1996

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6107218 A [0011]