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(54) REINFORCEMENT MATERIAL FOR LEATHER GOODS OR FOOTWEAR

(57) The present invention relates to a reinforcement material for use in the field of leather goods and footwear.

In particular, the invention relates to a reinforcement material for leather goods or footwear, consisting of a support layer made of cotton impregnated with a water-based biodegradable polymer of an aliphatic polyurethane nature, wherein the surface of the reinforcement material is sanded.

The non-biodegradable alternatives include soft polyacrylic resins (Tg <0), natural latex or SBR - soft *styrene butadiene rubber.*

Leather goods or footwear obtainable with said reinforcement material are also described, as well as a method for the manufacture thereof.

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Description

Technical field of the invention

[0001] The present invention relates to a reinforcement material for use in the field of leather goods and footwear.

Background art

[0002] In the field of leather goods and footwear, reinforcement materials are commonly used which are adapted to support and give body to the leathers to which they are coupled, which are often very soft and sagging and of low thickness.

[0003] Such reinforcement materials must therefore have anti-crease properties, so as to give roundness and fullness to the leather and to prevent it from being marked by the reinforcement material itself.

[0004] Another important feature, especially in use with footwear, is the anti-slip property. In fact, the reinforcement material will form the inner surface of the upper in contact with the foot, whereby it is important that the foot does not slide inside the shoe.

[0005] The reinforcement material must also be compatible with the glues or mastics commonly used in such fields and be soft and velvety to the touch. Other desirable properties should be water repellency and biodegradability.

[0006] The reinforcement materials commonly used in the leather goods and footwear field are:

- so-called "camoscina" or "synthetic leather lining", consisting of NBR rubber (acrylonitrile butadiene rubber) impregnated on a non-woven polyester support;
- polyurethane-based microfiber with a non-woven support characterized by a nylon/PES/PP fiber blend.

[0007] Both materials are obtained through a coagulation method and any subsequent splitting to obtain the thinner desired thicknesses.

[0008] Such reinforcement materials have some of the properties requested by the use described above, but certainly not biodegradability.

[0009] Water repellency is also commonly conferred by subsequent chemical treatments, which can have a further negative impact on both biodegradability and eco-sustainability.

Summary of the invention

[0010] Therefore, the need is felt to provide a reinforcement material which, in addition to having the essential features for the use thereof in the leather goods and footwear field, also has a high biodegradability and is environmentally friendly even in the production step. Such material must also have a low cost.

[0011] Such a problem is solved by a reinforcement material for leather goods and footwear as defined in the appended claims, the definitions of which form an integral part of the present description for the purpose of the sufficiency of description.

[0012] The object of the present invention is a reinforcement material for leather goods or footwear, consisting of a support layer made of cotton impregnated with a water-based biodegradable polymer of an aliphatic polyurethane nature, in which the surface of the reinforcement material is sanded. The non-biodegradable alternatives include soft polyacrylic resins (Tg <0), natural latex or soft SBR *-styrene butadiene rubber.*

[0013] A further object is a leather goods or footwear item comprising the reinforcement material according to the invention coupled to a layer of leather.

[0014] Still another object of the invention is a method for obtaining the reinforcement material according to the invention, comprising the following steps:

a) impregnating a cotton fabric with said impregnating polymer by means of a padder impregnation system;
b) drying by means of a stenter;
c) sanding the surfaces of both faces of the impregnated and dried fabric.

[0015] Further features and advantages of the present invention will become more apparent from the description of some embodiments, given by way of nonlimiting example herein below.

Brief description of the drawings

[0016] Figure 1 depicts a simplified diagram of the production cycle of the reinforcement material of the invention.

Detailed description of the invention

[0017] The reinforcement material according to the present invention consists of a support layer made of cotton impregnated with a water-based biodegradable impregnating polymer of an aliphatic polyurethane nature, in which the surface of the reinforcement material is sanded.

[0018] The non-biodegradable alternatives include soft polyacrylic resins (Tg <0), natural latex or soft SBR *-styrene butadiene rubber.*

[0019] For the purposes of the present invention, the term "consisting of" means both "comprising" and "consisting of". The term "comprising" in turn indicates the possible presence of other components in combination with a layer of cotton and impregnating polymer and/or the possible presence, on one or both sides of the reinforcement material as defined above, of an adhesive film. The term "comprising", on the other hand, indicates the presence of other layers or films beyond those defined

so far.

[0020] In preferred embodiments, the support layer is made of a circular knitted cotton fabric (jersey) or an orthogonal knitted cotton fabric. More preferably it is a cotton jersey. Preferably, the support layer is made of 100% cotton jersey brushed from two sides, thus of renewable vegetable origin.

[0021] By virtue of the chemical nature thereof, cotton jersey allows meeting the biodegradability requirement, while the circular knit structure thereof ensures a round touch, easily moldable and deformable during the application step, as well as a high dimensional stability to cutting.

