

[54] **METHOD FOR MANUFACTURING A FIBRE FLEECE LAMINATED WITH A FOIL AND A DEVICE FOR PERFORMING SUCH A METHOD**

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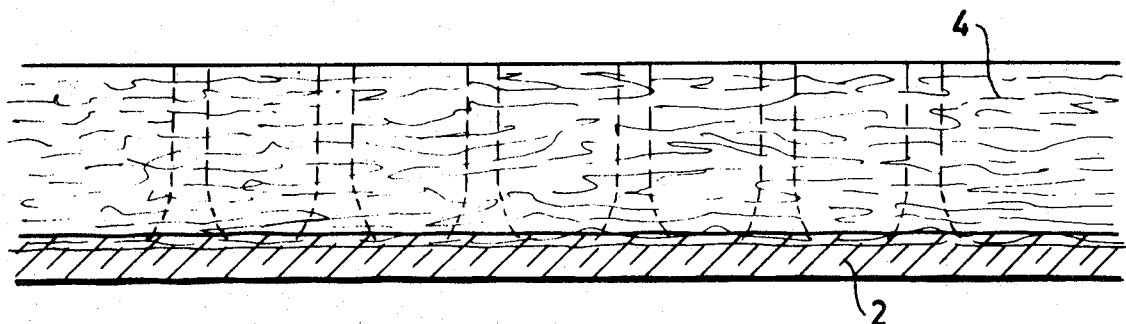
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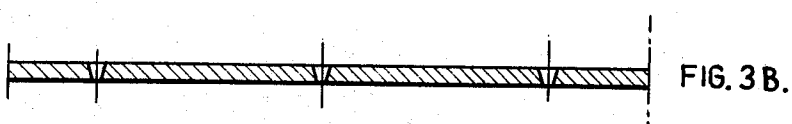
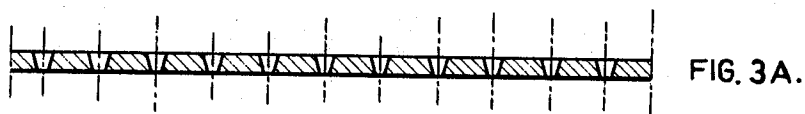
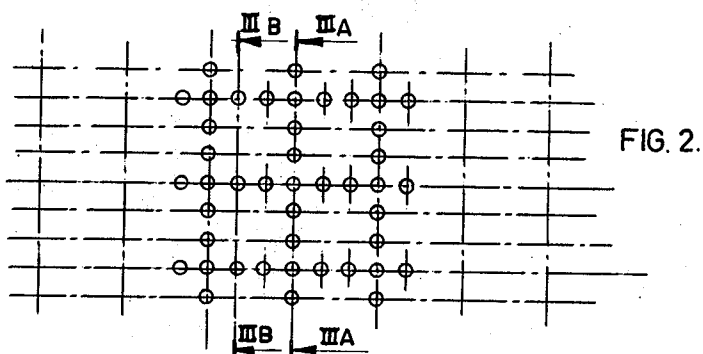
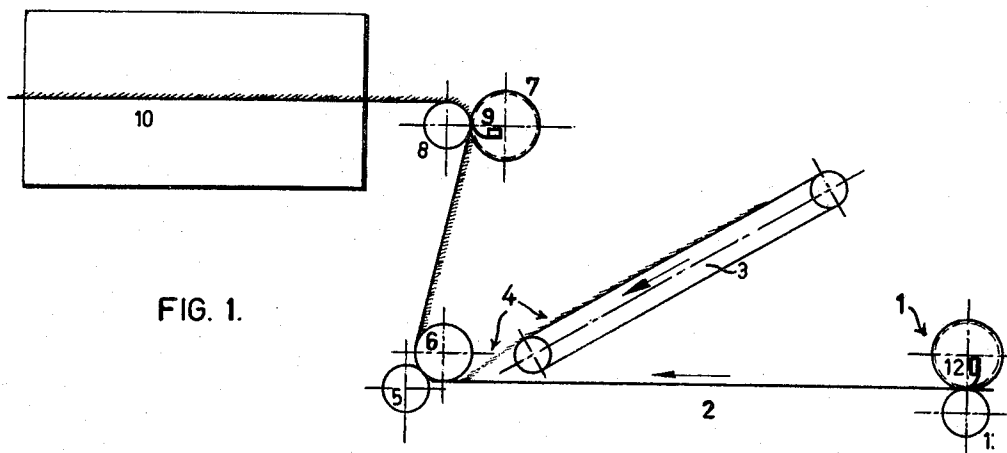
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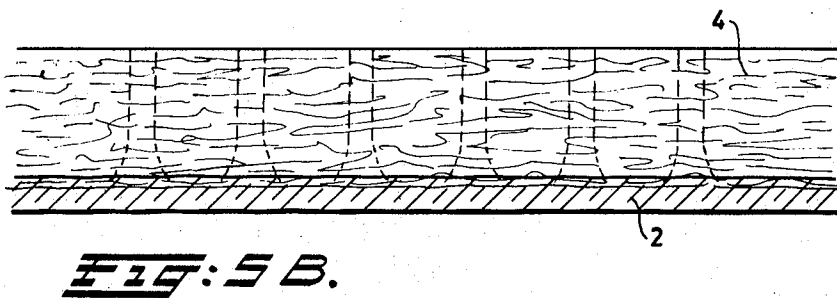
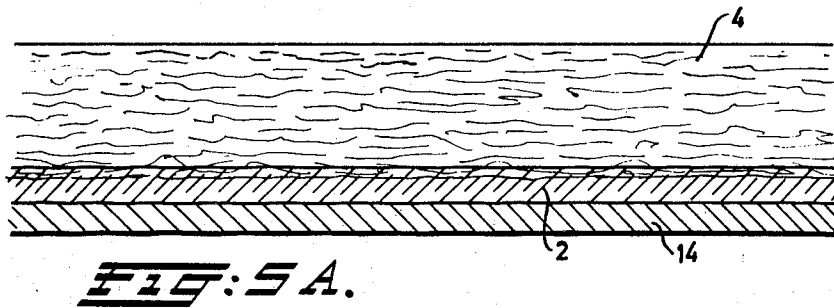
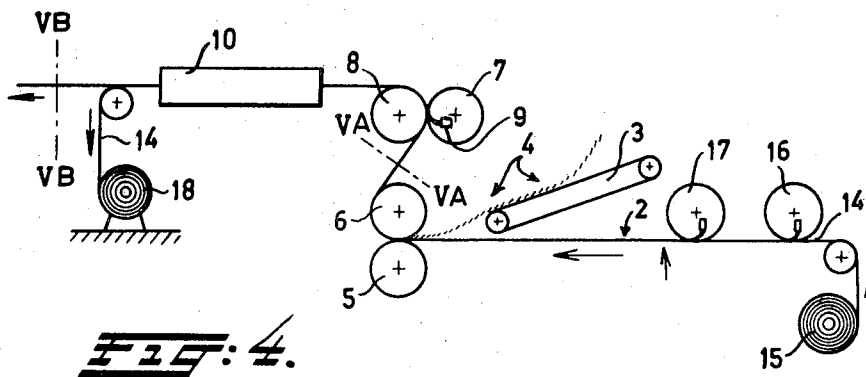
ABSTRACT

