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Anselrode

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[54] **METHOD FOR STIFFENING A WEB-SHAPED FLEECE OF FIBROUS MATERIAL**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **117/38**, 101/116, 117/111 F, 117/140 R

[51] **Int. Cl.** **B41c 1/14**

[58] **Field of Search** ..... 101/116; 34/156; 117/7, 38, 119.8, 111 F, 140 R

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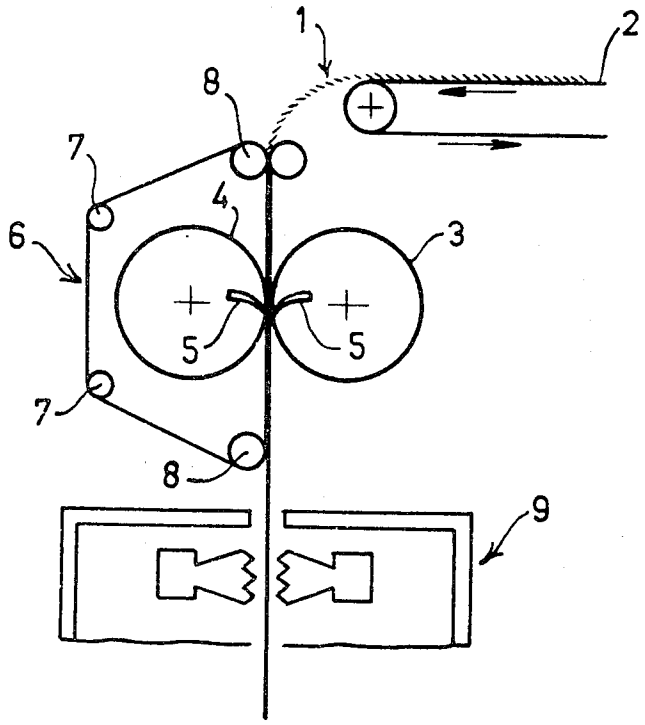
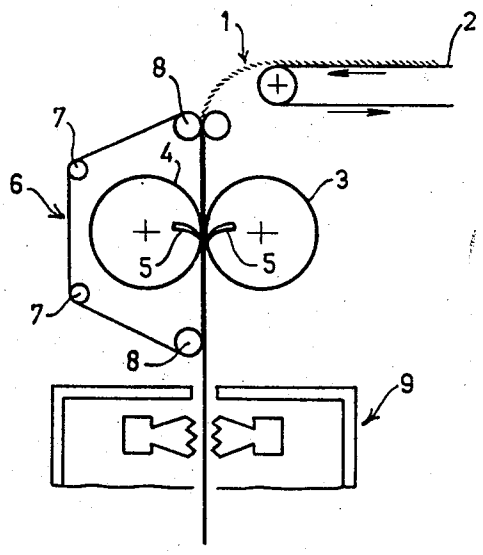
[57] **ABSTRACT**

For the stiffening of a web-shaped fleece of fibrous material, a stiffening agent is applied to a face of the fleece by means of a cylindrical stencil having internally a squeegee. By keeping the travelling speed of the fleece at least 1 percent higher than the tangential velocity of the stencil, no fibres of the fleece will adhere to the stencil.

3 Claims, 1 Drawing Figure

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METHOD FOR STIFFENING A WEB-SHAPED FLEECE OF FIBROUS MATERIAL

DISCUSSION OF THE PRIOR ART

The invention relates to an improved method for stiffening a web-shaped fleece of fibrous material, like non-woven material, by applying continuously a stiffening agent containing paste, emulsion or solution by means of one or more thin-walled, cylindrical screen stencils with squeegee, rotating in the direction of advance of the fleece. On performing this method described in the copending U.S. Patent application Ser. No. 84,980, filed Oct. 29, 1970 for fleeces manufactured on carding machines it may occur that the fleece sticks, entirely or layerwise, on the screen cylinder, whereby the apparatus is prevented from operating correctly.

The same problem occurs on performing a method in which by means of thin-walled screen stencils an analogous treatment of a non-woven fibre fleece is carried out, like described in said copending Patent application Ser. No. 84,981, filed Oct. 29, 1970.

SUMMARY OF THE INVENTION

Surprisingly it has now appeared that the difficulties owing to the adherence of fleece fibres on the outer surface of the stencils can be obviated when the travelling speed of the fleece is at least 1 percent greater than the tangential velocity of one of the stencils. This additional velocity or "leading" of the fibre fleece with respect to the stencils appears to be effective to overcome the aforementioned trouble.