[0022] In preferred embodiments, the impregnating polymer is an aqueous dispersion of polyurethane obtained by polymerization of hexamethylene-diisocyanate (HDI) and adipic acid-1,6-hexanediol, having about 40% solid content by weight. Preferably, said polymer has a weight average molecular weight of about 330,000, a glass transition temperature (Tg) of about -53°C and a particle size distribution with a mode of about 160 nm and having a light fastness 7 according to DIN EN ISO 105-B02. For indicative purposes, such a polymer will degrade in 52 days with a biodegradability index of 82% according to ISO 14855-1 (2012) or according to EN 13432 and ASTM D 6400.

[0023] The reinforcement material according to the invention can be obtained, starting from a cotton fabric as a support layer, by the following method, comprising the following steps in sequence:

a) impregnating a cotton fabric with said impregnating polymer by means of a padder impregnation system;
b) drying by means of a stenter;
c) sanding the surfaces of both faces of the impregnated and dried fabric.

[0024] The sanding is preferably carried out by means of sandpaper called "AG 513ER" with silicon carbide grain P600 with closed grain coating. The sanding was carried out so as to remove only the surface layer of the item (0.04 mm $\pm$0.01 mm), whereby the fabric structure is not damaged.

[0025] The stenter is a machine conventionally used for quick drying at a high temperature which allows a fast thermofixing of the impregnant. A simplified diagram of the usable plant is shown in figure 1.

[0026] With reference to figure 1, the reference numeral 1 indicates the cotton fabric, which is previously passed through a straightening-weft unit, so as to obtain a well-taut fabric which then passes through a padder impregnation module 4. After impregnation with the polymer as defined above, the fabric passes through an enlarger cylinder 3, then through the stenter, where a series of burners-dryers B dry/thermofix the polymer impregnated in the cotton fabric. The number 6 indicates the grilles between which the fabric is passed and the number 5 indicates the drains.

[0027] The reinforcement material is then wound back into a reel at the end of the treatment.

[0028] After the steps of impregnating and drying in the stenter, the reinforcement material undergoes a sanding process on both sides, a fundamental finishing to confer the features sought, mentioned above, and to confer the "velvety" or "suede" touch which distinguishes this particular class of reinforcement material. Furthermore, the sanding is useful to be able to more easily adhere the mastics and adhesives frequently used in footwear factories to the reinforcement material, or alternatively to be able to better adhere a coupled extruded adhesive film.

[0029] The fabric sanding machine is conventional machinery, in which the fabric is rotated on passing cylinders, kept well taut by a "piece tensioner" to avoid creases, and rubbed by a roller covered with fine-grained emery paper. The different effects are obtained with the use of multiple rollers, with the different grain of the emery paper and with the distance of the roller from the fabric. This is regulated by pressure cylinders which distance or approach it to the abrasive surface. A special suction system collects the fine dust produced by the processing.

[0030] In certain embodiments, the reinforcement material can be pre-coupled, on one or both sides, to an extruded adhesive film, so as to facilitate subsequent application to the leather by the leather goods or footwear manufacturer.

[0031] The reinforcement material of the invention is water-repellent (according to the "non-wicking test" i.e., the non-rise by capillarity) without addition of chemical auxiliaries, an aspect of considerable importance given by the particular hydrophilic nature of cotton-based fabrics. This inherent feature allows avoiding the use of chemical additives which would contribute to the decrease of the biodegradability and environmentally-friendly features of the product, which instead, are preserved.

[0032] The water repellency test was carried out with the method of UNI EN ISO 19074:2015 - Determination of water absorption by capillary action (wicking test): Conditioning and test atmosphere: 23$\pm$1 °C, 50$\pm$3 %R.U. Results: Water rise height = 0.4 mm.

[0033] The reinforcement material of the invention has anti-crease properties, anti-slip effect and extreme softness/roundness, resulting in a smooth and velvety feel to avoid any alteration to the touch of particularly thin leathers and/or uppers.

[0034] The reinforcement material of the invention also allows a reduction in processing times by virtue of the excellent skimming, which allows the end user (shearer/footwear factory) to save the second chamfering step, the compatibility thereof with typical adhesive mastics in the application use at footwear factories and in general the easy machinability and deformability.

[0035] The main advantages of the production method, when compared with the coagulation procedures of the

background art, deriving from the different type of plant, concern:

- elimination of infrared plates for the coagulation of the binder;
- the elimination and consequent use of additives such as coagulants, harmful to the environment;
- the elimination of the washing step after the coagulation with the double advantage related to both the water saving and the costs deriving from the possible waste disposal of the process waters.

[0036] The material of the invention can form a reinforcement component created by coupling said product to a layer of leather with which footwear of various types, in particular the upper of said footwear, and leather goods such as bags, backpacks, jackets, etc., can be manufactured.

