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(54) **Method for producing a woven/non-woven thermoadhesive product particularly for interfacings comprising dots melting at differential temperature, and a plant for implementing the method**

Verfahren zur Herstellung eines gewebten/nicht-gewebten thermoklebenden Produktes, insbesondere für Fixiereinlagestoffe mit auf unterschiedlichen Temperaturen heizschmelzbaren Punkten und Anlage zum Ausführen dieser Methode

Procédé pour la production des produits tissés/non-tissés thermocollants, notamment pour des doublures comportant des points thermofusibles aux températures différentes et une installation permettant la mise en oeuvre du procédé

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**EP-A- 0 503 204** **FR-A- 2 346 058**  
**US-A- 4 144 538**

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## Description

This invention relates to a method for producing a woven/non-woven thermoadhesive product particularly for interfacings comprising dots melting at differential temperature, in which heat-molten resins are extruded and deposited on the woven/non-woven fabric support and then covered with resin granules of a different melting point by means of a resin strewer. The fabric is then cleaned of all the excess deposited granules to leave it clean and ready for use. The present invention also relates to a plant for producing a woven/non-woven thermoadhesive product, the plant comprising a conveyor belt of low adhesive power. It is already known in the state of the art to produce textile supports of cotton, wool, polyamide or any other type of fabric or material, and to cover them with dots, lines or any other type of pattern formed from a thermoadhesive product of differential melting point. Although the known production systems apply the thermoadhesion concept and the double dot system they start by depositing resins in paste and powder form (see FR-A-2 346 058).

One of the main problems is that the fabric substrate undergoes thermal shock at the moment in which the adhesive material is deposited on it. A further often occurring drawback is that said thermoadhesive material can penetrate into the thickness of the fabric substrate and cause it to harden. In addition the feel of the fabric is strongly compromised.

In a known method of the aforesaid type a transfer support is covered with droplets of an at least partly thermoadhesive substance, these droplets then being heated to ensure adhesion.

The droplets are then brought into contact with the fabric without heating it, to enable the thermoadhesive substance to be transferred from the transfer support to said woven/non-woven substrate but without penetrating into the substrate.

Said system however uses a liquid solution. There is therefore the risk that by forming a wet base incorporating the resin, a so-called "snowflake" dot is formed, giving less constant adhesion.

The object of the present invention is therefore to provide a method for producing a product in woven/non-woven thermoadhesive form for use in the clothing field, which in the light of the drawbacks consequent on the use of methods of the known art offers two main characteristics, namely that the thermoadhesive substance which is deposited on the fabric substrate remains on the surface of the product, ie does not penetrate into it and therefore does not produce stiffening and traversing problems, and that the fabric substrate used, which can also be of non-woven type, is not subjected to excessive heating and hence does not suffer deterioration during production.

The invention therefore firstly provides a method for producing a woven/non-woven thermoadhesive product particularly for interfacings for use in the clothing field,

characterised by presenting dots melting at differential temperature and comprising the following processing stages in succession: melting heat-sensitive resins of any type and then extruding them onto an indented roll of low adhesion material; transferring the extruded material from the indented roll onto a preheated conveying transfer belt of medium adhesion material; preheating the material on the transfer belt and passing it from the transfer belt to a woven/non-woven substrate; activating with positive electrical charges; depositing resin microgranules having a melting point different from that of the base material; fixing the dots by passage through a micrometrically regulated cooled calender; deactivating the resin material with negative electrical charges; cleaning the woven/non-woven substrate by beating and blowing, followed by sucking off the material not retained by the substrate.

The invention also provides a plant for implementing said method, comprising a first indented roll of low adhesion material arranged to receive the thermoadhesive material by extrusion by a pump connected to it, first heating means positioned in proximity to the roll, guide and support means with a medium adhesion surface for thermoadhesive material transfer, a second discharge roll provided with associated second heating means, and cleaning means for the transfer support; said discharge roll being associated with a deviation and receiving roller positioned along a woven/non-woven product processing line along which means are also provided for strewing low melting-point resins over the thermoadhesive material, means for applying alternate positive and negative electrical charges to the thermoadhesive material, means for fixing the thermoadhesive material to the woven/non-woven substrate, beating means and blowing means associated with means for sucking off the excess material.

The invention will be more apparent from the ensuing description given with reference to the single accompanying drawing, which shows a schematic representation of a device for implementing the method of the invention.

