Oct. 7, 1930. H. H. BECKWITH 1,777,544

SHOE AND METHOD OF FIXING SHOE STIFFENERS IN POSITION THEREIN

Filed July 7, 1924

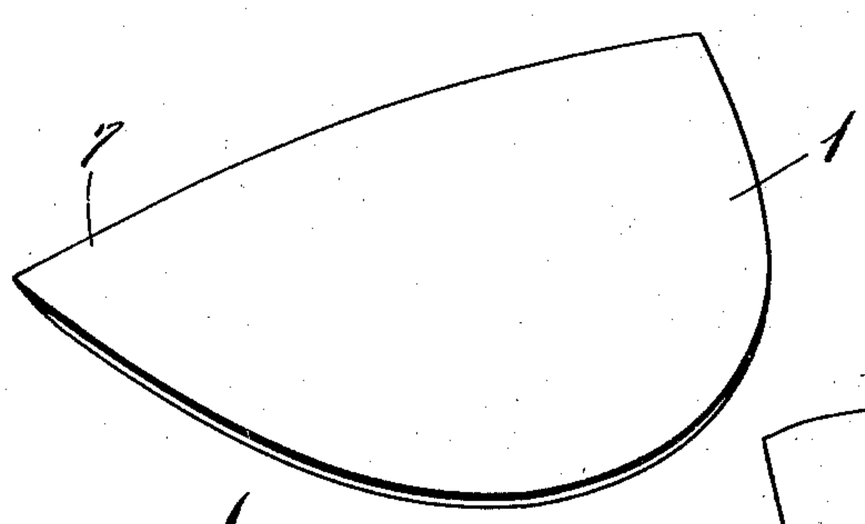

Fig. 1.

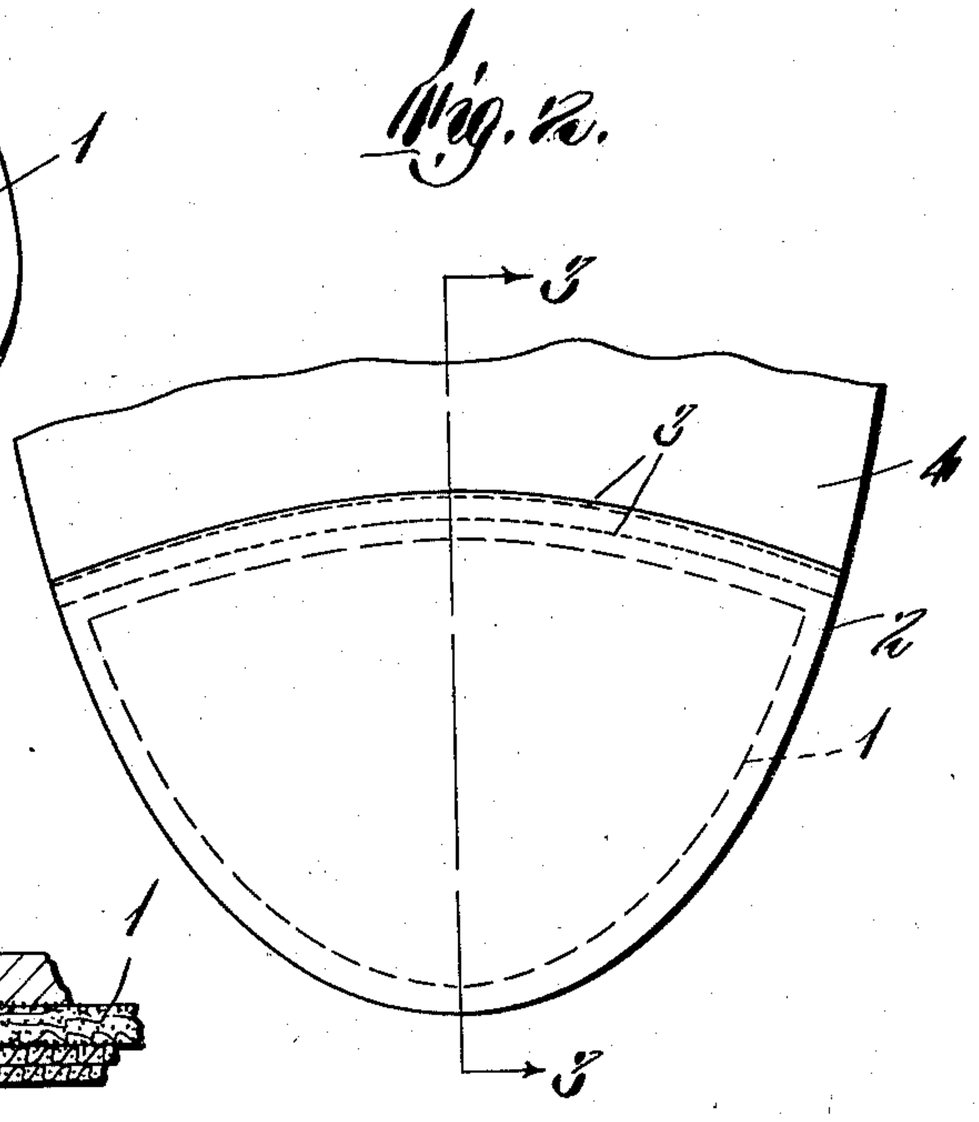

Fig. 2.