By starting from a non-bound fibre fleece one manufactures a composition consisting of a fleece strengthened at the fibre junctions with a stiffening agent and a foil, by taking care to have a discontinuous pattern of said stiffening agent available at the moment of uniting said fleece with said foil; the discontinuous pattern is obtained with a cylindrical screen with internal squeegee.

5 Claims, 7 Drawing Figures







METHOD FOR MANUFACTURING A FIBRE FLEECE LAMINATED WITH A FOIL AND A DEVICE FOR PERFORMING SUCH A METHOD

SUMMARY OF THE PRIOR ART

The invention relates to a method for manufacturing a fibre fleece laminated with a foil whilst applying a binding agent between the fleece and the foil and a subsequent drying of this aggregate. The product according to this method is applied for various purposes, principally in the hygienic sector, while mostly a foil of polyethylene, polypropylene or polyvinylchloride is used on which the fibre fleece is applied as a moisture absorbing layer. Such a product can be used for the manufacture of disposal sheets, baby napkins, etc.

The method so far adopted for the manufacture of such a product consists in that at first the fibre fleece consisting of paper or other non-woven material is prepared, that is to say a binding agent is added thereto, whereupon this product is laminated with the desired foil. A drawback of this known method consists in that the fleece should at least once be rolled up and unrolled during its processing and consequently a rather great quantity of binding agent in the fleece is required to impart sufficient strength and coherence to the fleece.

EXPLANATION OF THE INVENTION

It is an object of the invention to provide a method by which the final product aimed at can be manufactured whilst applying considerably less binding agent and whilst simplifying the method itself. This object is attained according to the invention in that the fibre fleece is supplied to the foil in a non-bound condition and in that only during or after the combination of the fleece and the foil a binding agent in a discontinuous pattern is caused to come into contact with the fleece.