In the figure the reference numeral 1 indicates an extruder of pump type, but which can equally be of another type, in which the granules of heat-sensitive material are melted. Any type of heat-meltable granule can be advantageously used, according to the method of the present invention, to form the substrate for the subsequent resin dot of differential melting point.

Preferably used are materials such as DPA, PeS, PVC etc., which are commercially available as granules. The extruded material is transferred via one end 2 of the extruder 1 to an indented roll 3, the indentations of which are in a number, diameter, depth and design which depend on the quantity of material to be deposited.

The extent of filling of the indentations 4 is limited by the doctor blade 5 positioned at the periphery of the roll 3.

The shape of the indentations in the roll 3 is chosen

in accordance with the dot shape to be obtained on the fabric. A preferred shape for example is a ring shape. The advantage of this shape is that the dot which then forms on the fabric layer tends to assume a dish shape, with the consequent advantage of offering a greater containing capacity for the resin microgranules which are later strewn over it in accordance with the method of the invention. The indented roll 3, onto which the molten material is fed at a temperature exceeding 200°C, is conveniently controlled to a temperature of 150-180°C, and being of low adhesion material is able to easily transfer the thermoadhesive material dots onto a belt of medium adhesion material at the point in which it comes into contact with the roll 3. Said belt 6 forms part of a conveying system for the thermoadhesive material dots 7, which comprises an assembly of temperature-controlled rollers 8 arranged to enable the belt to slide along the roll 3 at one end, and at the other end by means of a discharge roll 9 to discharge the dots 7 onto a woven/non-woven substrate 10 running adjacent to it.

The belt 6 and the dots 7 can be conveniently temperature-controlled, at 150-180°C for the former and at 70-90°C for the latter, by two infra-red banks 12, 13 positioned at the periphery of the rolls 3 and 9. By the effect of the heating by the infra-red bank 13, the dots conveyed by the belt 6 undergo a change of state at their inner and outer surfaces to become molten dots.

When the belt 6 comes into contact with the discharge roll 9, which as stated is temperature-controlled at 70-90°C, it tends to cool down. As the constituent material of the belt is of low adhesion, the thermoadhesive dots pass from the belt surface to a woven/non-woven substrate 10 passing around the roll 9, as this substrate is of greater adhesion.

One of the advantages of the method of the invention compared with the traditional method is that the woven/non-woven substrate is not subjected to thermal shock with consequences apparent only later, and hence resulting in a better feel and a saving in energy.

After transferring the thermoadhesive dots to the woven/non-woven substrate 10, the belt 6 proceeds along its endless path and is deviated by the rollers 8 to the indented roll 3. Of the rollers 8, one is a cold roller temperature-controlled at 30-50°C and is positioned immediately downstream of the roll 9 to cool the belt and enable it to be cleaned by a scraper 14 associated with the next roller. A collection tray 15 collects the pieces scraped from the belt so that they can be salvaged.

The fourth and last roller 8 returns the belt to a predetermined temperature to enable it to repeat the cycle by again collecting the extruded dots from the roll 3.

The woven/non-woven fabric is then moved through the subsequent stages of the method of the present invention by the following device.

The woven/non-woven fabric 10 which is wound in its basic state on a feed roller 17 is unwound and maintained tangential to the roll 9, as stated, by a deviation and receiving roller 18. The woven/non-woven fabric

which has now collected the thermoadhesive dots from the belt 6, is subjected to a positive electrostatic charge by passing over a charge applicator 19. The thermoadhesive dots thus charged with energy absorb in an optimum manner resin microgranules of different melting point strewn by a resin strewer arranged along the path of the fabric.

The woven/non-woven fabric is then passed through a further calender 22 maintained at a temperature of about 17-20°C, by which the resin microgranules strewn by the resin strewer 20 are incorporated into the thermoadhesive dots 7.

The device of the invention also comprises a negative charge applicator 23 for negatively charging the dots 7, and a series of carrier rollers 24 with a suction device interposed in a position corresponding with a blower 26 and a beater 27. These clean the woven/non-woven fabric by removing all those granules deposited on it which have not undergone incorporation, so as to leave on it only the thermoadhesive dots resulting from the superposing of two types of material of different melting point. A final reel 28 enables the processed woven/non-woven fabric to be wound in such a manner as to allow its inspection. The residual granules recovered by the suction device can be reused after filtering.