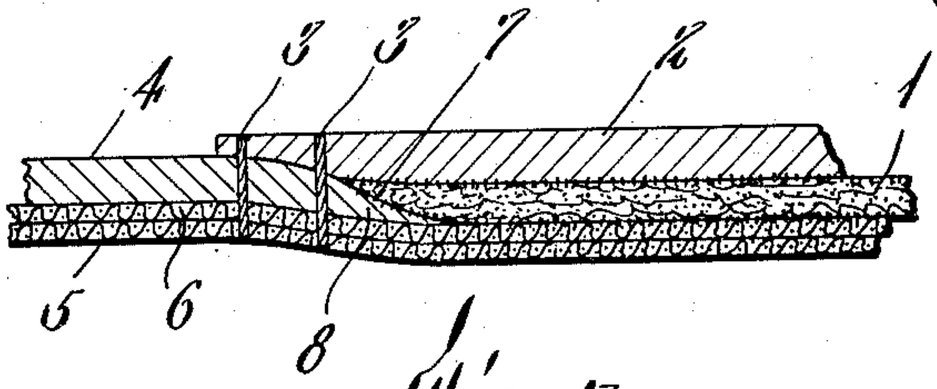

Fig. 3.

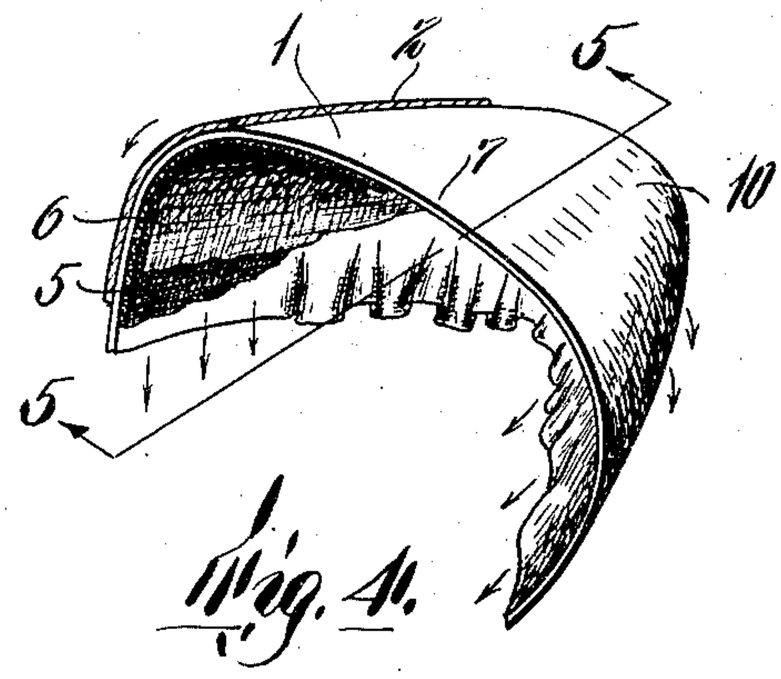

Fig. 4.

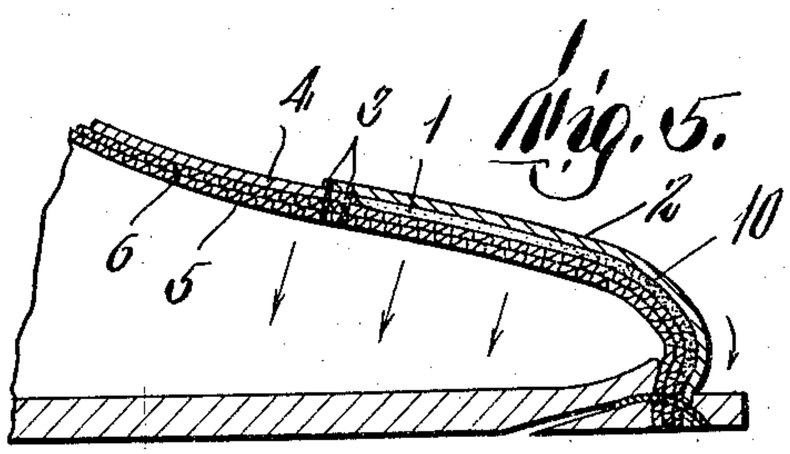

Fig. 5.

