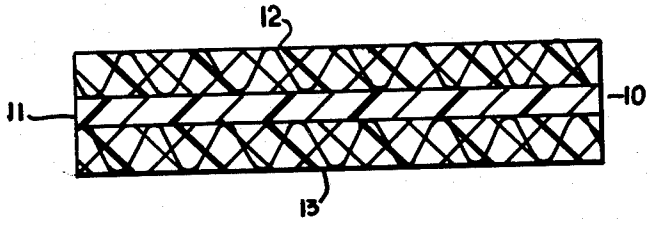
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STIFFENING SHOE COUNTERS

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INVENTOR
RUSSELL HAMILTON
by Ezekiel Wolf, Wolf & Greenfield
attorneys

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# STIFFENING SHOE COUNTERS

Russell Hamilton, East Orange, N.J., assignor to The Celastic Corporation, Kearny, N.J., a corporation of Delaware

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This invention relates to a new type of counter material for stiffening and shaping the heel portions of shoes, and more particularly it relates to a method of employing this counter material in manufacturing shoes in which the heel conforms exactly to the last.

Heel counters in the past have been made of flat pieces of leather which are lasted into shape during the shoe-making operations, but these types of counters lack the necessary stiffness unless they are made of thick sections, in which event, the leather must be softened by soaking in water for long periods prior to their incorporation into the shoe, and then must be held in place by an adhesive to eliminate looseness in the upper and the lining. In addition to the above-mentioned disadvantages of leather counters, they increase the bulkiness and the weight of the shoes, they do not readily conform to the complex curves of the last, and they tend to soften when the shoe subsequently comes into contact with water. If one attempts to use thin leather sections combined with an impregnated fabric stiffener, or to use a fabric stiffener alone, it is found to be almost impossible to insert the limp, solvent-treated fabric into the pocket formed by the shoe parts without rolling or folding the thin skived edge, and thereby destroying the smooth surface of the finished shoe. Furthermore, when the impregnated fabric is treated with a solvent it becomes so soft and limp that it faithfully reproduces every imperfection in the last and in the assembly of the heel and insole parts, thus accentuating, rather than hiding, the imperfection in the finished shoe. Moreover, a well made shoe exhibits a sharp corner where the upper joins the heel, and it is almost impossible to attain such a corner with a limp solvent-treated fabric counter. A more recent innovation is the use of preshaped counters of fiberboard leather, polyethylene, or polyethylene laminated to a fabric. These preshaped counters are not made in every conceivable size, nor even, in most cases, as a right-hand or a left-hand counter. Thus, a shoe employing such a counter often has a somewhat misshapen or loosely fitting heel because the shoe did not conform to the last. In shoes such a pumps or loafers, it is, of course, essential that the heel is properly shaped since this is the principal means for keeping the shoe on the foot.

A preformed counter material, such as that described and claimed in U.S. Patent 2,734,289 issued to W. H. Heaton and R. W. Morse on February 14, 1956, or U.S. Patent 2,738,600 issued to E. L. Shultz on March 20, 1956, is not completely desirable because the preformed shape, while it does bridge over imperfections in the last and in the assembly of the shoe parts, does not conform to the shoe last unless the preformed counter and the last happen to be the same size. At the present time, it is common practice to make preformed counters in three sizes only, while the last may be in any of the sizes of shoes sold today. Thus, in most instances, the last and the preformed counter do not match, and the resulting shoe is not a perfect reproduction of the last. Only by the use of a flat counter, which is pulled to the last of the shoe and formed at that time, may a perfect lasting be accomplished every time, regardless of fine differences in the placement, size, and countour of the insole, the upper materials, and the last.

It is an object of this invention to provide method of



making a shoe having a counter which is a laminate of a film-forming thermoplastic material and an impregnated fabric stiffener, and which is capable of conforming to any shoe last. It is a specific object of this invention to provide a flat counter material which may be applied to any shoe last to form a counter which conforms exactly to the last without duplicating minor imperfections in the last or in the assembly of shoe parts. Other objects will appear in the more detailed description of the invention which follows.

The above objects are accomplished by providing a stiffenable shoe counter material which is a flat laminate of one layer of a film-forming thermoplastic material, preferably polyethylene, 0.001–0.010 inch in thickness and bonded on each side to a lightweight fabric, preferably cotton flannel, impregnated with a polymeric material capable of being stiffened by the action of a solvent for the material. A suitable impregnating material is 50%–100% by weight of a vinyl polymer, preferably, a mixture of 1–3 parts by weight of polystyrene and 1 part by weight of a high styrene/low butadiene copolymer. The shoe counter, after being cut to size, skived, notched, and treated with a solvent for the impregnating resin, is inserted into the heel portion of a shoe, pulled into exact contact with the contour of the last, and, after being folded around the bottom of the heel to form a heel seat with a sharp corner, allowed to stiffen by evaporation of the solvent.