With the described system, as the basic dot is applied as molten resin rather than as a dispersion, its base is not wet, with the double advantage of saving the energy required for its drying and of preventing those microgranules of the lower melting point resin retained by the moisture at the base of the thermoadhesive dot becoming incorporated, by subsequent melting, into the fabric because of the fact that they are difficult to remove, with the result that the double dot formed in this manner is irregular.

The described method results in a perfectly frustoconical or drop-shaped dot, with resultant improvement both in adhesion and in the feel of the fabric.

## Claims

1. A method for producing a woven/non-woven thermoadhesive product particularly for interfacings for use in the clothing field, characterised by presenting dots melting at differential temperature and comprising the following processing stages in succession:

- melting heat-sensitive resins of any type and then extruding them onto an indented roll of low adhesion material;
- transferring the extruded material from the indented roll onto a preheated conveying transfer belt of medium adhesion material;
- preheating the material on the transfer belt and passing it from the transfer belt to a woven/non-woven substrate;

- activating with positive electrical charges;
  - depositing resin microgranules having a melting point different from that of the base material;
  - fixing the dots by passage through a micrometrically regulated cooled calender;
  - deactivating the resin material with negative electrical charges;
  - cleaning the woven/non-woven substrate by beating and blowing, followed by sucking off the material not retained by the substrate.
2. A method as claimed in claim 1, characterised in that the shape of the indentations in the indented roll of low adhesion material directly depends on the form of the melting dot to be provided on the woven/non-woven substrate.
3. A method as claimed in claim 1, characterised in that the heat-sensitive resins are in the form of granules.
4. A method as claimed in claim 1, characterised in that the extruded material is maintained at a temperature of between 70 and 90°C.
5. A method as claimed in claim 1, characterised in that the transfer belt of medium adhesion material is maintained at a temperature of between 150 and 180°C.
6. A method as claimed in claim 1, characterised in that after the extruded material has passed from it to the woven/non-woven substrate, the transfer belt is cooled to a temperature of between 30 and 50°C to facilitate its cleaning.
7. A plant for implementing the method claimed in claims 1 to 6, characterised by comprising a first indented roll (3) of low adhesion material arranged to receive the thermoadhesive material by extrusion by a pump (1) connected to it, first heating means (12) positioned in proximity to the roll, temperature-controlled guide and support means (6, 8) with a medium adhesion surface for thermoadhesive material transfer, a second discharge roll provided with associated second heating means (13), and cleaning means (14) for the transfer support; said discharge roll being associated with a deviation and receiving roller (18) positioned along the woven/non-woven product processing line along which means (20) are also provided for strewing low melting point resins over the thermoadhesive material, means for applying alternate positive and negative electrical charges to the thermoadhesive material, means (22) for fixing the thermoadhesive material to the woven/non-woven substrate, beating means (27) and blowing means (26) associated with means (25) for sucking off the excess material.
8. A plant as claimed in claim 7, characterised in that the first indented roll (3), constructed of low adhesion material, is provided with a temperature-controlling system to maintain it at a temperature of between 150 and 180°C.
9. A plant as claimed in claim 8, characterised in that the first and second heating means (12, 13) consist of infra-red banks.
10. A plant as claimed in claim 8, characterised in that the means for fixing the thermoadhesive material to the woven/non-woven substrate are a calender which is maintained at a temperature of between 17 and 20°C.
11. A plant as claimed in claim 8, characterised in that the guide and support means consist of an assembly of temperature-controlled rollers (8), of which at least one is controlled at a temperature of 30-50°C.

#### Patentansprüche

1. Verfahren zur Herstellung eines gewebten/nichtgewebten thermohaftenden Produktes, insbesondere für Einlagestoffe zur Verwendung im Bekleidungsbereich,
- gekennzeichnet durch**
- das Erzeugen von punktförmigen Teilchen, die bei unterschiedlichen Temperaturen schmelzen, wobei es die folgenden Bearbeitungsschritte umfaßt:
- Schmelzen von wärmeempfindlichen Harzen jeder Art, die danach auf eine eingekerbte Walze aus einem Material mit geringer Haftfähigkeit extrudiert werden;
  - Übertragen des extrudierten Materials von der eingekerbten Walze auf ein vorgeheiztes Transportförderband aus einem Material mit mittlerer Haftfähigkeit;
  - Vorheizen des auf dem Förderband befindlichen Materials und Übertragen des Materials von dem Förderband auf ein gewebtes/nichtgewebtes Substrat;
  - Aktivieren mit positiven elektrischen Ladungen;
  - Aufbringen von Harzmikrogranulat mit einem Schmelzpunkt, der unterschiedlich zu dem des Basismaterials ist;
  - Fixieren der punktförmigen Teilchen, indem sie einen mikrometrisch geregelten, gekühlten Kalender durchlaufen;
  - Deaktivieren des Harzmaterials mit negativen elektrischen Ladungen;
  - Säubern des gewebten/nichtgewebten Substrats durch Abklopfen und Wegblasen, gefolgt von Absaugen des nicht an das Substrat gebundenen Materials.