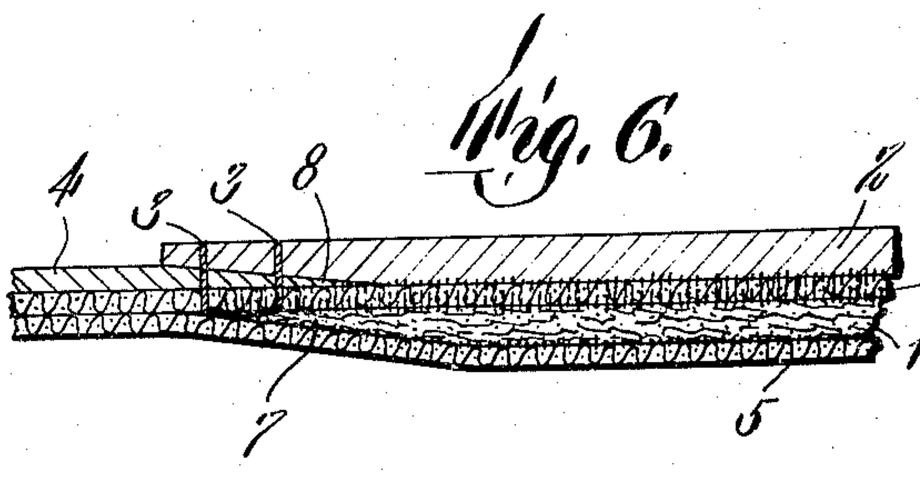

Fig. 6.

Inventor:
Harry H. Beckwith.
by Cushman Darby & Cushman
Attys.

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UNITED STATES PATENT OFFICE

HARRY H. BECKWITH, OF BROOKLINE, MASSACHUSETTS

SHOE AND METHOD OF FIXING SHOE STIFFENERS IN POSITION THEREIN

Application filed July 7, 1924. Serial No. 724,560.

Toe stiffeners for shoes have commonly been fixed in position by being stitched to the upper prior to the lasting operation, or by the use of a cement such as rubber cement, or in case of stiffeners formed of fibrous sheet material saturated with thermoplastic material, by thermoplastic material exuded therefrom by subjecting the parts to be united to heat and pressure.

The adhesives heretofore used have been somewhat unsatisfactory, either employing a volatile solvent which often penetrates the leather of the upper and stains it or necessitating the use of heat or heat and pressure. The solvents have been expensive and often dangerous and the adhesion has not been entirely satisfactory.

The present invention relates to the use of rubber in the form of an aqueous dispersion such as natural or artificial latex for the adhesive material. By the use of this material a very close adhesion of the parts is readily effected without the use of heat treatment and without danger of staining the leather. The stiffener blank, the shoe lining, or the leather upper, has a smear of latex applied thereto, the parts are then assembled while the latex is tacky and pressure is applied under atmospheric temperatures, and union of the parts of a high order of strength is obtained. This operation is no wise comparable to sticking with rubber cement. The attachment is much firmer when the latex is employed and there is no penetration of the leather or upper which is difficult to avoid when cements containing a rubber solvent are used.

There are available suspensions of rubber in water quite comparable to natural latex in that no rubber solvent is present, and such suspensions may be employed in the practice of this invention in the same manner as the natural latex. The term "latex" as used in this application is therefore intended to cover these artificial suspensions as well as the natural latex.

For a more complete understanding of this invention reference may be had to the accompanying drawings in which

Figure 1 is a perspective of a toe stiffener blank

Figure 2 is a fragmentary plan of the toe portion of a shoe upper having the blank incorporated therein.

Figure 3 is a section on line 3—3 of Figure 2.

Figure 4 is a fragmentary perspective showing the stiffener as incorporated in the shoe after the shoe has been lasted.

Figure 5 is a section through the forward portion of the lasted shoe on line 5—5 of Figure 4.

Figure 6 is a section somewhat similar to Figure 3, but illustrating a modification.

A toe stiffener blank such as is shown at 1 in Figure 1 is to be fixed to the portions of a shoe upper, as shown in Figure 3, in which 2 indicates the toe piece which is attached along its rear edge as by stitching lines 3 to the forward portion of the cut vamp 4. At 5 is shown the lining of the shoe and at 6 a doubler. The rear edge of the blank 1 which is formed thin, as shown at 7, is inserted between the forwardly projecting edge 8 of the vamp and the toe piece, after the toe stiffener, the toe piece 2 or the doubler, or any of these parts, have been smeared with a coating of the latex. The latex may be applied over the entire surface of the stiffener if desired, or it may be applied only adjacent to its rear edge. The parts are then subjected to pressure under atmospheric temperature to secure adhesion.

