April 30, 1968 W. L. HOCHNER 3,380,869

METHOD OF STIFFENING FABRIC SHOE UPPERS

Filed Sept. 21, 1964

Fig. 1.

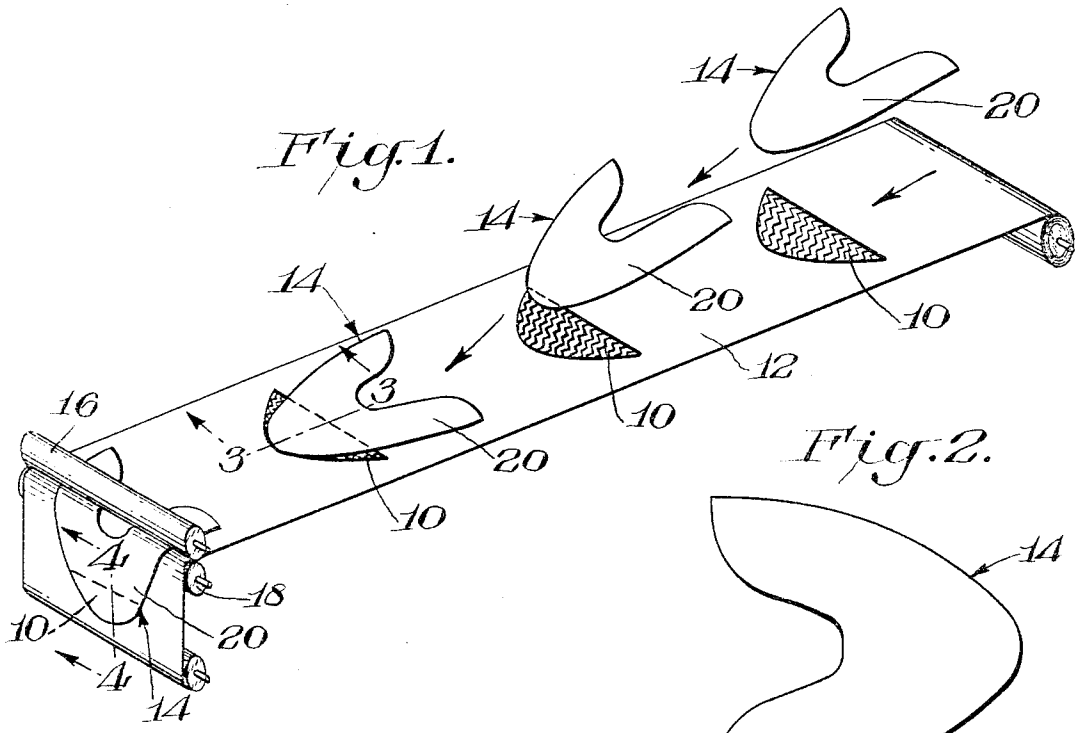


Fig. 2.

Fig. 3.

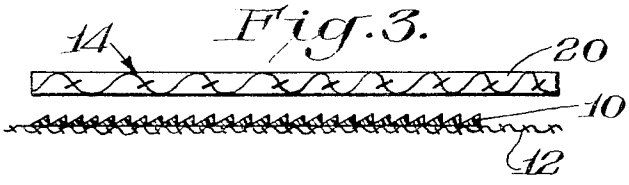


Fig. 5.

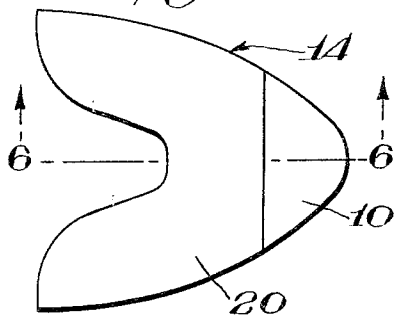


Fig. 4.

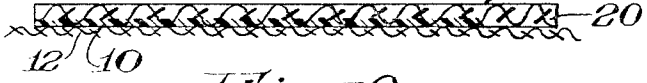


Fig. 6.