2. Verfahren nach Anspruch 1,  
**dadurch gekennzeichnet, daß**  
die Form der Einkerbungen in der eingekerbten Walze, die aus einem Material mit geringer Haftfähigkeit besteht, direkt von der Form des auf das gewebte/nichtgewebte Substrat aufzubringenden schmelzenden, punktförmigen Teilchens abhängt.
3. Verfahren nach Anspruch 1,  
**dadurch gekennzeichnet, daß**  
die wärmeempfindlichen Harze in Form von Granulat vorliegen.
4. Verfahren nach Anspruch 1,  
**dadurch gekennzeichnet, daß**  
das extrudierte Material auf einer Temperatur zwischen 70 und 90°C gehalten wird.
5. Verfahren nach Anspruch 1,  
**dadurch gekennzeichnet, daß**  
das Förderband aus einem Material mit mittlerer Haftfähigkeit auf einer Temperatur zwischen 150 und 180°C gehalten wird.
6. Verfahren nach Anspruch 1,  
**dadurch gekennzeichnet, daß**  
das Förderband auf eine Temperatur zwischen 30 und 50°C abgekühlt wird, um dessen Säuberung zu erleichtern, nachdem das extrudierte Material von ihm auf das gewebte/nicht-gewebte Substrat übertragen wurde.
7. Vorrichtung zum Durchführen des in den Ansprüchen 1 bis 6 beanspruchten Verfahrens,  
**gekennzeichnet durch**  
eine erste eingekerbte Walze (3) aus einem Material mit geringer Haftfähigkeit, die so angeordnet ist, daß sie das mittels einer ihr zugeordneten Pumpe (1) extrudierte thermohaftende Material aufnimmt, eine nahe der Walze angeordnete erste Heizvorrichtung (12), eine temperaturgeregelter Führungs- und Haltevorrichtung (6, 8) mit einer mittelstark haftenden Oberfläche zum Transport des thermohaftenden Materials, eine zweite Entladewalze, der eine zweite Heizvorrichtung (13) zugeordnet ist, und eine Säuberungsvorrichtung (14) für die Transport-Haltevorrichtung; wobei die Entladewalze mit einer Umlenk- und Aufnahmewalze (18) zusammenwirkt, die entlang der Bearbeitungsstraße für das gewebte/nichtgewebte Produkt angeordnet ist, entlang der auch eine Vorrichtung (20) zum Streuen von Harzen mit niedrigem Schmelzpunkt über das thermohaftende Material, Mittel zum abwechselnden Aufbringen positiver und negativer elektrischer Ladungen auf das thermohaftende Material, Mittel (22) zum Fixieren des thermohaftenden Materials an dem gewebten/nicht-gewebten Substrat, eine Abklopfvorrichtung (27) und eine Gebläsevorrich-

tung (26) vorgesehen sind, die mit einer Vorrichtung (25) zum Absaugen des überschüssigen Materials zusammenwirkt.

- 5 8. Vorrichtung nach Anspruch 7,  
**dadurch gekennzeichnet, daß**  
die aus einem Material mit geringer Haftfähigkeit gebildete erste eingekerbte Walze (3) mit einem Temperaturregelsystem ausgestattet ist, um sie auf einer Temperatur zwischen 150 und 180°C zu halten.
- 10 9. Vorrichtung nach Anspruch 8,  
**dadurch gekennzeichnet, daß**  
die erste und zweite Heizvorrichtung (12, 13) aus Infrarotbänken bestehen.
- 15 10. Vorrichtung nach Anspruch 8,  
**dadurch gekennzeichnet, daß**  
das Mittel zum Fixieren des thermohaftenden Materials auf dem gewebten/nichtgewebten Substrat ein Kalandrier ist, der auf einer Temperatur zwischen 17 und 20°C gehalten wird.
- 20 11. Vorrichtung nach Anspruch 8,  
**dadurch gekennzeichnet, daß**  
die Führungs- und Haltevorrichtung aus einer Anordnung von temperaturgeregelten Walzen (8) besteht, von denen wenigstens eine auf eine Temperatur von 30 bis 50°C geregelt ist.
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## Revendications