Beside the advantage of prompt and efficient sticking of the parts there are collateral advantages in the use of latex as an adhesive material. For example, rubber-covered toe parts are much more safe from cracking by flexure than when no such rubber is present. Also if the blank is formed of fibrous material saturated with a thermoplastic stiffening agent and the thinner parts of the blank nearer the instep be covered with rubber in this manner, the subsequent heating and molding of the box in the lasting operation, as illustrated in Figures 4 and 5, causes a portion of the thermoplastic material to flow forwardly toward the toe portion of the shoe, as shown at 10 in Figures 4 and 5, and the rubber covering of the stiffener being impervious thereto prevents the thermoplastic material

from exuding therefrom. This will be apparent from an inspection of Figures 4 and 5 in which it will be seen that the forces exerted when the upper is pulled into position during the lasting operation, as shown by the arrows, causes considerable pressure to be exerted between the upper and the last over the rear portions of the stiffener and a concentration of the fibrous material where the blank is gathered together over the curve of the toe as at 10. The thermoplastic material in the stiffener is thus squeezed forward so that it is somewhat impoverished along its rear edge where flexibility is desirable and is present in a greater amount even relative to the amount of fibrous material at the curve of the toe, as at 10, where maximum stiffness and hardness is desirable. When the parts are permitted to cool after the lasting operation, therefore, the maximum stiffness is at the curve 10 where it is most desirable and the rear portion of the stiffener is flexible, which is also desirable.

The heating of the stiffener and adjacent parts in order to soften the thermoplastic so that the stiffener may be shaped to the last in the lasting operation, also causes the rubber to become more tacky, the temperatures used being, however, insufficiently high to cause breaking down of the rubber.

Any suitable thermoplastic compound is employed as the stiffening agent for the box toe which will soften at such moderate temperatures as to render the box toe blank limp and moldable without injury to the other parts of the shoe. The usual agents may thus be employed such as various gums, resinous or hydrocarbon materials, Montan wax, or the like or combinations thereof.

In Figure 6 a modified construction is shown in which the stiffener 1 is placed within the doubler 6, the latex penetrating this doubler and fixing both the stiffener and the doubler firmly to the under face of the toe piece 2.

Where a separate toe piece stitched to the vamp is employed, as is shown in Figures 3 and 6, the use of the latex causes the forwardly projecting edge portion 8 of the vamp to be firmly held against wrinkling, which is a difficulty often experienced in shoes made up in this manner where other methods of fixing the toe stiffener in position have been employed. Of course the toe piece might be integral with the vamp if desired.

Having thus described this invention, what is claimed is:

1. The method which comprises coating with latex a shoe stiffener comprising a fibrous base saturated with thermoplastic material, incorporating the coated stiffener in a shoe upper while the latex is tacky and pressing it into close union therewith, heating the parts to soften the thermoplastic material to permit it to flow within the stiffener, and then lasting in the upper.

2. The method of attaching shoe parts comprising a shoe upper and a stiffener formed of fibrous material saturated with a thermoplastic, which comprises smearing one of said parts with latex and uniting them under pressure.

3. A shoe comprising an upper, a doubler, a lining, and a shoe stiffener comprising thermoplastic material interposed between said lining and doubler and fixed in position by rubber saturating said doubler and adhering to said lining and stiffener.

4. A shoe comprising an upper having incorporated therein a toe stiffener comprising fibrous material saturated with a thermoplastic, said stiffener being united to said upper by rubber, said upper being free from rubber-solvent stains and the bond between the stiffener and upper having the great tenacity characteristic of the rubber having been applied in the form of latex.

5. A shoe comprising an upper having incorporated therein a stiffener comprising fibrous sheet material saturated with a thermoplastic and united to said upper by rubber, said upper being free from rubber-solvent stains and the bond between the stiffener and upper having the great tenacity characteristic of the rubber having been applied in the form of latex, said rubber coating the stiffener and sealing the thermoplastic therein.

6. A shoe comprising an upper having incorporated therein a stiffener comprising fibrous sheet material saturated with a thermoplastic and united to said upper by rubber, said upper being free from rubber-solvent stains and the bond between the stiffener and upper having the great tenacity characteristic of the rubber having been applied in the form of latex, said rubber coating the stiffener and sealing the thermoplastic therein the amount of thermoplastic being relatively great at the forward portion of said stiffener and relatively small adjacent to its rear edge.

7. A shoe comprising an upper having incorporated therein a stiffener comprising fibrous sheet material saturated with a stiffening agent, said stiffener being coated with rubber which also bonds said stiffener with said upper, the proportion of stiffening agent to fibrous material being greater at the forward portion of the stiffener than rearwardly thereof.

In testimony whereof I have affixed my signature.

HARRY H. BECKWITH.