[0037] It is apparent that only some particular embodiments of the present invention have been described, to which those skilled in the art will be able to make all changes required for the adaptation thereof to particular applications, without however departing from the scope of protection of the present invention.

Claims

1. A reinforcement material for leather goods or footwear, consisting of a support layer made of cotton impregnated with a water-based biodegradable polymer of an aliphatic polyurethane nature, wherein the surface of the reinforcement material is sanded.

2. The reinforcement material according to claim 1, wherein the support layer is made of a circular knitted cotton fabric (jersey) or of an orthogonal knitted cotton fabric, preferably 100% cotton jersey brushed from two sides.

3. The reinforcement material according to claim 1 or 2, wherein the impregnating polymer is an aqueous dispersion of polyurethane polymer obtained by polymerization of hexamethylene-diisocyanate (HDI) and adipic acid-1,6-hexanediol, with about 40% solid content by weight.

4. The reinforcement material according to claim 3, wherein said polymer has a weight average molecular weight of about 330,000, a glass transition temperature (Tg) of about -53°C and a particle size distribution with a mode of about 160 nm.

5. The reinforcement material according to any one of claims 1 to 4, wherein an extruded adhesive film is coupled on one or both sides.

6. The reinforcement material according to any one of claims 1 to 5, wherein said reinforcement material has a biodegradability index of at least 90% according to ISO 14855-1 (2012).

7. The reinforcement material according to any one of claims 1 to 6, wherein said reinforcement material is inherently water-repellent as determined by the "non-wicking test", and has anti-crease properties and anti-slip properties.

8. A leather goods or footwear item comprising the reinforcement material according to any one of claims 1 to 7 coupled to a layer of leather.

9. A method for obtaining the reinforcement material according to any one of claims 1 to 7, comprising or consisting of the following steps:

   a) impregnating a cotton fabric with said impregnating polymer by means of a padder impregnation system;
   b) drying by means of a stenter;
   c) sanding the surfaces of both sides of the impregnated and dried fabric to a thickness reduction up to at most 0.04 mm $\pm$0.01 mm,

   wherein said method is carried out in the absence of solvents and coagulation.

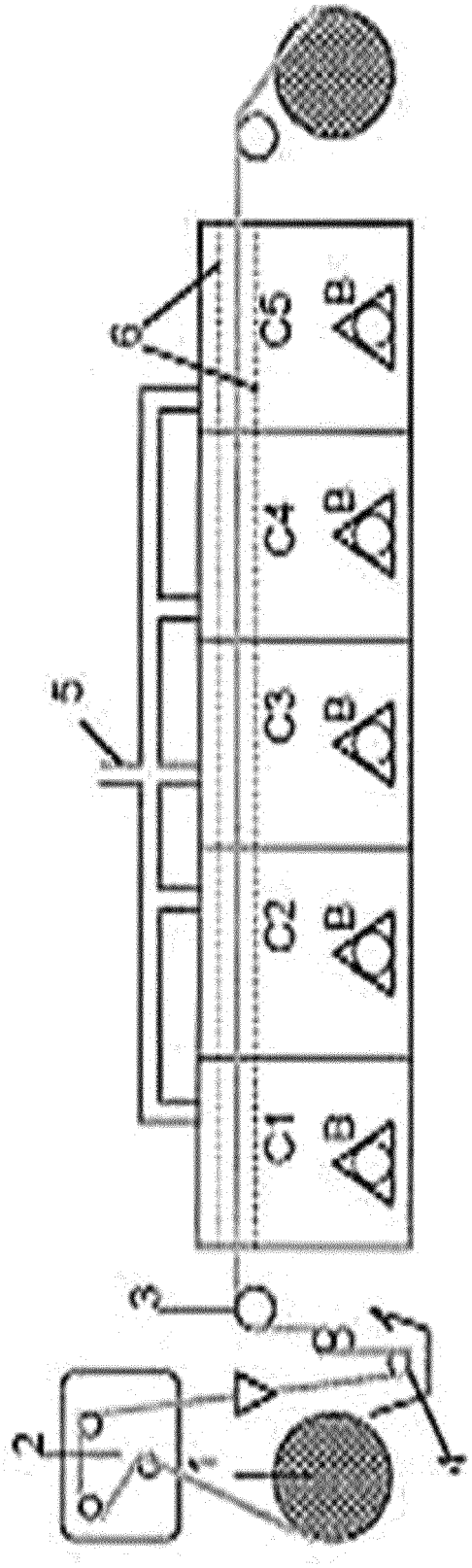

Figure 1

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EUROPEAN SEARCH REPORT

Application Number
EP 22 18 0882

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	7 November 2022	Barathe, Rainier

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X : particularly relevant if taken alone
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A : technological background
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EUROPEAN SEARCH REPORT

Application Number
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X : particularly relevant if taken alone
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