METHODS OF MAKING FLEXIBLE FOREPART SHOES

Fig. 1

Fig. 2
Coating of amylaceous material

Fig. 3

Fig. 4

Fig. 5

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This invention relates to methods of making shoes and particularly to methods whereby shoes having flexible foreparts may be produced.

Objects of the invention are to provide methods by which during the manufacture of the shoe the feather line of the insole may be maintained by stiffening means and, after the shoe is lasted and before the outsole is laid, the stiffness of the insole may be reduced.

The prior art discloses other methods of obtaining similar results by applying a stiffening element to the inner side of the insole as, for example, in United States Letters Patent No. 1,947,031, granted February 13, 1934, upon application of William H. Bain, and in my application Serial No. 470,995, filed November 24, 1954, in which I have disclosed a method which includes providing a pocket on the outer face of the insole, inserting a stiffening plate in the pocket and, after lasting the upper, removing the plate.

I have now discovered that similar results may be obtained by a method which consists in providing a thin flexible insole which has been stiffened on its outer face by material the stiffness of which can be reduced by treatment after the insole has been incorporated in a shoe, attaching an upper to the insole, treating the stiffening material to reduce its stiffness, and attaching an outsole to the shoe. This method may be practised by providing a thin flexible insole to the outer face of which amylaceous stiffening material has been applied. The insole is thus stiffened sufficiently to withstand the pulling-over and lasting operations without being displaced or distorted. Thus, the feather line of the insole is maintained. When the shoe has reached the stage in its manufacture at which the bottom filler, midsole or outsole is to be laid, the amylaceous material on the outer face of the insole is treated with an enzyme which, by changing the amylaceous material to a sugar, substantially reduces the stiffening effect. The marginal portions of the insole covered by the lasted upper need not be treated with the enzyme since the stiffening material in this part of the insole has a shape-retaining advantage during the wear of the shoe.

Instead of applying stiffening material directly to the outer face of the insole, I find it preferable to peripherally attach to the outer face of the insole, as by a fine seam, a layer of fabric coextensive with the forepart, which fabric has been stiffened with amylaceous stiffening material. The fabric readily absorbs this stiffening material and, being secured to the insole, serves to maintain the feather line of the shoe during lasting. Before the outsole is laid the exposed portion of the fabric is treated with an enzyme such as diastase to reduce the stiffening effect of the amylaceous material. That is, the amylaceous material is converted to sugar which has little stiffening effect and which, if desired, may be substantially removed by treating the fabric with hot water.

In case a shoe having a welt is desired, the stiffened insole may be attached to an upper, a welt attached to the insole and upper, for example, by through-and-through stitching, while guiding the position of the welt by the stiffened insole, thus maintaining the feather line of the shoe, then reducing the stiffness of the insole and attaching an outsole to the welt.

In the drawings—

Fig. 1 is a perspective view of a full-length insole of flexible material;

Fig. 2 is a perspective view of a shank-and-heel piece skived at its front end;

Fig. 3 is a perspective view showing the shank-and-heel piece of Fig. 2 applied to the insole of Fig. 1 and showing the outer face of the forepart of the insole coated with amylaceous material;

Fig. 4 is a perspective view of a thin flexible insole forepart;

Fig. 5 is a perspective view showing the shank piece of Fig. 2 applied to the thin flexible forepart of Fig. 4;

Fig. 6 is a sectional view showing the insole of Fig. 3 applied to a last and an upper lasted over the insole;

Fig. 7 is a view similar to Fig. 6 showing an outsole cement-attached to the shoe;

Fig. 8 is a perspective view of a modification of the insole of Fig. 3, this view showing the forepart of the insole provided with a piece of fabric impregnated with amylaceous material;

Fig. 9 is a perspective view of a modification of the insole of Fig. 5, this view showing the forepart of the insole provided with a stiffening fabric similar to that shown in Fig. 8;

Fig. 10 is a sectional view showing the insole of Fig. 8 or Fig. 9 applied to a last and an upper lasted over it;

Fig. 11 is a view similar to Fig. 10 after attachment of the outsole; and

Fig. 12 is a sectional view of a portion of a welt shoe made by the present method.

In the drawings, Fig. 1 shows the outer face of a full-length flexible insole 10, preferably of leather. Fig. 2 shows a shank-and-heel piece 12 which may be of substantial thickness and of the usual fibrous material. Fig. 3 shows the insole 10 after the shank-and-heel piece 12 has been cemented to its shank-and-heel portion. The outer face of the forepart 10 has applied to it a coating 14 of amylaceous material such as cornstarch temporarily to stiffen the forepart of the insole so as to withstand the operations of pulling over and lasting the upper over it without being bent or rucked up. Thus the feather line of the insole is maintained.

