Nov. 29, 1932. J. FAUSSE ET AL 1,889,196

ART OF STIFFENING PARTS OF BOOTS AND SHOES

Filed April 30, 1928

Fig. 1.

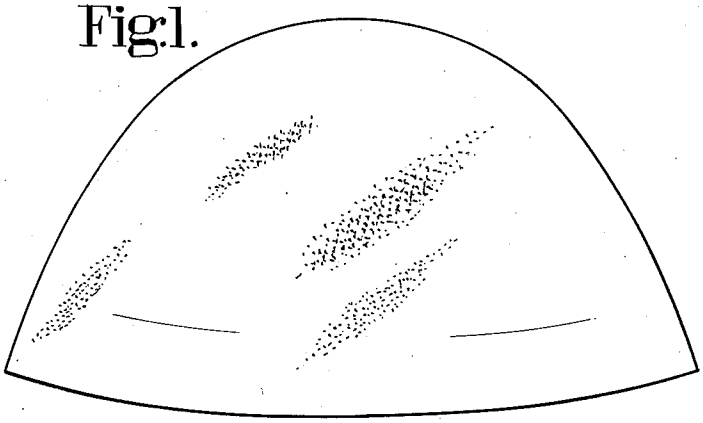


Fig. 2.

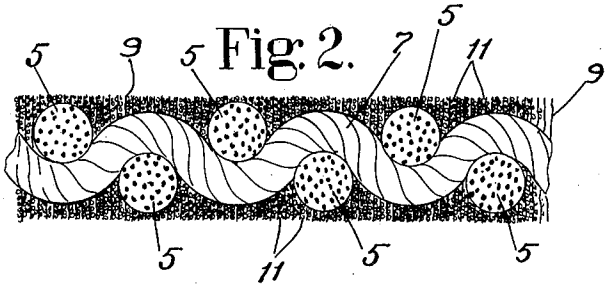
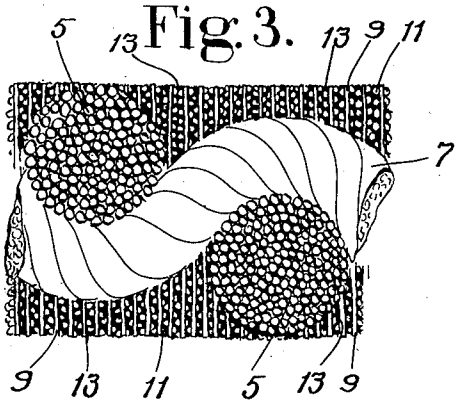


Fig. 3.



INVENTORS-
Joseph Fausse
Delgustus H. Boudrot
By their Attorney,
Nelson W. Howard

Patented Nov. 29, 1932 1,889,196

UNITED STATES PATENT OFFICE

JOSEPH FAUSSE, OF MELROSE, AND AUGUSTUS H. BOUDROT, OF BOSTON, MASSACHUSETTS, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE CELASTIC CORPORATION, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE

ART OF STIFFENING PARTS OF BOOTS AND SHOES

Application filed April 30, 1928. Serial No. 274,138.

This invention relates to the stiffening of parts of boots and shoes, to a stiffener blank, and to making said blank, the invention being herein described in its application to the stiffening of the toe portions of the uppers of boots and shoes although not limited in the scope of its application to this particular use.

In the manufacture of certain types of shoes, for example those in which no toe cap is used, it is customary to incorporate in the toe portion of the upper a stiffener commonly known as a "soft box toe". The requirements for a shoe containing such a stiffener are that the toe portion of the upper shall be maintained in its proper shape and restored to said shape after having been deformed, while at the same time said toe portion shall be comparatively soft and deformable as compared with the stiff toe portion of the ordinary shoe having a toe cap.

In order to satisfy these requirements, the invention, in one aspect, provides for treating a stiffener blank comprising a porous base containing a solid in finely divided condition with a resilient substance in a liquid carrier, incorporating the blank in the upper of a shoe and permitting the liquid carrier to evaporate or otherwise pass out of the blank.

As herein exemplified, a stiffener blank consisting of a piece of fabric, the interstices of which contain precipitated celluloid, is treated with rubber latex and assembled while wet in the upper of a shoe. During the pulling-over and lasting operations the stiffener is conformed to the last; and after an interval the rubber coagulates and binds together the particles of precipitated celluloid to produce a box toe which is comparatively soft and at the same time possesses enough strength and resilience to maintain its shape during wear of the shoe.