- 35 1. Procédé de production d'un produit tissé/non tissé thermocollant, en particulier pour des entoilages à utiliser dans le domaine de l'habillement, caractérisé en ce qu'il présente des points thermofusibles à des températures différentes et qu'il comprend les étapes ci-après, qui consistent à :
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- faire fondre des résines thermosensibles d'un type quelconque, puis les extruder sur un rouleau à empreintes constitué d'un matériau à faible adhérence ;
  - transférer la matière extrudée du rouleau à empreintes sur une courroie de transfert préchauffée, constituée d'un matériau à adhérence moyenne ;
  - préchauffer la matière sur la courroie de transfert et la faire passer de la courroie de transfert à un substrat tissé/non tissé ;
  - activer avec des charges électriques positives ;
  - déposer des microgranules de résine ayant un point de fusion différent de celui de matériau de base ;
  - fixer les points en les faisant passer au travers d'une calandre refroidie, à régulation
- 45 50 55

- micrométrique ;
  - désactiver la résine avec des charges électriques négatives ;
  - nettoyer le substrat tissé/non tissé par battage et soufflage, suivis d'une aspiration de la matière non retenue par le substrat.
2. Procédé selon la revendication 1, caractérisé en ce que la forme des empreintes aménagées dans le rouleau à empreintes constitué d'un matériau à faible adhérence dépend directement de la forme du point de matière fondue devant être disposé sur le substrat tissé/non tissé.
3. Procédé selon la revendication 1, caractérisé en ce que les résines thermosensibles se présentent sous la forme de granules.
4. Procédé selon la revendication 1, caractérisé en ce que la matière extrudée est maintenue à une température comprise entre 70 et 90°C.
5. Procédé selon la revendication 1, caractérisé en ce que la courroie de transfert constituée d'un matériau à adhérence moyenne est maintenue à une température comprise entre 150 et 180°C.
6. Procédé selon la revendication 1, caractérisé en ce que, après que la matière extrudée est passée de la courroie de transfert au substrat tissé/non tissé, la courroie de transfert est refroidie jusqu'à une température comprise entre 30 et 50°C pour faciliter son nettoyage.
7. Installation permettant la mise en oeuvre du procédé selon les revendications 1 à 6, caractérisée par le fait qu'elle comprend un premier rouleau à empreintes (3) constitué d'un matériau à faible adhérence et aménagé de façon à recevoir la matière thermosensible, obtenue par extrusion, par l'intermédiaire d'une pompe (1) qui lui est raccordée, des premiers moyens de chauffage (12) disposés au voisinage du rouleau, un guide à régulation de température et des moyens de support (6, 8) ayant une surface à adhérence moyenne pour le transfert de la matière thermocollante, un deuxième rouleau de décharge munis de deuxième moyens de chauffage associés (13), et des moyens de nettoyage (14) pour le support de transfert ; ledit rouleau de décharge étant associé à un rouleau de réception et de déviation (18) disposé le long de la ligne de traitement du produit tissé/non tissé, le long de laquelle sont également prévus des moyens (20) pour répandre des résines à bas point de fusion sur la matière thermocollante, des moyens permettant d'appliquer à la matière thermocollante des charges alternativement positives et négatives, des moyens (22) pour fixer la matière thermocollante au substrat tissé/non tissé, des moyens de battage (27) et des moyens de soufflage (26) associés à des moyens (25) servant à aspirer la matière en excès.
8. Installation selon la revendication 7, caractérisée en ce que le premier rouleau à empreintes (3), constitué d'un matériau à faible adhérence, est muni d'un système de régulation de température pour le maintenir à une température comprise entre 150 et 180°C.
9. Installation selon la revendication 8, caractérisée en ce que les premiers et deuxième moyens de chauffage (12, 13) consistent en des bancs à infrarouges.
10. Installation selon la revendication 8, caractérisée en ce que les moyens servant à fixer la matière thermosensible au substrat tissé/non tissé sont constitués d'une calandre maintenue à une température comprise entre 17 et 20°C.
11. Installation selon la revendication 8, caractérisée en ce que le guide et les moyens de support consistent en un ensemble de rouleaux à régulation de température (8), dont au moins l'un d'entre eux est régulé à une température 30-50°C.

