July 14, 1970 W. L. HOCHNER 3,520,760

TRANSFER SHEET HAVING SHAPED THERMOPLASTIC TRANSFER FOR STIFFENING OR REINFORCING FABRIC APPAREL AND SHOES

Filed April 19, 1968

Fig. 1.

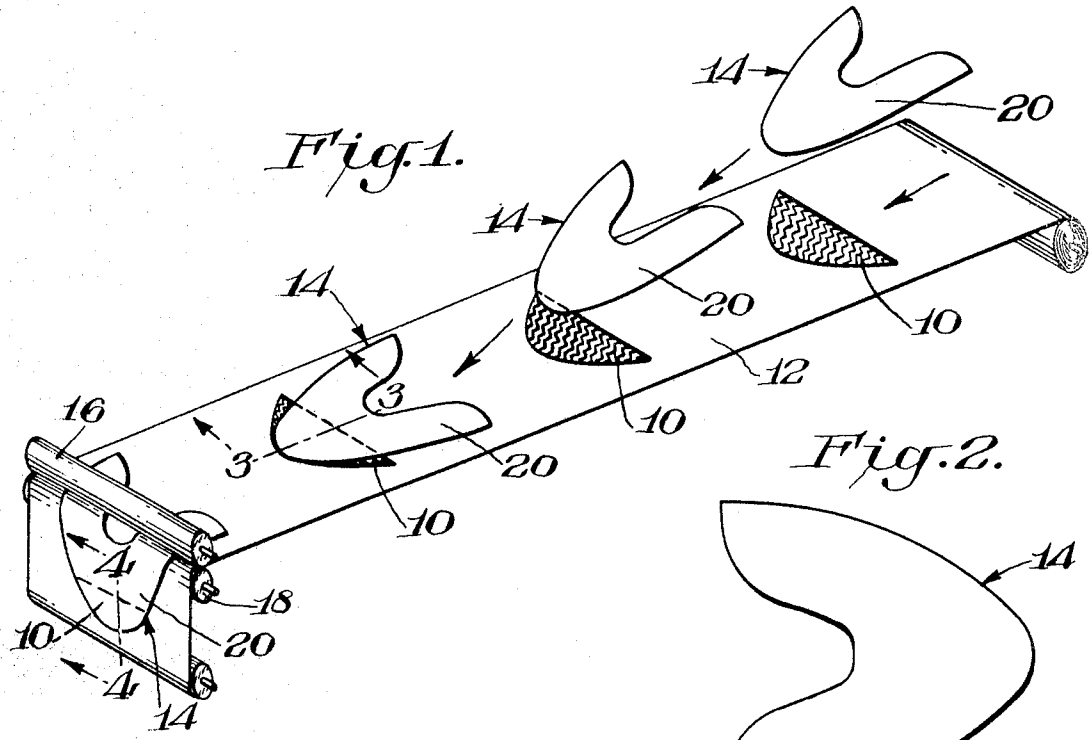


Fig. 2.

Fig. 3.

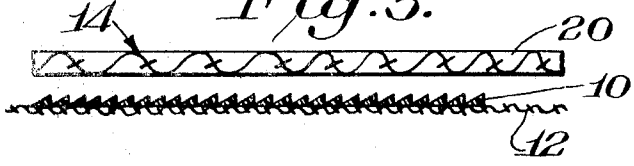


Fig. 4.

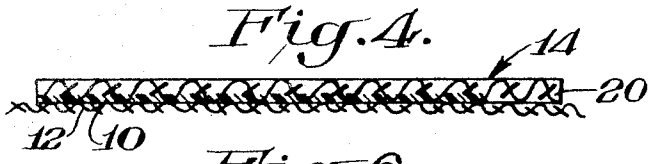


Fig. 5.

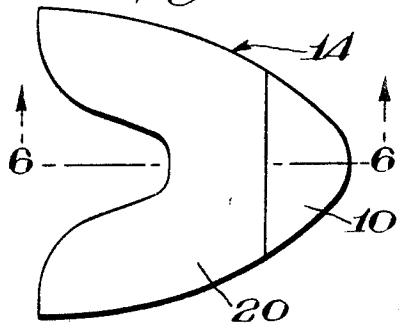


Fig. 6.

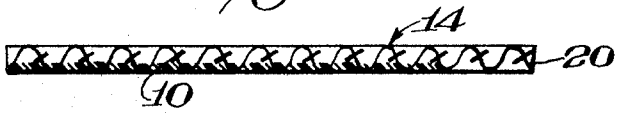
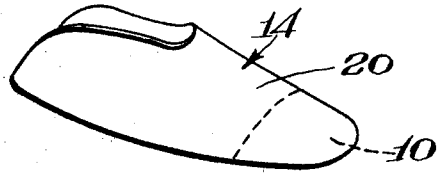


Fig. 7.



