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METHODS OF MAKING FLOCKED SOLVENT ACTIVATABLE
STIFFENING AND SHOE LINING MATERIALS
Original Filed Aug. 7, 1958

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Fig. 1

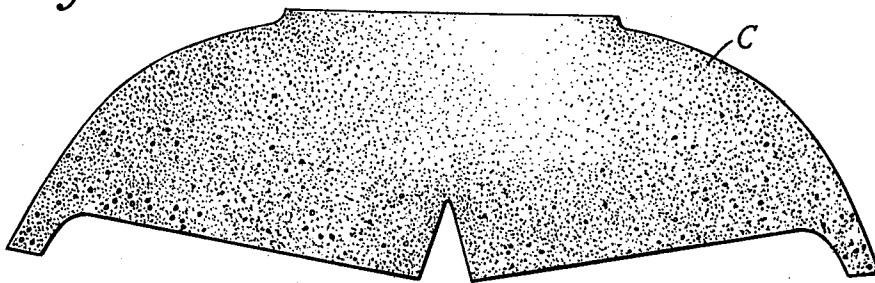
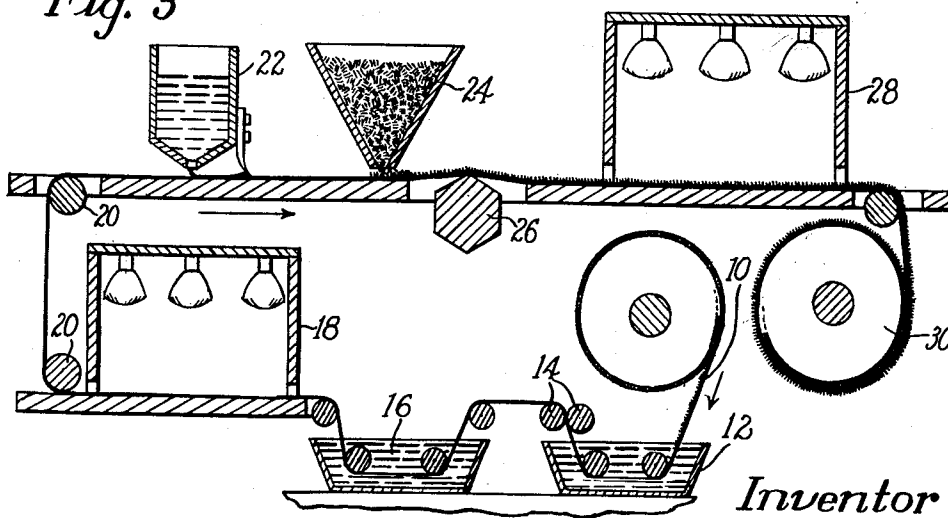


Fig. 2



Fig. 3



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METHODS OF MAKING FLOCKED SOLVENT ACTIVATABLE STIFFENING AND SHOE LINING MATERIALS

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Original application Aug. 7, 1958, Ser. No. 753,717, now Patent No. 3,022,188, dated Feb. 20, 1962. Divided and this application June 26, 1961, Ser. No. 119,562
4 Claims. (Cl. 117-25)

This invention relates to shoemaking and more particularly to methods of making sheet material for providing solvent activatable stiffening elements for shoe uppers. This application is a division of my application Serial No. 753,717, filed August 7, 1958, now Patent No. 3,022,188.

Much effort has been devoted in the past to provide economic materials for and methods of stiffening selected portions of shoe uppers. However, the difficulty of providing a stiffening element for the heel portion of an unlined shoe which combines pleasing appearance, good wearing qualities, and ease of activation with initial conformability has left much to be desired in materials hitherto available.

In the past there has been developed a stiffener material comprising a porous base impregnated in discontinuous form with a stiffener agent such as cellulose nitrate or polystyrene resin and hence adapted to be solvent activated to cause the material to become stiff after evaporation of the solvent. Stiffener elements died out of such material have been used extensively for shoe toe stiffening. However, such material has had little use in heel end stiffening, particularly since efforts to provide a layer of flock on such material for use in unlined shoes had proved unsatisfactory because the flock together with layer of flocking adhesive tended to crack on flexing of the material and to peel away too easily from the underlying surface of the stiffener sheet.

It is accordingly an object of the present invention to provide an improved method of making flocked solvent activatable sheet stiffener material by the use of which method material having securely bonded flock may be prepared.

To this end and in accordance with a feature of the invention, a method is provided featuring the steps of treating a single napped fabric base to deposit therein in discontinuous form a stiffening agent coalescible by solvent, said treatment including impregnating the fabric with a liquid composition comprising a stiffening agent and removing from the unnapped side of the fabric sufficient of the impregnating composition to expose the surface of the fabric in its treated and dried condition, drying the treated fabric, applying a layer of flocking adhesive to the unnapped surface, applying a layer of flock over the adhesive layer and drying the adhesive. The success of the method depends to a large extent upon the use of a single napped fabric and in the removal from the unnapped surface thereof of sufficient stiffening agent to expose the surface of the fabric and thus provide a firm base for the flocking adhesive.

The material provided by the method of the present invention comprises a single napped fabric impregnated with a solvent coalescible stiffening agent in discontinuous form and a layer of flock bonded to the unnapped side by a layer of adhesive which, instead of being superimposed on a layer of stiffening agent covering the fabric, is directly engaged with the fabric surface.