In another aspect, the invention provides a stiffener blank comprising a porous base containing a finely divided solid and a resilient substance.

In still another aspect the invention comprises depositing in the interstices of a porous shoe stiffener base finely divided particles of a solid and treating the resulting product with a resilient substance in solution or dispersion.

Referring now to the accompanying drawing,

Fig. 1 is an elevation of a box toe blank in which the present invention is embodied;

Fig. 2 is a cross-section on an enlarged scale of a portion of the fabric base containing finely divided solid material; and

Fig. 3 is a cross-section on a scale still further enlarged of a portion of the stiffener blank after it has been impregnated with the resilient material.

Stiffener blanks may be made ready for treatment with the resilient substance in various ways. For example, a sheet of felt or textile fabric may be passed through a bath consisting of a solution or a dispersion of a solid and then through a precipitating bath. For example, the solid may be a colloid, such as celluloid or a mixture of celluloid and rosin dispersed in a liquid such as acetone which is miscible with water, and the second bath may be a water bath. In such case the first bath serves to impregnate the absorbent sheet material with the colloid; and the second bath displaces the solvent and thereby precipitates the colloid in finely divided condition in the interstices of the sheet material. The resulting product, an example of which is disclosed in United States Letters Patent No. 1,353,520, granted Sept. 21, 1920, upon an application filed in the name of Stanley P. Lovell, although containing a considerable amount of the precipitated solid substance, is still very porous. From this material the stiffener blanks ready to be treated with the resilient substance may be died out and certain of their edges skived if desired.

Various other substances than those named above may be used. For example, any colloid which is solid at ordinary temperature and is capable of being dissolved in a solvent which is miscible with water could be employed. In this class of substances may be mentioned the esters of cellulose such as nitrocellulose and cellulose acetate which are soluble, for example, in diacetone alcohol. In this class also are the resins such as rosin,

dammar, copal, shellac and sandarac which are soluble, for example, in ethyl alcohol. Preferably a colloid is employed since colloidal precipitates are particularly adapted to cling to the fibers of the fabric or felt base; but any solid may be used which may conveniently be incorporated in finely divided condition in the absorbent material provided that said solid is insoluble in the liquid in which the rubber or other resilient material, subsequently to be added, is dissolved or dispersed.

Fig. 2 shows what is believed to be the structure of the blank at this stage when a woven fabric having a nap on both sides is used as a base. Such a fabric comprises warp threads 5 and weft threads, one of which is shown at 7, both warp and weft being made up of twisted fibres; and projecting from the threads are the fine fibres 9 of the nap. The small particles 11 of the finely divided solid—in the illustrated example celluloid—adhere to the fibres of the nap and to an extent to one another.

In the manufacture of a shoe, a blank such as that which has been described above is dipped into a suitable solution or dispersion of a resilient substance, for example, into an aqueous dispersion of rubber, such as natural or artificial rubber latex, and is then while wet assembled with the upper of a shoe. Thereafter, when the upper is subjected to the action of the pulling-over machine, the stiffener is conformed in general to the toe portion of the last, this conformation being completed by the subsequent operation of the lasting machine. The shoe is then allowed to stand until the water evaporates or otherwise passes out of the stiffener.

Fig. 3 shows what is believed to be the structure of the finished stiffener, the resilient substance 13—in the illustrated example rubber—having substantially filled the interstices between the particles of the celluloid and having bonded said particles together. It should be understood that the showings in Figs. 2 and 3 are what applicant believes may be the structure of the blank in two of its stages and are not represented as being strictly accurate.

The blank, before treatment with the rubber latex (Fig. 2), has some stiffness, practically no resilience and very little strength. After it has been treated with latex, incorporated in the shoe and allowed to stand (Fig. 3), its stiffness, resilience and strength have all increased so that, without being hard to the degree that an ordinary box toe is hard, it serves nevertheless to maintain the toe portion of the upper of the shoe in the shape imparted to said toe portion by the pulling-over and lasting operations and to cause it to return to that shape after having been deformed. The desirable qualities of the finished stiffener are due, it is believed, to the facts first, that the rubber acts as an adhesive to bind together the particles of the finely divided solid material in the base, and second, that the coagulated rubber forms, with the particles of the solid a layer which extends substantially continuously throughout or across the stiffener.