For the sake of economy of material, a thin flexible material such as that of the insole 10 may be confined to the forepart only of the insole. That is, a forepart piece 16 (Fig. 4) of thin flexible material may be skived and secured by a seam 18 to the skived front end of the shank-and-heel piece 12, as shown in Fig. 5. To the outer face of this insole is applied a liquid coating of amylaceous stiffening material as there shown. An insole so treated, as shown in Figs. 3, 4 and 5, may be secured to the bottom of a last 20 and an upper 22 lasted over it and secured, for example, by cement (Fig. 6). A solution of an enzyme, preferably hot (140° F.), is then applied to the exposed amylaceous material to change the amylaceous material to sugar, thus reducing the stiffness of the forepart of the insole. If desired, the sugar may be removed by the application of warm water. An outsole 28 may then be attached, for example, by cement with or without a filler or shank stiffener and the shoe completed as usual (Fig. 7).

Since fabric will absorb a greater amount of starch than leather, it is preferred to attach to the outer face of the forepart of an insole, such as that shown in Fig. 1 or Fig. 5, a starch-stiffened piece of fabric 24 coextensive with the forepart of the insole, the attachment being
preferably made by sewing the stiffened fabric 24 to the insole by a fine seam 26 close to its outer edge. The peripheral attachment of the stiffening fabric to the insole assures that the insole will stay in place on the last bottom and will not be rucked up or otherwise disturbed during the lasting operation and that the feather line of the shoe will be thus maintained. The fabric 24, of course, takes the place of the coating 14 of Figs. 3 and 5.

The insole thus prepared, as shown in Fig. 8 or Fig. 9, is attached to the last 20 (Fig. 10). The upper 22 is assembled thereon, lasted over the fabric layer 24 and attached thereto, for example, by cement. The exposed portion of the layer of fabric 24 is then treated with an enzyme such as diastase dissolved in hot water. The sugar formed by action of the diastase may, if desired, be substantially removed by the application of warm water to the exposed portion of the fabric. An outsole 28 (Fig. 11) may then be attached to the shoe, for example, by cement, with or without the use of a filler.

Since the outer margin of the fabric 24 is covered by the lasting margin of the upper, the treatment with diastase does not extend to the outer edge of the fabric but leaves a narrow margin untouched by the diastase which preserves a firm feather line on the insole in the finished shoe and during wear thereof.

If a shoe having a welt is desired, the procedure disclosed in Fig. 12 may be followed. Either of the shoes in Fig. 6 or Fig. 10 with the last removed and while the insole is still stiffened with amylaceous material may have a welt 30 sewed to it by through-and-through stitches 32 such as lockstitches, the location of the welt being guided by the stiffened insole, the feather line of the shoe being thus maintained. The stiffness of the insole is then reduced by application of an enzyme to the insole and an outsole 34 is attached to the shoe by a seam 36, preferably after a filling 38 has been applied to the shoe bottom.

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

1. That improvement in methods of making flexible shoes which consists in providing a flexible insole stiffened with amylaceous material to maintain the feather line of the shoe, completing the shoe to the stage where an outsole is to be applied, then reducing the stiffness of the insole by applying an enzyme to the amylaceous material, and then applying the outsole.

2. That improvement in methods of making flexible shoes which consists in providing a thin flexible insole stiffened with amylaceous material, attaching a shoe upper to said insole, reducing the stiffness of the insole by applying a hot solution of an enzyme to the amylaceous material, and removing the sugar so formed by the application of hot water to the insole.

3. That improvement in methods of making shoes which consists in providing an insole having a thin flexible forepart to which a coextensive layer of fabric stiffened with starch has been applied, assembling the insole and an upper upon a last, lasting the upper to the insole, treating the layer of fabric with diastase to convert the starch to sugar, and attaching an outsole to the shoe.

4. That improvement in methods of making shoes which consists in providing an insole having a thin flexible forepart to the forepart of which a coextensive layer of fabric stiffened with starch has been peripherally attached by a fine seam, assembling the insole and an upper upon a last, lasting the upper to the insole, treating the fabric layer with a hot solution of diastase to convert the starch to sugar, thereby reducing the stiffness of the insole, attaching an outsole, and completing the shoe.

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