Feb. 20, 1962 S. M. GRISWOLD 3,022,188

FLOCKED SOLVENT ACTIVATABLE STIFFENING AND SHOE LINING MATERIALS

Filed Aug. 7, 1958

Fig. 1

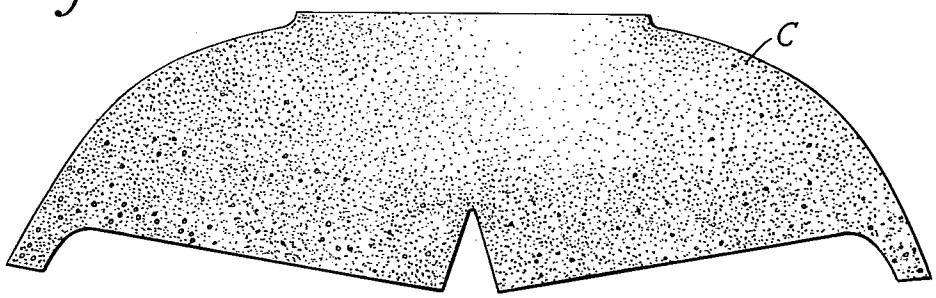


Fig. 2

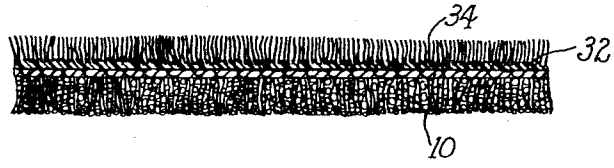
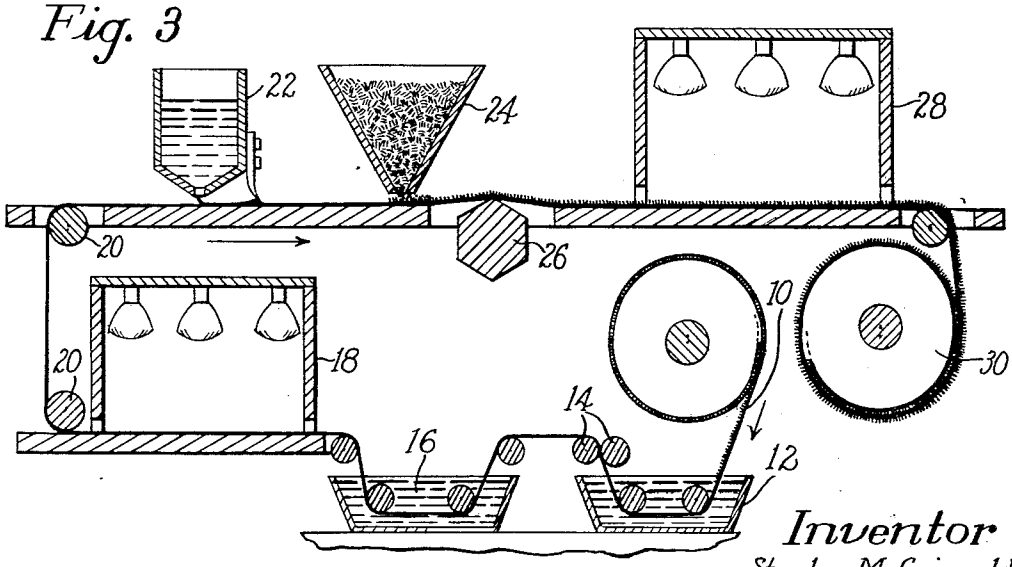


Fig. 3



Inventor

Stanley M. Griswold

By his Attorney

George C. Fuller

United States Patent Office 3,022,188 Patented Feb. 20, 1962

3,022,188

FLOCKED SOLVENT ACTIVATABLE STIFFENING AND SHOE LINING MATERIALS

Stanley M. Griswold, Newton, Mass., assignor to B.B. Chemical Co., Boston, Mass., a corporation of Massachusetts

Filed Aug. 7, 1958, Ser. No. 753,717
7 Claims. (Cl. 117—25)

This invention relates to shoemaking and more particularly to sheet material for making solvent activatable stiffening elements for shoe uppers.

Much effort has been devoted in the past to provide economical materials for 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 the 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 improved solvent activatable stiffener material adapted for use in stiffening end portions of unlined shoes which will not have the above undesirable characteristics.

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

Certain method aspects disclosed in the present application are the subject of a divisional application Serial No. 119,562, filed June 26, 1961, in my name.

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 died 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 of the present invention comprises a base **10** of single napped fabric such as cotton flannel 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 to completely 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 non-porous 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.

Another advantage of the material provided by the present invention which appears to bear some relation to the aforesaid non-cracking characteristic is that the material is less likely to fail at a seam than material in which surplus stiffening compound between the fabric base and the flock adhesive exists.

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

1. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a base of single napped fabric carrying therein in discontinuous form a solvent coalescible stiffening agent, and a layer of flock adhesively bonded to the unnapped side of said fabric, said flock being free of said coalescible stiffening agent.

2. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a base of single napped fabric carrying therein in discontinuous form a solvent

coalescible stiffening agent, a layer of flocking adhesive directly engaging the unnapped side of said fabric, said flock being free of said coalescible stiffening agent and a layer of flock bonded thereto by means of said flocking adhesive.

3. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a layer of single napped fabric carrying therein in discontinuous form a solvent coalescible stiffening agent and a layer of flock bonded to the unnapped side of said fabric by a porous layer of flocking adhesive, said flock being free of said coalescible stiffening agent.

4. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a base of single napped fabric carrying therein in discontinuous form a cellulosic derivative adapted to be coalesced by the application thereto of a solvent, a layer of flocking adhesive directly engaging the unnapped side of the fabric and a layer of flock bonded thereto by means of said flocking adhesive, said flock being free of said cellulosic derivative.

5. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a base of single napped fabric carrying therein in discontinuous form a cellulose nitrate adapted to be coalesced by the application thereto of a solvent, a layer of flocking adhesive directly engaging the unnapped side of the fabric and a layer of flock bonded thereto by means of said flocking adhesive, said flock being free of cellulose nitrate.

6. Solvent-activatable stiffener sheet material for lining shoes and the like comprising a base of single napped fabric carrying therein in discontinuous form a polymeric resin adapted to be coalesced by the application thereto of a solvent, a layer of flocking adhesive directly engaging the unnapped side of the fabric and a layer of flock bonded thereto by means of said flocking adhesive, said flock being free of said polymeric resin.

7. Solvent-activatable stiffener material comprising a base layer of single napped fabric carrying therein in discontinuous form a solvent coalescible stiffening agent, the surface of the unnapped side of said fabric being substantially free from said stiffening agent and having adhesively bonded thereto a layer of flock, said flock being free of said coalescible stiffening agent.

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