In this way it suffices to apply a smaller quantity of binding agent, since less own strength of the fibre fleece is required because this strength is already provided by the foil. As a result the product becomes cheaper and moreover more flexible so that it is better adapted to the form which it should eventually take. The product obtained by performing the aforementioned method has a greater absorbing capacity as a consequence of the lower binding agent content. The discontinuous pattern may consist of individual dots or spots, lines and the like, which e.g. are formed by points which are flown together.

The essence of the invention is based on the understanding that it is possible, by using a binding agent with the right chemical properties, to obtain in a single operation a strengthening of the fibre fleece and a sufficient adherence to the foil.

Preferably the aggregate of foil and fibre fleece bearing on each other is passed past a screen cylinder, while such a quantity of binding agent in a suitable pattern is applied to the fleece that a part of the binding agent penetrates as far as the foil. By exerting a sufficient pressure of the squeegee within the screen cylinder such a quantity of binding agent is applied in a suitable pattern to the fibre fleece, so far not bound, that not only sufficient fibres are bound in the fleece, but also the binding agent penetrating through the fleece ensures sufficient adherence of the bound fleece to the foil.

According to another embodiment of the method the foil is passed past a screen cylinder in order to apply a suitable binding agent pattern and only thereupon the fibre fleece is supplied to that printed face of the foil.

5 This variant can be applied to sufficiently thin fleece webs, whereby the quantity of binding agent on the foil suffices to ensure both the adherence of the fleece to the foil and the binding of the fleece itself.

For very thick fleeces where the quantity of binding agent penetrating through the fleece is relatively small, the adherence can be improved by passing the aggregate of adhering foil and fibre fleece, obtained by previously printing the foil, past a second screen cylinder for applying a binding agent pattern to the uncovered face of the fleece.

15 Another interesting variant of the method according to the invention is distinguished in that the fleece is supplied under some pressure to a not yet dried, gelled or polymerised foil which is supplied on a temporary supporting belt, whereupon the binding agent pattern is applied to the uncovered face of the fleece and the entire aggregate is heated and/or dried and finally the belt is removed. The adherence of the fleece to the foil is not obtained by means of binding chemicals applied in a pattern, but in the form of a closed stratum in which a thin layer of the fibres of the fleece is embedded. The mutual binding of the fibres, that is to say the strengthening of the fibre fleece itself is ensured by the binding agent pattern. The lower adhering stratum should not have the property to penetrate fast into the rest of the fibre fleece, since the final product would otherwise lose its special touch and absorptivity. The layer constituted by the dried, gelled or polymerised adhesive stratum has the properties of a layer of reinforced plastic.

The non dried, gelled or polymerised foil on the temporary supporting belt can be obtained whilst performing the method described in the U.S. Pat. application No. 831.784. In that case the foil can be provided with a design which considerably increases the aesthetic value of the final product.

The invention relates further to a device for performing the various methods described hereinbefore comprising a feeder for a foil web and a feeder for a fibre web. According to the invention this device is distinguished in that at least a screen cylinder is provided which is designed in such a way that a discontinuous pattern of a binding agent is obtained in the final product.

SURVEY OF THE DRAWINGS

FIG. 1 represents in outline a device for performing the method in which simultaneously several variants have been embodied.

55 FIG. 2 shows to an enlarged scale the design of a screen cylinder which can be applied in the device according to FIG. 1.

FIG. 3A and 3B show a section according to the line IIIA, IIIB, respectively in FIG. 2.

FIG. 4 shows diagrammatically a second device for performing the method.

The FIGS. 5A and 5B represent to a strongly enlarged scale a section of the product at the locations V A and V B in FIG. 4.

DESCRIPTION OF SOME EMBODIMENTS

As is visible in FIG. 1 the device consists of a feeder

1 for a foil web 2 and a feeder 3 for a fibre fleece 4. This fibre fleece is in a condition entirely devoid of binding agent and comes e.g. from a carding machine which delivers the fibre fleece to a conveyor belt of the feeder 3, which advances at almost the same speed as the foil 2. The combined webs 2 and 4 move from between a pair of rollers 5, 6, whereupon the combination of the foil and fibre fleece bearing on each other is passed past a screen cylinder 7. The foil is supported by a roller 8. Within the screen cylinder 7 is a squeegee 9 by means of which an adequate quantity of binding agent is applied to the fleece according to a pattern. This binding agent may consist of a solution, emulsion or suspension of a suitable binder chemical, e.g. an acrylate resin. The foil consists e.g. of polyvinylchloride. After printing the aggregate is passed through a drying device in order to obtain the final product aimed at.

The screen cylinder 7 consists of a thin walled cylinder provided with perforations in a pattern depicted in FIG. 2. The pattern defined by the perforations consists in this example of adjacent squares with a length on each side which is a multiple of the pitch between two holes. In the selected embodiment as depicted in the FIGS. 3A and 3B the inner diameter of each hole is about 250 micron with a length of pitch of about 1 mm. The length of each side of the square amounts therefore to 3 mm, while the thickness of the wall of the screen cylinder is 0.2 mm.