It should be noted that the application of a difference of velocity or "leading" is already known under different circumstances. In U.S. Pat. No. 3.420.167 a screen printing machine is described, wherein in order to avoid a fluctuation of load in the stencils, a velocity is imparted to the material to be printed which is slightly greater (some percent) than the circumferential velocity of the stencils. Also in carpet printing a difference of velocity is sometimes applied in order to turn over the pile and to cause the dye-stuff to penetrate sufficiently into the material.

The advantage of the leading obtained according to the method in conformity with the invention has nothing to do with the effect of the leading according to said known methods and provides in a surprising way a solution of an existing problem. A special advantageous effect for keeping the stencils "clean" is obtained when the fibre fleece is passed along the contact area with the stencil(s) according to a convex plane. In this manner the period of contact between the fleece and each stencil is as short as possible.

When in a manner described in the copending Patent application Ser. No. 84,980 the fleece is passed from between two stencils rotating in an opposite sense, the above mentioned method can be performed by temporarely supporting the fleece on one side by a very open supporting structure. The stencil which is in contact with the fleece through the supporting structure, has the same tangential velocity as the traveling speed of the fleece, while the other stencil with respect to the velocity of advance of the fleece lags at least 1 percent.

SURVEY OF THE DRAWING

The sole FIGURE shows very diagrammatically one arrangement for performing the method.

DESCRIPTION OF SOME PREFERRED EMBODIMENTS

A fibre fleece **1** which c.g. may come from a carding machine is supplied by a conveyor **2.** This fleece is thereupon passed along a thin walled cilindrical screen stencil **3** and **4** respectively rotating in the direction of advance of the fleece, each stencil being provided with an inner squeegee **5.** In the depicted embodiment the stencils **3** and **4** are opposite each other in conformity with the aforementioned copending Patent application Ser. No. 84,980. A paste, emulsion or solution a stiffening agent is continuously applied to the fleece **1** by means of these stencils.

A travelling speed such is imparted to the fibre fleece that is exceeds at least by 1 percent, but preferably 3 percent the tangential velocity of the stencil **3** and is equal to that of the stencil **4.** The difference in velocity may range from 2 to 5 percent.

Since the fleece **1** has a very small tensile strength there are provisions for maintaining the difference of velocity mentioned, the so-called leading of the fleece. These provisions consist of a very open supporting structure **6** on the side of the stencil **4,** e.g. consisting of very thin endless ropes, a gauze with fine mesh or thin-walled perforated metal or plastic foil advancing past a number of supporting rollers **7** and **8.** The rollers **7** are freely rotatable and the rollers **8** are driven in such a way that the fleece **1** obtains the desired traveling speed with respect to the stencils **3** and **4.** These stencils, too, are driven and the circumforential volocity is such that the stencil **3** exhibits the aforementioned difference of velocity with respect to the stencils **4,** the open supporting structure **6,** and therefore with respect to the fibre fleece **1.**

After the fleece has left the supporting structure **6** it is introduced into a drying tunnel **9** in order to obtain the desired thermal treatment. The aforementioned difference of velocity between the fleece **1** on the one hand and the stencil **3** on the other hand ensures that the trouble of fleece fibres adhering to the outer circumference of the stencil **3** is avoided.

It should be noted that the difference of velocity can also be applied when the fibre fleece is treated on one face in conformity with the methods described in the copending application Ser. No. 84,981. The fibre fleece is then supported by a foil or by an endless belt. Under these circumstances it is advantageous to pass the fleece according to a convex plane past the area of contact with the stencil. The narrowing of the area of contact obtained hereby contributes to the obtainment of the effect aimed at with the difference of velocity (leading), that is to say the fibres are prevented from adhering to the outer circumference of the stencil(s).

I claim:

1. In a process of stiffening web-shaped fleece of fibrous nonwoven material comprising the steps of advancing the fleece, applying continuously a paste, emulsion or solution containing a stiffening agent to the advancing fleece by means of a thin-walled cylindrical screen stencil with a squeegee therein while rotating the stencil in the direction of advance of the fleece and thereafter subjecting the treated fleece material to a drying treatment to produce a finished product, the improvement comprising the speed of the advancing fleece being 1–5 percent greater than the tangential velocity of the rotating stencil whereby the fibers of the

fleece are prevented from adhering to the periphery of the stencil.

2. In a process as claimed in claim **1** wherein the fleece is advanced along a convex plane past the area of contact with the stencil.

3. In a process as claimed in claim **1** wherein the difference between the speed of the advancing fleece and the tangential velocity of the stencil ranged from 2–5 percent.

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