Jan. 5, 1937. A. R. SCHOENKY 2,066,423

MANUFACTURE OF SHOES

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Fig. 1.

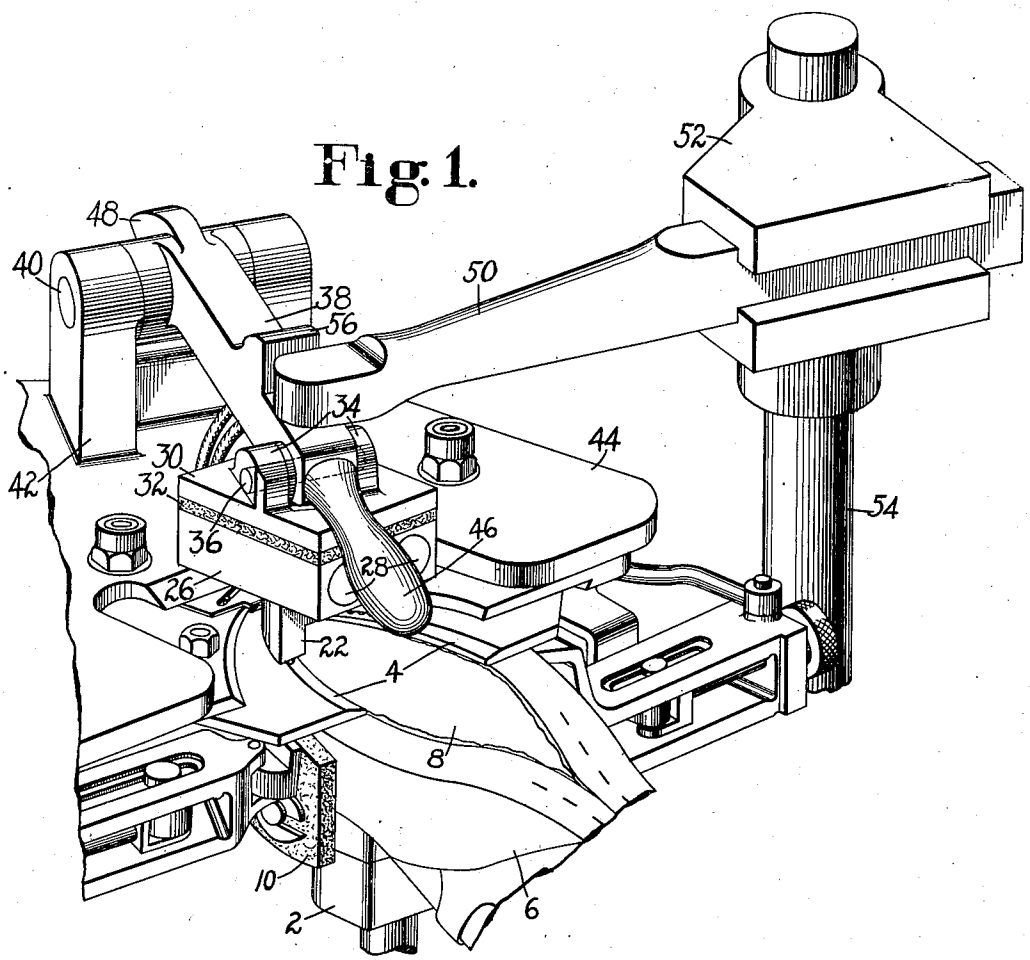

Fig. 2.

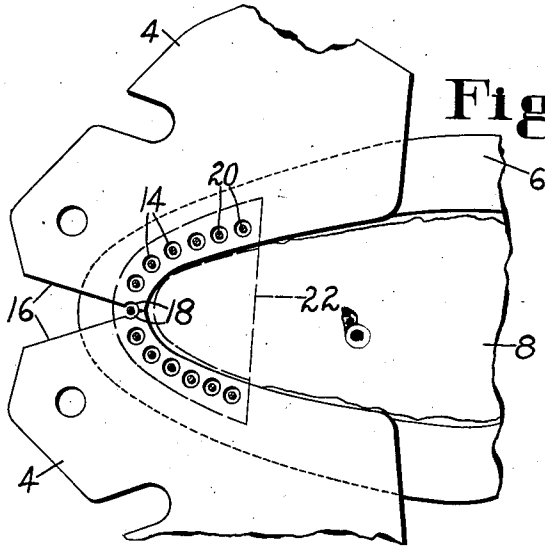

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Fig. 3.