A printing unit may be likewise provided in the feeding device 1 for the foil 2, this printing unit being embodied as a screen cylinder 11 with squeegee 12 and counter roller 13. By means of this provision a suitable pattern of binding agent can be applied to the foil 2, whereupon this foil without drying is passed to the location of the pair of rollers 5, 6 whereat the fibre fleece 4 is supplied to the face of the foil printed in this manner. On applying sufficiently thin fleece webs 4 the quantity of binding agent on the foil 2 can be sufficient to achieve both the adherence of the fleece to the foil and the binding of the fleece itself. In this case the printing unit 7-9 can be omitted.

In case of thicker fleeces both the printing unit 11-13 and the unit 7-9 will be used in order to obtain in this way a sufficient adherence and a sufficient binding of the fleece itself.

FIG. 4 shows a device which may be considered as a combination of a part of FIG. 1 with the device according to the U.S. Pat. application No. 831,784. A temporary supporting belt 14 is unrolled from a bobbin 15 and moved past two screen cylinders 16 and 17. The cylinder 16 is provided with a design and constitutes therefore a stencil by which a decorative pattern consisting e.g. of a coloured polyvinylchloride plastisol is applied to the belt 14. The cylinder 17 consists of a plain mesh stencil and transfers such a quantity of thixotropic material to the belt that a foil 2 is formed. On this still "liquid" foil or adhesive stratum the fleece 4 is laid and pressed by means of the rollers 5, 6.

A thin layer of fibres is embedded in this not yet polymerised adhesive stratum 2. In this way the situation depicted in FIG. 5A arises. In the portion of the path before the cylinders 7, 8 a heating and subsequent cooling may be effected before the binding agent from the cylinder 7 can be applied to the fleece in conformity with the operations described in relation to FIG. 1. After having traversed the drying device 10 the belt 14 is pulled loose and wound on a bobbin 18. The final

product is represented in section in FIG. 5B, the foil 2 formed by the dried and polymerised adhesive stratum can be considered as a reinforced plastic layer with a fleece lining on the one side and a design on the other side.

It should be noted that an important aspect of the invention consists in the provision of a binding agent pattern on the not yet bound fibre fleece by means of the screen cylinder 7. The contact time plays a part and it is desirable to keep same as short as possible. To that end the aggregate of foil and fleece is not passed in a straight but in a curved condition, via the roller 8, past the cylinder 7.

The binding agent pattern printed by the cylinder 7 with squeegee 9 on the fibre fleece may consist of individual points; to some extent a flowing together is also permissible, provided the pattern remains discontinuous, that is to say provided no closed layer of binding agent is formed on the fleece.

The method is particularly destined for making a fibre fleece adhere to a plastic foil. It is, however, also applicable to a paper or textile web. The fibre material may be vegetable, animal, synthetic or mineral (e.g. glass fibre).

There are consequently a number of variants of the method according to the invention, while in each of these cases the basic conception of the invention is utilized viz. that such a quantity of a binding agent is applied in a suitable pattern to the fibre fleece, which so far is not bound, that sufficient fibres in the fleece are bound, whereby also an adequate adherence of the bound fleece to the foil is provided for, all this after drying of the aggregate.

What I claim is:

1. A method for manufacturing a composite product of fibers laminated with a foil comprising the steps of forming a single layer of loose fibers as fleece in an unbound condition and devoid of binding agent upon a foil, applying a binding agent in a discontinuous pattern on the uncovered face of the fiber layer during or after the combining of the fibers and the foil by passing the same past a screen cylinder, the binding agent being caused to penetrate the fibers from the top of the layer of fleece to the foil to adhere fibers to the foil in said discontinuous pattern and to bind fibers to each other in an irregular pattern.

2. The method according to claim 1, in which a quantity of binding agent in a suitable pattern is applied to the fibre fleece that a part of the binding agent penetrates as far as the foil.

3. The method according to claim 1, in which the fleece is supplied at some pressure to a not yet dried, gelled or polymerised foil which is advanced on a temporary supporting belt, whereupon the binding agent pattern is applied to the uncovered face of the fleece and the entire aggregate is heated and/or dried and finally the belt is removed.

4. The method according to claim 1, in which the foil is passed past a screen cylinder in order to apply a suitable pattern of binding agent and that only thereupon the fibre fleece is supplied to the printed face of the foil.

5. The method according to claim 4, in which the adhering foil and fibre fleece are passed past a second screen cylinder in order to apply a binding agent pattern to the uncovered face of the fleece.

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