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NONWOVEN FABRICS WITH A FABRIC-LIKE APPEARANCE

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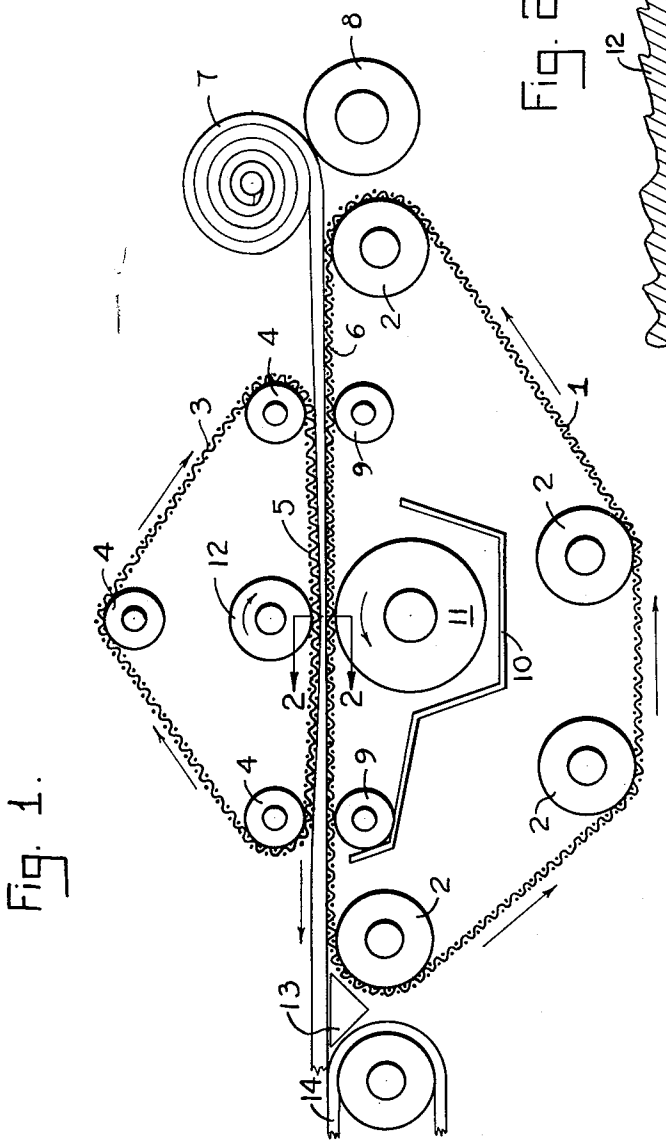


Fig. 1.

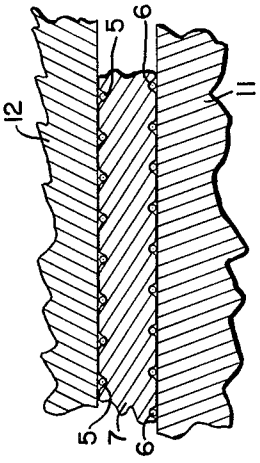


Fig. 2.

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NONWOVEN FABRICS WITH A FABRIC-LIKE APPEARANCE

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This invention relates to a method and apparatus for the treatment of nonwoven fabrics to impart thereto a fabric-like appearance.

It is an object of this invention to provide a method and apparatus for applying a fluid film forming substance to a nonwoven fabric in varying concentrations to impart thereto a fabric-like appearance.

It is another object of this invention to provide a method and apparatus for imparting a fabric-like appearance to nonwoven fabrics so that the treated nonwoven fabric is more flexible in all directions.

It is a further object of this invention to provide a method and apparatus for imparting a fabric-like appearance to nonwoven fabric in which a minimum of pressure on the nonwoven material is used to obtain the fabric-like appearance.

The above objects are accomplished in accordance with the instant invention by positioning the nonwoven fabric between adjacent reaches of endless moving screens, applying a fluid film forming substance to the nonwoven fabric, and passing the nonwoven fabric and screens between pressure rollers so that varying amounts of pressure are applied to the nonwoven fabric thereby distributing the fluid film forming substance in varying concentrations throughout said nonwoven fabric to impart thereto a fabric-like appearance.

The invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the following detailed description of a preferred embodiment of the invention and the accompanying drawing in which

FIG. 1 is a schematic illustration of apparatus of the type described in the instant application; and

FIG. 2 is an enlarged fragmentary view in cross section taken on lines 2—2 of FIG. 1.

In accordance with the drawing, there is disclosed apparatus for imparting a fabric-like appearance to nonwoven fabric in which an endless moving screen **1** is trained for movement around a series of rollers **2**. The endless screen **1**, as illustrated in the drawing, moves in a counterclockwise direction. A second endless screen **3** is trained for movement around a series of rollers **4** and moves in a clockwise direction as also illustrated in the drawing. The lower reach **5** of the endless screen **3** is adjacent to the upper reach **6** of the endless screen **1** and moves in the same direction as the upper reach **6**. A roll **7** of nonwoven fabric is mounted between an idler roller **8** and an adjacent roller **2** at one end of the upper reach **6** around which moves the endless screen **1**. The roll **7** is held in position by conventional mechanism (not shown) which allows the nonwoven fabric to be deposited from the roll **7** onto the endless screen **1**. The unwoven fabric may, if desired, be fed continuously in any other suitable manner onto the endless screen **1**. A pair of positioning rollers **9** maintain the upper reach **6** of the endless screen **1** in a plane spaced a predetermined distance from the lower reach of the endless screen **3**. The upper reach **6** is so positioned that as the nonwoven fabric from the roll **1** moves between the adjacent reaches **5** and **6**, the nonwoven fabric is simultaneously in contact with the endless screens **1** and **3**.