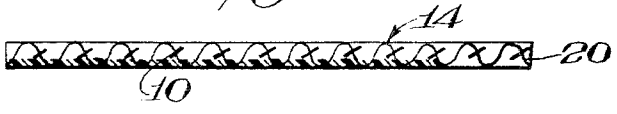
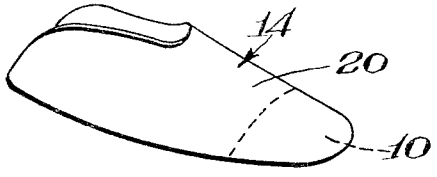


Fig. 7.



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United States Patent Office 3,380,869 Patented Apr. 30, 1968

3,380,869

METHOD OF STIFFENING FABRIC SHOE UPPERS

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Continuation-in-part of application Ser. No. 311,510, Sept. 25, 1963. This application Sept. 21, 1964, Ser. No. 400,622

4 Claims. (Cl. 156—230)

ABSTRACT OF THE DISCLOSURE

Fabric uppers for shoes are stiffened by applying thermoplastic stiffening substance to the toe portion of each shoe upper and simultaneously applying heat and presure to the toe portion and the thermoplastic stiffening substance to impregnate the thermoplastic stiffening substance into the toe portion.

This application is a continuation-in-part of application Ser. No. 311,510, filed Sept. 25, 1963, now abandoned.

This invention relates to a method and transfer for stiffening a fabric portion of a shoe, and more particularly to a method and transfer for stiffening the toe portion of a shoe upper.

In making canvas shoes, it is common to apply a heat activated cloth to the toe area of the fabric upper to stiffen it and maintain it arched and spaced above the toes. This involves expenditure of material and labor.

An object of this invention is to provide a simple, efficient and inexpensive method and means for stiffening fabric shoe uppers.

In accordance with this invention the toe portion of a fabric shoe upper cutout is impregnated with a thermoplastic composition to stiffen without an extra thickness of material. The thermoplastic composition may be mounted on a transfer carrier sheet and applied to the fabric by heat and pressure from rollers through which they are fed. In an advantageous form of this invention, the thermoplastic composition is applied to its carrier sheet in a pattern slightly wider than the toe portion of the fabric cutout to facilitate registry during application.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a perspective schematic diagram of the method performed in accordance with one embodiment of this invention;

FIG. 2 is a plan view of an untreated fabric shoe cutout shown in FIG. 1;

FIGS. 3 and 4 are cross-sectional views in elevation respectively taken through FIG. 1 along the lines **3—3** and **4—4**;

FIG. 5 is a plan view of a stiffened blank made in accordance with the method shown in FIG. 1;

FIG. 6 is a cross-sectional view in elevation through FIG. 5 along the line **6—6**; and

FIG. 7 is a perspective view of the blank shown in FIG. 5 in the arched form that is assumes in a finished shoe.

In FIG. 1 is shown a schematic view of the method of stiffening fabric shoe uppers. Thermoplastic stiffening substance **10** is first applied to carrier sheet **12** such as 18# MG paper in half-moon patterns similar to the toe portion of the shoe uppers. Substance **10** is printed on carrier paper **12** at for example 300° F. and varies in height from for example five to eight thousandths of an inch and is approximately two inches by five and a half inches. The transfer sheet **12**, which includes the thermoplastic patterns, is then fed through presure roller **16** and heat roller **18** at a speed of for example 20 feet per minute. As the transfer sheet is fed through the rollers, fabric shoe cutouts **14** are superimposed over the patterns, and the inner surface of each cutout contacts a corresponding pattern **10** between the rollers. Heating roller **18** operates at for example 560° F. to melt the thermoplastic substance. The thermoplastic substance is of a hot melt composition such as 300 parts polyeterpene resin as for example sold by Newport Industries under the name Nirez 1125, 300 parts Epolene C–10 (a trademark of the Eastman Chemical Products, Inc. for a low-molecular-weight polyethylene), 600 parts Kalite (a trademark of the Diamond Alkali Co. for a calcium carbonate), and 5 parts Solvent Blue 36 dye which flows into the voids or interstices between the fibres of the fabric cutout. The dye is used to make patterns **10** visible to the operator but can be omitted. Although the composition of the thermoplastic substance varies in accordance with the desired stiffness, it is essential that the hot melt composition remain integral with the fabric and not transfer to the aluminum last during the subsequent curing of the shoe.