Preferably, also, the flocking adhesive will be porous to minimize danger of blistering the flock surface during

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solvent activation through swelling of the flocking adhesive by certain solvents like toluol.

Further features and advantages of the present invention will best be understood by reference to the following description in connection with the appended drawings, in which

FIG. 1 is a counter dyed out of material made in accordance with the present invention;

FIG. 2 is a greatly enlarged partial section through a sheet of such material; and

FIG. 3 is a diagrammatic illustration of a method of manufacturing the material of the present invention.

Referring to FIGS. 1 to 3, the sheet material provided by the method of the present invention comprises a base 10 of single napped fabric such as cotton flanel carrying in discontinuous form a stiffening agent capable of being coalesced upon activation with a solvent. Conveniently, the material may be prepared by passing the base through a bath 12 containing a liquid mixture of a stiffening agent in a form appropriate to deposit the stiffening agent in the base in a discontinuous form when the sheet is thereafter dried. Two well-known stiffening agents used in preparing solvent activatable stiffener material are cellulose nitrate and polystyrene. Either of these agents may be used although I prefer the cellulose nitrate because of its better adhesive qualities. Where cellulose nitrate is employed as the stiffening agent, the fabric 10 is passed through the bath 12 containing the cellulose nitrate dissolved in a solvent. After leaving the bath 12, the fabric is passed between stripping rolls 14 which are adjusted to remove sufficient of the cellulose solution from the unnapped side of the fabric so that after drying there is not sufficient stiffening agent left on this side of the material completely to cover the threads of the fabric thereby permitting the flocking adhesive to come into direct contact therewith. From the stripping rolls, if the stiffening agent is cellulose nitrate, the fabric 10 passes through a water bath 16. This bath is not employed where the stiffening agent is polystyrene which is preferably applied in the form of the latex of the type disclosed in United States Letters Patent No. 2,760,884, issued August 28, 1956, on an application filed in the name of George Leonard Graf, Jr. The fabric is then dried in a drying oven 18 and after passing over idler rollers 20, proceeds to a conventional flocking of the unnapped surface wherein a flocking adhesive 32 is applied from a trough 22 and flock 34 is applied from a second trough 24 followed by beating with a bar 26. After this the stiffener material passes through an oven 28 to evaporate the solvent of the flocking adhesive and to cure it, and the finished material is then taken up on a roll 30. The layer 32 of flocking adhesive, shown in FIG. 2, applied in this manner may be either porous or nonporous as desired. A porous film of flocking adhesive is preferable to prevent distortion, blistering or swelling on contact with some solvents. To provide a porous adhesive layer it is usually sufficient to employ a low solids and relatively low viscosity adhesive such as #1734, a curing neoprene flock adhesive using aromatic solvent, made by B. B. Chemical Co., Cambridge, Mass. In some cases, however, a conventional flocking adhesive may be employed where activation will be performed by application of solvent only to the unflocked surface of the stiffener material.

The finished material may then be died out to form shoe lining elements such as the counter C shown in FIG. 1. In the dry form, this counter may be flexed without cracking the flocked surface and the flock is so securely bonded to the fabric base as not to be easily removable. Previous efforts to flock such a fabric base impregnated in discontinuous form with a stiffening agent

had resulted in a material having defects corresponding to the aforesaid good qualities of the present material which I believe arose because of the substantial layer of stiffening compound covering the fabric surface to which it was quite loosely bound and which afforded a very insecure surface for the flock anchorage through the flocking adhesive not only before but during activation.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of making sheet stiffener material for shoes and the like comprising treating a single napped fabric base to deposit therein in discontinuous form a solvent coalescible stiffening agent, said treatment including impregnating the fabric with a liquid composition comprising said agent and removing from the unnapped side of the fabric sufficient composition to expose the fabric surface in dried condition, applying to said unnapped side of the fabric a layer of flocking adhesive and applying a layer of flock over said adhesive.

2. The method of making sheet stiffener material for shoes and the like comprising treating a single napped fabric base with a solvent coalescible stiffening agent, said treatment including impregnating the fabric with a liquid composition comprising said agent and removing from the unnapped side of the fabric sufficient composition to expose the fabric surface in dried condition, applying to said unnapped side a flocking adhesive in solvent solution, applying a layer of flock over the adhesive, and applying heat to evaporate the solvent and cure the adhesive.

3. The method of making sheet stiffener material for lining shoes and the like comprising treating a single napped fabric base with a solvent coalescible stiffening agent to dispose said agent within the fabric, the surface coating of said agent on the unnapped side of the fabric being sufficient to embed all threads of said fabric, applying a layer of flocking adhesive over said unnapped side and applying a layer of flock over the adhesive.

4. The method of making sheet stiffener material for shoes and the like comprising treating a single napped fabric base to deposit therein in discontinuous form a solvent coalescible stiffening agent, said treatment including impregnating the fabric with a liquid composition comprising said agent while leaving on the unnapped side of the fabric insufficient composition to cover completely the fabric surface in dried condition, applying to said unnapped side of the fabric a layer of flocking adhesive which is porous in its dried condition and applying a layer of flock over said adhesive.

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