A vat **10** is mounted in position beneath the upper reach **6** of the endless screen **1** and is adapted to hold a supply

of the fluid film forming substance. A rubber covered pickup roll **11** is mounted, by a conventional mechanism (not shown), for counterclockwise rotation as shown in the vat **10** and is arranged to transfer the fluid film forming substance from the vat **10** to the surface of the nonwoven fabric adjacent the endless screen **1**. A press roll **12** is mounted, by conventional mechanism (not shown), for clockwise rotation as shown above the lower reach **5** of the endless screen **3**. The press roll **12** cooperates with the roll **11** to apply a predetermined pressure to the endless screens **1** and **3** at the nip between the rolls **11** and **12**. Because of the mesh of the screens **1** and **3** as illustrated in FIG. 2 varying amounts of pressure are asserted upon the nonwoven fabric impregnated with the fluid film forming substance from the vat **10**. As a result of this variance in pressure, the fluid film forming substance is distributed in varying concentrations throughout the nonwoven fabric to impart thereto a fabric-like appearance. In the areas of reduced pressure there is a higher concentration of the fluid film forming substance allowing for greater expansion of the nonwoven fabric.

After passing between the rolls **11** and **12**, the treated nonwoven fabric moves with the screens **1** and **3** under some compression until it passes the nip between the last opposed pair of rollers **4** and **9**, A transfer table **13** is positioned at the other end of the upper reach **6** of the endless screen **1** and guides the treated nonwoven fabric from the endless screen **1** to a conveyor **14** leading to an oven for curing.

In operation, a continuous strip of nonwoven material is deposited on the one end of the upper reach **6** of the endless screen **1**. The nonwoven material moves with the endless screen **1** into position between the upper reach **6** of the endless screen **1** and the lower reach **5** of the endless screen **3**. A layer of the fluid film forming substance is picked up by the roll **11** from the vat **10** and deposited on the surface of the nonwoven material adjacent the upper reach **6** of the endless screen **1** just prior to entering the nip between the rolls **11** and **12**. A predetermined pressure is placed upon roll **12** so that rolls **11** and **12** cooperate to place a predetermined pressure on the screens **1** and **3** urging them toward each other. This predetermined pressure applied to the screens **1** and **3** is transmitted to the nonwoven fabric positioned therebetween so that the nonwoven fabric is subjected to varying amounts of pressure and so that the fluid film forming substance deposited thereon by the roll **11** is distributed in varying concentrations throughout the nonwoven fabric. The treated fabric then moves with the screens **1** and **3** under some compression until it has passed the nip between adjacent rollers **4** and **9**. The treated material is then transferred from the other end of the upper reach **6** of the endless screen **1** to the conveyor **14** which leads to an oven for curing.

Successful operation of the above method and apparatus has been obtained in the treating of a nonwoven fabric with a fluid film forming substance which consisted of 100 parts by weight of a butadiene acrylonitrile copolymer resin manufactured and distributed by B. F. Goodrich Chemical Company identified as Hycar 1512 thoroughly mixed with 5 parts by weight of formamide. The appearance given to the nonwoven fabric may be varied by changing the mesh of the screens **1** and **3** or the pressure applied between the rolls **11** and **12**. The particular fluid film forming substance may be varied to give a desired result and it is not intended to limit the invention to the foregoing example since many types of resinous material may be used. Also, both surfaces of the nonwoven fabric may be treated by arranging conveyors to direct the nonwoven fabric through additional treating apparatus arranged to apply the fluid film forming sub-

stance to the other side of the nonwoven fabric in a manner similar to that previously described.

Nonwoven fabric treated in accordance with the instant invention has a more pronounced fabric-like appearance than can be obtained by embossing alone, and this more pronounced appearance is obtained under considerably less pressure. Thus, nonwoven fabric treated in accordance with the instant invention is not damaged by excessively high treating pressures and therefore is more flexible in all directions.

Having thus described the invention in rather full detail, it will be understood that these details need not be strictly adhered to and that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. A method for treating a nonwoven fabric to impart a fabric-like appearance thereto which comprises positioning the nonwoven fabric between the upper reach of one endless screen and the lower reach of another endless screen, moving the adjacent reaches of said endless screens and said nonwoven fabric in the same predetermined direction, applying a fluid film forming substance to impregnate said nonwoven fabric while between said screens, passing said screens and said impregnated nonwoven fabric between adajacent and opposed pressure rolls, applying varying amounts of pressure to said nonwoven fabric by applying a predetermined pressure to said rolls so that when transmitted through said screens said impregnated nonwoven fabric is subjected to varying amounts of pressure and so that said fluid film forming substance is distributed in varying concentrations throughout said nonwoven fabric.

2. Apparatus for treating nonwoven fabric to impart a fabric-like appearance thereto comprising a first endless moving screen having an upper reach, a second endless moving screen being positioned and arranged so that its lower reach is adjacent and moves in the same direction as the said upper reach of said first endless moving screen, said adjacent reaches being spaced from each other a predetermined distance, means for depositing a nonwoven fabric onto said first endless moving screen so that said nonwoven fabric may move into position between the adjacent reaches of said screens, a vat containing a fluid film forming substance positioned adjacent to said upper reach, a pickup roll in said vat for transferring said fluid film forming substance from said vat to impregnate said nonwoven fabric through said first endless moving screen, a press roll positioned above said lower reach and cooperating with said pickup roll to apply pressure to said impregnated nonwoven fabric through said screens so that said impregnated nonwoven fabric is subjected to varying amounts of pressure and so that said fluid film forming substance is distributed in vary concentrations throughout said nonwoven fabric.

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