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United States Patent Office 3,520,760 Patented July 14, 1970

3,520,760

TRANSFER SHEET HAVING SHAPED THERMOPLASTIC TRANSFER FOR STIFFENING OR REINFORCING FABRIC APPAREL AND SHOES

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Continuation-in-part of application Ser. No. 400,622, Sept. 21, 1964, which is a continuation-in-part of application Ser. No. 311,510, Sept. 25, 1963. This application Apr. 19, 1968, Ser. No. 722,584

Int. Cl. B32b 3/00, 25/00

U.S. Cl. 161—40 4 Claims

ABSTRACT OF THE DISCLOSURE

A transfer sheet carries a readily releasable thermoplastic substance which is applied to a fabric apparel such as a shoe upper to fill the voids of the fabric upon application of heat and pressure.

BACKGROUND OF INVENTION

This application is a continuation in part of copending application Ser. No. 400,622, filed Sept. 21, 1964 and now Pat. No. 3,380,869, which in turn is a continuation in part of abandoned application Ser. No. 311,510, filed Sept. 25, 1963.

This invention relates to a transfer for stiffening a fabric apparel such as a portion of a shoe, and more particularly to a 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.

SUMMARY OF INVENTION

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.

Although the application of this invention is described with specific reference to stiffening and reinforcing fabric shoe uppers, it is to be understood that the invention may also be practiced for reinforcing and/or stiffening other fabric apparel such as the knee or elbow portions of clothing.

THE DRAWINGS

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

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 it assumes in a finished shoe.

DETAILED DESCRIPTION

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. Where applied to other fabrics the pattern may be of any desirable shape. 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 readily releasable thermoplastic patterns, is then fed through pressure 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 polyterpene 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 formulation of substance **10** is as follows:

100 parts depolymerized rubber
3 parts zinc oxide
0.3 part sulfur
0.3 part Captax (a trademark of the R. T. Vanderbilt Co., for a rubber accelerator)
0.3 part Methyl Zimate (a trademark of the R. T. Vanderbilt Co. for an accelerator)
1.8 parts Mthyl Tuad (a trademark of the R. T. Vanderbilt Co. for an accelerator and vulcanizing agent)
200 parts Atomite filler (a trademark of the Thompson, Weinman & Co. for calcium carbonate)
30 parts paraffin wax

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

When used for reinforcing and/or stiffening other fabrics, other suitable thermoplastic substances may be used which might, of course, require a change in the operating temperatures and pressures. For example with certain known polymers the temperature range may be 350 to 425° F. and the pressure range from 2 to 5 p.s.i. Pressure means other than rollers may also be used, such as standard pressing equipment used in the garment manufacturing industry or even conventional household irons.

What is claimed is:

1. A transfer sheet for reinforcing a fabric apparel comprising a carrier sheet, a reinforcing substance on said carrier sheet, said reinforcing substance being disposed in a pattern similar to a portion of the apparel to be reinforced, and said reinforcing substance being a thermoplastic composition that enters the voids in said fabric when heat and pressure are applied to said substance and said fabric with said fabric being initially free of said substance whereby said substance impregnates said fabric to reinforce it, said pattern being half-moon shaped to correspond to the toe portion of a fabric shoe upper, and said pattern being slightly wider than the toe portion of said fabric shoe upper whereby registry of said pattern with said fabric shoe upper is facilitated.

2. A transfer sheet for reinforcing a fabric apparel comprising a carrier sheet, a reinforcing substance on said carrier sheet, said reinforcing substance being disposed in a pattern similar to a portion of the apparel to be reinforced, and said reinforcing substance being a thermoplastic composition that enters the voids in said fabric when heat and pressure are applied to said substance and said fabric with said fabric being initially free of said substance whereby said substance impregnates said fabric to reinforce it, said reinforcing substance including a mixture of thermoplastic material and low molecular weight rubber, with curing agents being added to said mixture, said pattern being half-moon shaped to correspond to the toe portion of a fabric shoe upper, said substance being on said sheet in a readily releasable herringbone pattern, and said pattern being slightly wider than the toe portion of said fabric shoe upper whereby registry of said pattern with said shoe upper is facilitated.

3. A transfer sheet as set forth in claim **4** in combination with a fabric shoe upper shaped cutout blank, said reinforcing substance being compatible with and remaining integral with said fabric cutout blank during its subsequent curing.

4. A transfer sheet as set forth in claim **4** in combination with a fabric shoe upper, said reinforcing substance being impregnated in the toe portion of said upper, and said reinforcing substance being compatible with and remaining integral with said fabric upper during its subsequent curing.

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U.S. Cl. X.R.

2—59, 62; 36—9, 47; 117—28; 156—230; 161—88, 167, 228, 232, 244, 406