A soft box toe stiffener in the finished shoe should be somewhat stiffer throughout a zone extending along its sides and front portion than it is throughout its upper portion; and a stiffener of the kind described above has this desirable difference in stiffness due, it is believed, to the action of the wipers of the usual bed lasting machine in wiping the upper heightwise of the last preparatory to laying the margin of the upper over the insole, a machine of this type being shown in Letters Patent No. 1,018,477, granted Feb. 27, 1912, upon an application filed in the name of Matthias Brock. In the manufacture of boots and shoes, a considerable interval, commonly about five hours, intervenes between the pulling-over and the lasting operations; and during this interval the greater part of the water or other dispersing or solvent liquid passes from the stiffener, probably by reason of the capillary action of the fabric lining. When, therefore, the shoe reaches the lasting machine, the rubber is almost completely coagulated but is not quite dry and is more or less sticky and plastic. Consequently, when the shoe with the nearly dry stiffener is lasted, the wipers of the lasting machine compress the mixture of particles of the solid and of the rubber and bond the particles firmly together, with the result that the portions of the stiffener acted upon by these wipers have imparted to them an increased stiffness.

Although the invention has been set forth with particular reference to stiffeners made in a particular manner by the use of certain materials, and to the incorporation of such stiffeners in shoes, it should be understood that the invention is not limited in the scope of its application to the particular manner of making and using or the particular materials which have been described.

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

1. The method of making stiffened parts of boots and shoes which consists in treating a stiffener blank comprising a porous base containing a mass of solid particles in powdered form with a resilient substance in a liquid carrier, incorporating the blank in the upper of a shoe, conforming the upper and the blank to the last, and permitting the liquid carrier to pass out of the blank.

2. The method of making stiffened parts of boots and shoes which consists in treating a a stiffener blank comprising a porous base containing a precipitated solid in finely di-

vided condition with a resilient substance in a liquid carrier, incorporating the blank in the upper of a shoe, conforming the upper and the blank to the last, and permitting the liquid carrier to pass out of the blank.

3. The method of making stiffened parts of boots and shoes which consists in treating a stiffener blank comprising a porous base containing a precipitated cellulose ester in finely divided condition with a resilient substance in a liquid carrier, incorporating the blank in the upper of a shoe, conforming the upper and the blank to the last, and permitting the liquid carrier to pass out of the blank.

4. The method of making a stiffener of substantially homogeneous construction throughout which comprises depositing in the interstices of a porous base a mass of solid particles in powdered form, and thereafter treating the resulting product with a solution or dispersion of an adhesive substance which is resilient in its dry state.

5. The method of making a stiffener which comprises depositing in the interstices of a porous base a colloid, in finely divided condition, and thereafter treating the resulting product with a solution or dispersion of a resilient substance.

6. The method of making a stiffener of substantially homogeneous construction throughout which comprises depositing in the interstices of a porous base, a mass of solid particles in finely divided form, and thereafter treating the resulting product with an aqueous dispersion of rubber.

7. The method of making a stiffener which comprises depositing in the interstices of a porous base, a cellulose ester in finely divided condition, and thereafter treating the resulting product with an aqueous dispersion of rubber.

8. The method of making a stiffener which comprises precipitating a solid in a porous base, and thereafter treating the resulting product with a solution or dispersion of a resilient substance.

9. The method of making a stiffener which comprises precipitating a colloid in a porous base, and thereafter treating the resulting product with a solution or dispersion of a resilient substance.

10. The method of making a stiffener which comprises precipitating a solid in a porous base, and thereafter treating the resulting product with an aqueous dispersion of rubber.

11. A shoe stiffener of substantially homogeneous construction throughout comprising a porous base containing a mass of solid particles in solid form, and a resilient substance.

12. A shoe stiffener comprising a porous base containing a precipitated colloid, and a resilient substance.

13. A shoe stiffener blank of substantially homogeneous construction throughout comprising a porous base containing a mass of solid particles in powdered form, and impregnated with an aqueous dispersion of rubber.

14. A shoe having a portion of its upper supported by a stiffener comprising a porous base containing a precipitated solid in finely divided condition, and a resilient substance which binds the particles of the solid together.

15. A shoe stiffener comprising a fabric base, a mass of solid particles in powdered form distributed through the interior of the base, and a rubber matrix in which the fibres of the base and the particles are embedded, said stiffener consisting of a single sheet having a substantially homogeneous construction throughout.

In testimony whereof we have signed our names to this specification.

JOSEPH FAUSSE.
AUGUSTUS H. BOUDROT.