Sept. 2, 1941. S. P. LOVELL 2,254,228

SHOEMAKING

Filed May 22, 1939

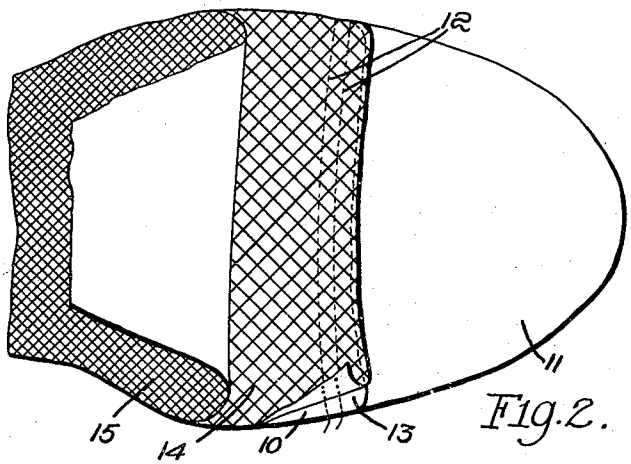


Fig. 1.

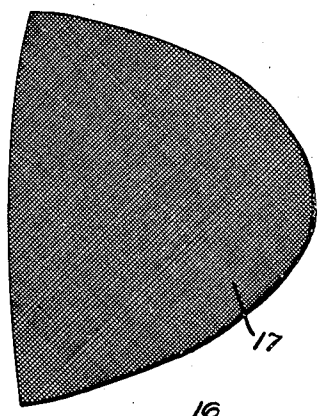


Fig. 2.

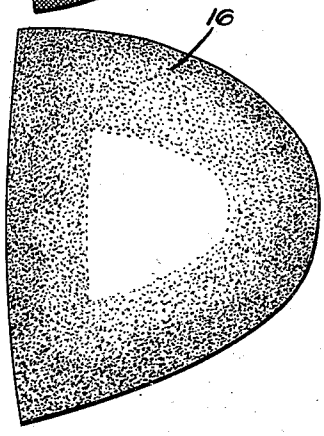


Fig. 3.

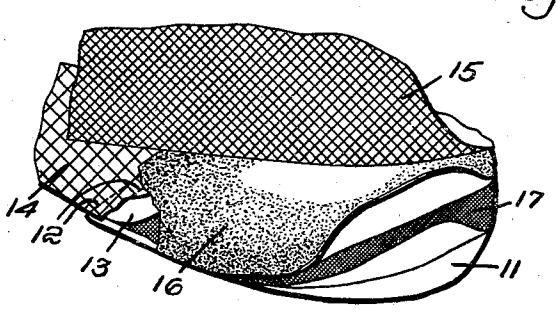


Fig. 4.

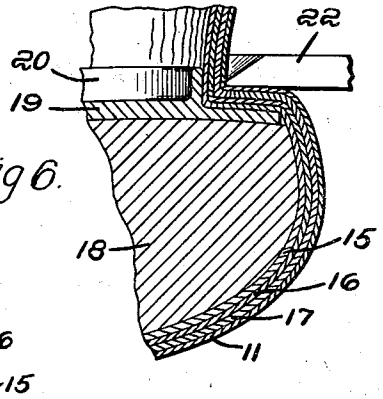


Fig. 6.

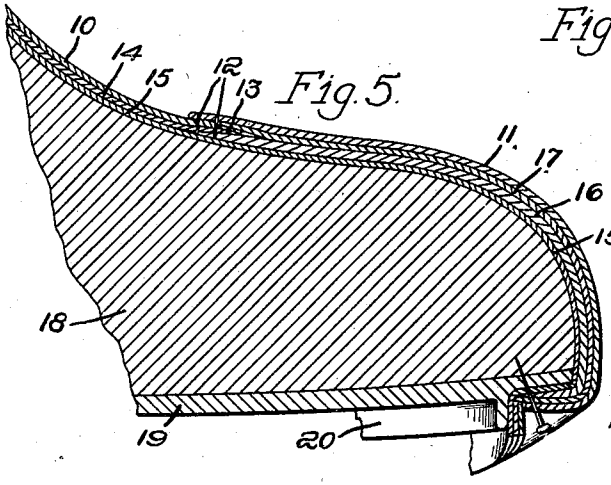


Fig. 5.