The stiffenable shoe counter material of this invention is illustrated in the drawing which shows a cross-sectional view of a flat laminate of this invention. The laminate **10** is made-up of a central layer of a film-forming thermoplastic material **11** and upper and lower fabric layers **12** and **13** respectively which are impregnated with a polymeric material.

The preferred, impregnated fabric is made by the process described and claimed in U.S. Patent 2,760,884 issued to G. L. Graf on August 28, 1956, and in copending patent applications Serial No. 445,184, filed by C. E. Hendricks on July 22, 1954, now Patent No. 2,805,962, and Serial No. 502,220, filed by G. L. Graf on April 18, 1955, now Patent No. 2,923,641. Alternatively, other types of impregnated fabrics, such as cotton flannel impregnated with nitrocellulose, or other known stiffening materials capable of being stiffened by the action of a solvent for the material, may be employed in the process of this invention. The fabrics impregnated with a latex of polystyrene and a copolymer of styrene/butadiene are preferred over other impregnated materials because they provide a higher stiffness per unit weight of fabric, and, therefore, are lighter than the other impregnated materials.

The film-forming thermoplastic material employed as the central layer **11** of the laminate **10** may be a polyolefin, a polyamide, a polyester, or other similar material, although polyethylene is preferred because of its stiffness, economy, and fabricability. The central layer of thermoplastic material may be laminated to the two impregnated fabrics by any known procedure, although extrusion-lamination is preferred. Extrusion-lamination is accomplished by extruding molten thermoplastic material in the form of a sheet between two pieces of the impregnated fabric described above. By applying pressure to the two fabrics, the molten or softened thermoplastic material is tightly bonded to the fibers of the fabric and a thin three-layer laminate is produced. Any other method of bonding the thermoplastic material to the impregnated fabric may also be used.

The fabric, prior to impregnation, may be any type of fibrous sheet material such as textiles, felts, or papers, but the preferred material is cotton flannel having a twill

or basket weave, a thickness caliper of 0.020–0.105 inch, and a weight of 0.16–0.86 pound per square yard.

The following example illustrates the method of incorporating the above-described counter into the heel portion of a shoe.

*Example*

A laminate of a central layer of polyethylene, 0.002–0.004 inch thick, and two outside layers of cotton flannel, impregnated with a polymeric material, were laminated into a flat sheet for use as a counter material. The polymeric impregnating material amounted to about 70% by weight of the untreated flannel and was formed of a mixture of 3 parts of polystyrene to 1 part of an 80/20 copolymer of styrene/butadiene. One of the flannel pieces was a heavier grade than the other, the heavier grade weighing about 0.34 pound per square yard prior to impregnation and the lighter grade weighing about 0.16 pound per square yard prior to impregnation. The laminate was then blanked to the size and shape of the desired counter and skived down to the polyethylene on the side of the heavy grade impregnated fabric, and notched along the edge which would form the heel seat. The flat, skived counter was dipped into a solvent consisting of 91% by weight of toluol and 9% by weight of naphtha. The wet counter was then inserted into the counter pocket between the upper and the lining with the skived side next to the upper, the stiffness of the polyethylene preventing the edge of the counter from rolling or folding. About one-half inch of the upper and the notched portion of the counter was left for the heel seat. The last was inserted into the shoe and the upper was tacked to the last and to the end of the insole. The upper was then pulled over the last and tacked in place. The notched portion was folded over the heel and insole and fastened in place, the polyethylene providing sufficient stiffness to cause the fold to be a sharp corner. After 5–7 days the heel portion was examined and found to be an exact reproduction of the shape of the last with sufficient rigidity to maintain that shape, and yet sufficiently flexible to be comfortable. The bond between the counter and the upper and the bond between the counter and the quarter lining was excellent. The outer surface of the shoe was smooth and free of any imperfections which might have been present in the last or the assembly of the parts of the shoe heel, and the corner at the heel seat was sharp. Other suitable counter materials have been made by employing an impregnating



resin containing 1–3 parts of polystyrene per 1 part of an 80/20 copolymer of styrene/butadiene.

The advantages of this type of counter material are:

(1) That the counter is not premolded,

(2) The impregnating medium furnishes a much stronger bond than any other known counter adhesive between the counter and the upper or the lining,

(3) That the counter may be stiffened by the action of a solvent for the impregnating medium in the fabric,

(4) The flat counter material can be shaped on the last to conform exactly to contour of the last,

(5) The counter is waterproof and will not soften nor break under normal usage, and

(6) The counter is cheaper, lighter, and less bulky than other known counters of high quality and of comparable stiffening ability.

I claim:

A flat counter material for shoes comprising a three-layered laminate, the central layer being a film-forming thermoplastic polymeric material 0.001–0.010 inch in thickness, and each of the two outside layers being a lightweight fabric impregnated with a latex of polystyrene and a copolymer of styrene/butadiene adapted simultaneously to be rendered adhesive and highly flexible when soaked by a solvent for said latex and capable of being stiffened by the evaporation of said solvent for said latex.


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