It is highly desirable that the stiffened shoe upper possess sufficient elasticity that when the toe portion is depressed, it can quickly bounce back to its original position. Accordingly, in an advantageous form of this invention stiffening substance **10** contains rubber as well as thermoplastic material. For example, the thermoplastic material, such as polyethylene, wax, or a terpene resin, is mixed with a low molecular weight rubber; and various curing agents are added to the rubber. When the shoe upper **20** is vulcanized, the rubber becomes cured and imparts the necessary resilience to the stiffened area. Thus the rubber comprises the main ingredient of substance **10**, while the thermoplastic material provides an effective media to drive-in and penetrate the composition into the textile fibers of cut-outs **14**.

A typical formation of substance **10** is as follows:

	Parts
Depolymerized rubber	10(
Zinc oxide	3
Sulfur	0.3
Captax (a trademark of the R. T. Vanderbuilt Co. for a rubber accelerator)	0.3
Methyl Zimate (a trademark of the R. T. Vanderbuilt Co. for an accelerator)	0.3
Methyl Tuad (a trademark of the R. T. Vanderbuilt Co. for an accelerator and vulcanizing agent)	1.8
Atomite filler (a trademark of the Thompson, Weinman & Co. for calcium carbonate)	20(
Paraffin wax	3(

As shown in FIG. 1, the thermoplastic stiffening substance is applied to carrier sheet **12** in a herringbone pattern so that the melted substance will not flow away from the cutout. As also shown in FIG. 1, pattern **10** is slightly wider than the toe portion of the fabric cutout so that the same size pattern **10** can be used for all sizes of shoe uppers. Additionally the wider size facilitates an accurate registry of the cutout and pattern. The stiffening substance **10** is absorbed into the fabric shoe upper blank **20** and is planar with its undersurface, as shown in FIG. 6, so as not to irritate the foot. When pattern **10** is applied to the top surface of the fabric upper, it functions as a decoration or identification means, as well as stiffening and reinforcing the fabric. As shown in FIG. 7, after blank **20** is stiffened, it preserves an arched form when it is curved into the shape that it assumes in a finished shoe.

This method of stiffening a shoe upper is particularly advantageous in that it permits the use of existing ma

chinery, such as that used for transferring designs and identifications to textiles, to apply the stiffening patterns to the shoe upper cutouts.

What is claimed is:

1. A method of stiffening fabric uppers for shoes comprising the steps of applying a thermoplastic stiffening composition to a carrier sheet in a pattern corresponding to the toe portion of a shoe upper, feeding the carrier sheet through rollers, simultaneously feeding a fabric upper cutout through said rollers, contacting the toe portion of said fabric upper cutout with said thermoplastic pattern, and applying heat and pressure to said thermoplastic pattern and fabric upper cutout in said rollers whereby said thermoplastic composition enters the voids in said fabric upper cutout and becomes integral with it to stiffen it.

2. A method as set forth in claim 1 wherein said thermoplastic stiffening substance is made by mixing low molecular weight rubber with a thermoplastic material, and adding curing agents.

3. A method of stiffening fabric uppers for shoes comprising feeding fabric shoe uppers in a forward direction, applying thermoplastic stiffening substance to the toe portion of each shoe upper, and simultaneously applying heat and pressure to the thermoplastic stiffening substance and toe portion to impregnate the toe portion with the thermoplastic stiffening substance.

4. A method as set forth in claim 3 wherein said heat and pressure are simultaneously applied by passing each shoe upper and the thermoplastic stiffening substance through pressure rollers, at least one of which is heated.

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