Inventor
Stanley P. Lovell.
by Pennway & Witter
Attorneys

Patented Sept. 2, 1941 2,254,228

UNITED STATES PATENT OFFICE

2,254,228

SHOEMAKING

Stanley P. Lovell, Newton Center, Mass., assignor to Beckwith Manufacturing Company, Dover, N. H., a corporation of New Hampshire

Application May 22, 1939, Serial No. 274,913

7 Claims. (Cl. 12—145)

The present invention relates to the manufacture of shoes and more particularly to the manufacture of shoes employing a tip cut separately and stitched to the vamp. The invention comprises a novel method of manufacturing such shoes with a unit-bonded structure of forepart, and includes within its scope a novel tip liner which forms a part of that structure.

In stitched tip shoes it is essential that the forward end of the vamp should underlie the rear end of the toe tip, and the underlying portion is known in the shoe trade as the "vamp cut-off." While the upper is being assembled, it is common practice to introduce a fabric doubler between the tip and the box toe with the result that the forepart structure of the upper generally consists of the leather tip (underlaid to some extent by the vamp-cut-off), the tip doubler (generally of flannel), the box toe, and the shoe lining. Subsequently, when the shoe is subjected to wear, the natural motion of the foot causes the vamp to transmit a forward pressure against the tip. Even though the tip his under it the stiffness of the box toe, the vamp cut-off responds to this pressure by wrinkling transversely or laterally of the shoe. This lateral wrinkling is a well-known and unsightly defect in a great many shoes so produced and is particularly objectionable and conspicuous in shoes made of light leather such as kid or kangaroo.

The primary object of the present invention is to solve the problem presented by this defect and prevent the formation of wrinkles originating in the vamp cut-off. I have discovered that by placing between the vamp cut-off and the surface of the tip a liner of properly fabricated and treated material the difficulties above discussed may be completely avoided. The liner of my invention is fabricated from the point of view of the type of box toe to be employed in the shoe and may carry or be impregnated with a stiffening material capable of being temporarily softened by the same agency that is effective to soften the box toe. For example, when I employ a box toe of thermoplastic nature which is inserted in a heated condition in the shoe upper, I may supply a liner consisting of sheet material impregnated with or coated by a compound present in a dry, hard condition but sensitive to heat. The use of such a liner makes it possible, though not necessary, to cut off the vamp doubler at the line of the tip stitching. The box toe blank may then be laid directly against the liner, and its residual heat becomes effective to activate the liner by softening or resoftening its thermoplastic ingredient. Thus the box toe blank and the liner are both temporarily softened and rendered adhesive, and in that condition they may be shaped and simultaneously bonded to each other, to the tip, and also to the lining if desired, thereby converting the forepart of the upper into a unit-bonded structure. This bonding may be partially or completely effected at the pulling over operation or shortly thereafter; or the final and complete bonding of the parts may be delayed until the toe lasting operation takes place.

If the box toe to be used in the shoemaking process is of the solvent-softenable type, such for example as one consisting essentially of a pyroxylin deposit in a fabric base, the liner of my invention may comprise a similar fabric sheet but impregnated or coated with a light pyroxylin load or with pyroxylin compounded with soluble gums, such as gum damar, gum copal, or the like. Here again the box toe blank is inserted in the shoe upper in treated or activated condition, as by being wetted with an organic solvent, and this softening agent in evaporating from the box toe temporarily softens the liner rendering both the box toe and the liner plastic and highly adhesive.

If the box toe employed in the shoemaking process consists in a fabric base carrying water soluble colloids such as glue, dextrin, casein and the like, the liner of my invention may in that instance comprise fabric saturated or coated with a light application of glue, gum arabic, or other suitable water softenable adhesive which is present in a dry, hard condition. In any of the three examples above discussed it will be found that when the shoe is completed, the softening agency, be it heat, solvent or moisture, in passing by evaporation or conduction from the box toe blank has made my liner thoroughly cement the tip and box toe together and has also formed a complete and permanent bond between the liner, the tip, and the lining of the shoe.

As a further and optional feature my invention contemplates utilizing the unit-bonded structure of the forepart in carrying out an improved bed lasting operation in which it is possible to eliminate the customary wiring of the toe. Toe wires are commonly secured in position about the toe portion of the upper by tacks, and it is well known that the tacks and wires together cause a heavy damage factor in shoemaking. The unit-bonded structure of the fore-

part above discussed presents an upper at the bed lasting operation which can be wiped into proper position upon the insole as if it were one piece of material, even though it is acutally made up of bonded lining, box toe, special liner and tip. In taking advantage of this condition I apply to the channel or lip of the insole a cementitious material of such character that it can be activated by the same agency as that employed primarily for softening the box toe and liner before lasting. Then when the wipers of the bed laster are advanced, they bring the bonded upper with firm pressure tightly against the lip of the insole rendered adhesive by this cement, and the forepart is thus held securely in lasted position and ready for the stitching operation without any necessity for extraneous metallic fasteners.

These and other features and characteristics of my invention will be best understood and appreciated from the following description of a preferred manner of carrying it into effect, selected for purposes of illustration and suggested in the accompanying drawing, in which—

Fig. 1 is a view showing a lined upper ready to have a box toe blank and tip liner assembled therewith.

Figs. 2 and 3 are plan views respectively of the box toe blank and tip liner.

Fig. 4 is a fragmentary view showing the same parts in their assembled relation,

Fig. 5 is a sectional view on an enlarged scale showing the upper in pulled-over condition, and

Fig. 6 is a fragmentary sectional view showing the upper and toe portion in lasted condition.

In Fig. 1 is shown, in inverted position, the upper of a man's shoe ready to be placed upon the last and comprising a leather vamp **10** having a leather toe tip **11** stitched thereto by a double line of tip stitching **12** and having a vamp cut-off **13** underlying the tip for perhaps one quarter of an inch in advance of the tip stitching line. The vamp as herein shown is provided with a textile fabric doubler **14** which is attached to the vamp by the lines of tip stitching and is substantially coextensive with the vamp in size and shape. The whole upper, including the vamp, is also provided with a textile fabric lining **15** which is substantially coextensive with the combined vamp and tip. It is attached to the vamp at the back seam, not shown, and in Fig. 1 is represented as folded back to expose the parts of the upper ordinarily lying beneath it.

In making up a shoe with the upper shown in Fig. 1 it is good commercial practice to employ a thermoplastic box toe. The blank **16** for such a box toe comprises a fibrous base shaped to correspond to the tip and impregnated or coated with resinous material or gums capable of being temporarily softened by the application of heat and of stiffening again when cooled. A thermoplastic blank such as that herein shown is usually heated until it becomes soft, pliable and adhesive and then placed in the upper in that condition and shaped with the upper to the last.

In those instances where a thermoplastic box toe is employed in the upper I propose to combine therewith a novel tip liner shaped to fit within the toe portion of the upper and impregnated with or coated with a stiffening compound present in a hard, cool condition but sensitive to heat. In its preferred form my novel liner may comprise a cotton fabric sheet, for example, with a count of 60 warp and 68 filling threads per inch impregnated or coated with a thermoplastic composition consisting approximately of rubber 40%, rosin 30%, candelilla wax 30%, to a load approximating 6 oz. per 40 inch yard. A blank **17** for such a liner is shown in Fig. 2 ready to be inserted directly upon the inner face of the tip **11** with its rear edge slipped under the vamp cut-off **13**. If preferred the liner **17** may be stitched into the upper by being caught in the tip stitch line. It is essential only that the liner be substantially coextensive in size with the tip and capable of being rendered plastic and adhesive by the heat to which it is to be subsequently subjected by contact with the heated box toe blank. In this sense it may be said that the liner and the box toe blank are responsive to the same activating agency, viz. heat.

Fig. 4 suggests the steps of inserting the liner **17** upon the tip **11**, covering the liner by the heated and softened, or activated, box toe blank **16** and laying the upper lining **15** smoothly over the vamp and the plies assembled upon the tip. As already explained the heat of the activated box toe blank is effective at once to render the liner **17** plastic and adhesive so that it adheres to the tip **11** on one face and to the box toe blank **16** at its other face. The box toe blank being also plastic and adhesive likewise adheres to the lining **15**. The activated box toe blank is preferably placed in the upper upon the liner **17** immediately before the pulling-over operation and in the latter step the layers of the tip are shaped to conform to the contour of the forepart of the last and are drawn forcibly over the last with the development of pressure sufficient to bond all parts of the tip into a unit structure. From that point on in the manufacture of the shoe the forepart of the upper may be treated as a unit and certain important advantages in lasting are incident to that fact.

Fig. 5 suggests the pulling-over step, the upper being shown as assembled on the last **18** carrying an insole **19** and positioned thereon by pulling-over tacks **21**, one of which is shown in this figure as driven into the tread face of the last. In this figure the thickness of the several parts of the upper is greatly exaggerated for the sake of clearness.

The partially formed shoe is now, or after side lasting, ready for the bed lasting operation upon the toe and this is effected by wiping the margin of the upper inwardly over the bottom of the last **18** and conforming it to the contour of the insole rib **20** to which it is eventually sewn in the welting operation. In the past the separate plies of the tip and lining have necessitated the exercise of great shoemaking skill on the part of the laster. In fact the lining has often been separately lasted and the elaborate mechanism of toe wiring has been resorted to for the purpose of maintaining all plies of the tip in conformity to the last until the upper can become set to the shape of the last. All this is obviated in accordance with the present invention, for, as already noted, the unit-bonded tip may be lasted as if it were an integral single ply of sheet material.

Moreover, I propose to eliminate extraneous fasteners by adhesively uniting this unit-bonded material to the insole rib. To this end I apply to the channel or to the insole lip a cementitious material which may be rendered adhesive by the same agency that is employed primarily to soften the box toe blank. The partially completed shoe is then placed in a bed lasting machine, as suggested in Fig. 6, and the wipers **22** are advanced

to bring the bonded upper with tight pressure against the cemented lip. The forepart of the upper is thus held by cement in lasted position when the wipers are retracted and is ready for the welt sewing operation. Since lasting tacks, anchor tacks and the toe wire are thus eliminated, there is nothing to obstruct the passage of the needle and consequently the sewing operation is greatly facilitated and a troublesome and expensive source of damage is removed from the shoemaking process.

Where a thermoplastic box toe and liner are employed the cement used upon the insole rib should be responsive to heat and for this purpose I have found very satisfactory a cement consisting of polymerized vinyl acetate with or without the addition of rosin. This is easily applied by dissolving the desired amount of polymerized vinyl acetate in benzol or toluol and then painting the solution on the insole lip and allowing the solvent to dry, thus depositing the cementitious compound in place. This compound, it will be understood, is rendered adhesive by heat transmitted to it from the margin of the upper material which has been heated preparatory to the lasting operation to render the overlasted margin plastic in condition.

In those instances where it is desired to employ a solvent softenable box toe blank consisting, for example, of a pyroxylin deposit on a fabric base, I propose to employ a liner of cotton fabric of the character above described but impregnated or coated with a light pyroxylin load, such as Celluloid lacquer, or with a pyroxylin compound with soluble gums such as gum damar, gum copal, and the like. The cotton liner may be coated at any convenient time, either when positioned on the tip or separately before it is assembled on the tip. In using this combination the box toe blank is softened and rendered adhesive by being dipped in acetone, ethyl acetate or the like and then placed in position upon the liner which has already been assembled with the tip blank of the upper and is now present in a hard, dry condition. As the solvent leaves the box toe blank on the last the solvent vapor therefrom necessarily makes plastic and highly adhesive the liner located next to the tip by softening or resoftening its pyroxylin deposit, and in a manner similar to that already described the various plies of the upper are adhesively united in a unit-bonded structure.

In those instances where it is desired to employ water softenable box toe blanks consisting, for example, of a fabric base carrying water-soluble colloids such as glue, dextrin, casein and the like, I propose to employ a liner of textile fabric saturated or coated with a light application of glue, gum arabic or other suitable water softenable adhesive. In using this combination the box toe blank is softened and rendered adhesive by being dipped or spread with water and then placed in position upon the liner which has already been assembled with the tip blank of the upper and coated in place or previously with its adhesive which is now present in hard, dry condition. As the moisture leaves the box toe blank on the last it renders plastic and highly adhesive the liner located next to the tip, and in the manner similar to that already described the various plies of the upper are adhesively united in a unit-bonded structure.

In addition to the advantages above discussed the employment of the novel tip liner of the character disclosed in connection with a thermoplastic box toe presents the desirable feature that it maintains the shape of the toe in shoes exhibited in show windows and subjected to heat which would otherwise tend to collapse the box toe and seriously impair the appearance of the shoe.

In another aspect, therefore, my invention consists in combining in the tip portion of a shoe upper a box toe blank responsive to a conveniently available stiffening or activating agency with a liner responsive to the residual softening or activating agency of the box toe blank itself. Thus I provide a shoe structure that will stand up under conditions which have heretofore seriously impaired the appearance of shoes having a single stiffening ply. In this aspect, of course, my invention is not limited to stitched-tip uppers, but has a much wider range of application to the shoemaking industry. In the following claims I have referred to the tip liner as carrying softenable stiffening material and mean by this term to include a liner impregnated with stiffening material or coated therewith before or after it is assembled in the upper.

It will be understood that in the foregoing disclosure the stiffening and adhesive compounds mentioned and the solvent employed are illustrative only, and, while they are the best now known to me for the purposes stated, a great many other materials and solvents would serve as well and are intended to be included within the scope of the following claims wherein the invention is defined which I desire to secure by Letters Patent:

1. The process of making shoes having stitched tips, which includes the steps of placing inside the tip a liner carrying hard but inherently softenable stiffening material having adhesive properties, laying upon said liner an activated box toe blank and thereby temporarily softening the liner and rendering it adhesive, covering the activated box toe blank with a lining, and then shaping the forepart of the upper and thereby forming a bond between the lining and the tip.

2. The process of making shoes having stitched tips, which includes the steps of placing next to the tip a liner carrying hard but inherently softenable stiffening material having adhesive properties, laying upon said liner an activated box toe blank and thereby temporarily softening the liner and rendering it adhesive, covering the activated box toe blank with a shoe lining, and then shaping the forepart of the upper and thereby forming a unit-bonded structure of the tip, liner, box toe and lining.

3. The process of making shoes having stitched tips, which includes the steps of placing next to the tip a liner carrying thermoplastic stiffening material, laying upon said liner a heated thermoplastic box toe blank and thereby temporarily softening the liner, covering the heated box toe blank with a lining, and then shaping the forepart of the upper and at the same time forming a bond between the lining and the tip.

4. The process of making shoes having stitched tips, which includes the steps of placing in contact with the tip a liner carrying a hard but inherently softenable stiffening material, covering said liner with a box toe blank which has been softened and rendered adhesive by the same agency to which the material of the liner is responsive and thereby temporarily softening the liner by the residual softening agency of the box toe blank itself, uniting the tip, liner, box toe and lining into unit-bonded structure, and

then lasting the margin of said bonded upper to an insole rendered adhesive by the same softening treatment to which the liner and box toe are responsive.

5. A shoe having a vamp with a tip stitched thereto which overlies the vamp cut-off, the tip being incorporated into a unit-bonded structure including a liner disposed in direct face-to-face contact with the tip and carrying a thermoplastic stiffening material, a thermoplastic box toe, and a textile shoe lining.

6. As a step product, a shoe upper including a stitched tip and being prepared for lasting and having in one portion thereof in superposed relation a heated and softened thermoplastic box toe blank, and in direct face-to-face contact therewith, a liner of sheet material carrying a thermoplastic material softened by the residual heat of the box toe blank.

7. As a step product, a shoe upper including a stitched tip and being prepared for lasting and having in one portion thereof in superposed relation a box toe blank carrying a softenable stiffening material which has been softened by a softening agency, and in direct face-to-face contact with the box toe blank, a liner of sheet material carrying substantially the same kind of softenable stiffening material softened by the residual softening agency of the box toe blank.

STANLEY P. LOVELL.