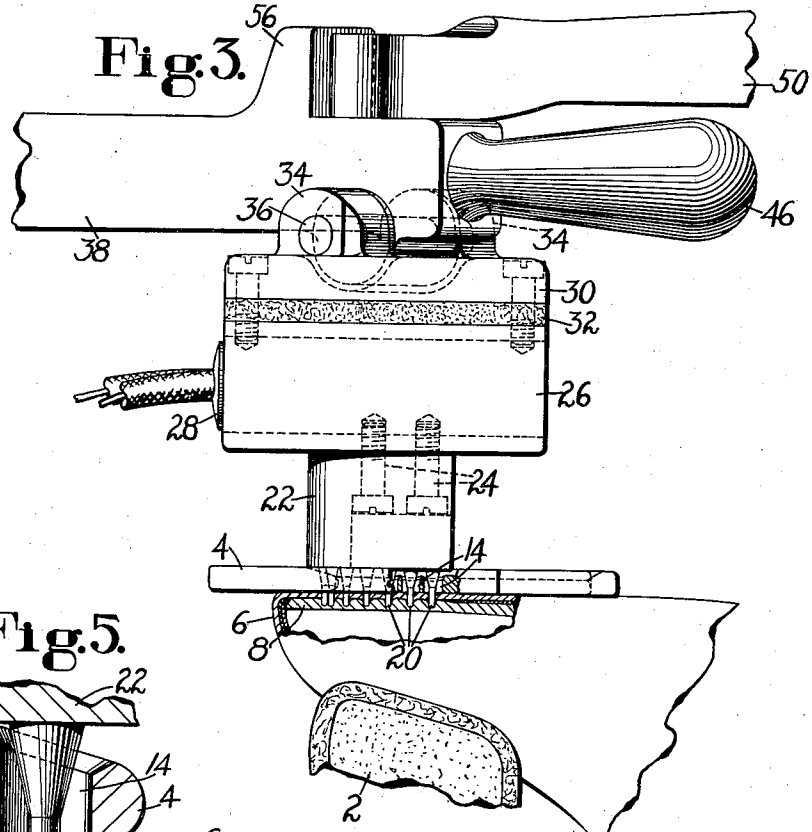


Fig. 5.

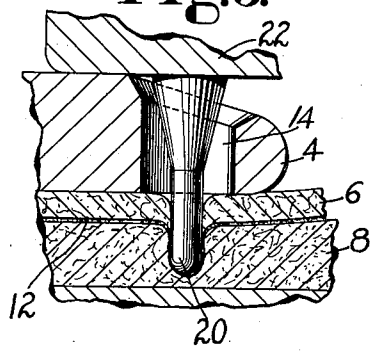


Fig. 4.

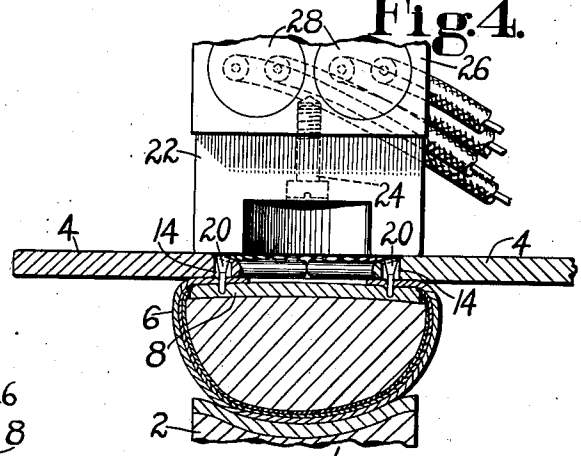
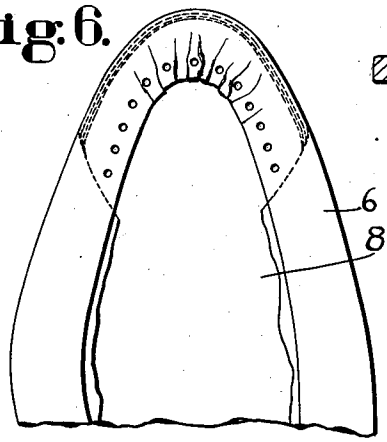


Fig. 6.



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Patented Jan. 5, 1937 2,066,423

UNITED STATES PATENT OFFICE

2,066,423

MANUFACTURE OF SHOES

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Application March 31, 1936, Serial No. 71,903

17 Claims. (Cl. 12—14)

This invention relates to the manufacture of shoes, and more particularly to the fastening of uppers in lasted position in the lasting operation. The invention is herein illustrated by reference to the lasting of the toe end of a shoe, but it is to be understood that it is not limited to the lasting of that particular portion.

In lasting shoes the uppers of which are secured in lasted position by an adhesive it is desirable under some conditions to dispense with driven fastenings or other temporary means attached to the shoe for retaining the upper in lasted position until the adhesive has dried or set, but in that case it is necessary that the treatment applied be such that the upper will be held effectively by the adhesive without requiring that the margin of the upper remain under pressure of the lasting means an undue length of time. The present invention, in one aspect, provides a novel method whereby heat is applied directly to adhesive between the margin of an upper and an insole to accelerate the drying or setting of the adhesive while the margin of the upper is held in lasted position. In the practice of the method in the manner herein illustrated a plurality of heated perforating tools are forced through the margin of the upper and into the insole around the toe end of the shoe bottom while the margin of the upper is held in lasted position by toe-lasting wipers, the tools applying heat directly to the adhesive which they encounter as they penetrate through the upper. In the locations adjacent to these tools, therefore, the adhesive is quickly dried or set, so that after the tools are withdrawn the wipers may be immediately retracted from the shoe without any danger that the upper will be displaced from its properly lasted position. Preferably, as herein illustrated, a portion of the upper material adjacent to each perforation is deflected into the insole and thus serves additionally to insure against any outward displacement of the margin of the upper when the wipers are retracted. For this purpose there are utilized perforating tools which are somewhat blunt at their ends and accordingly have a deflecting action on the upper as they penetrate through it and into the insole. It will be understood that in this part of the invention there are advantages which are not necessarily dependent upon the use of heat.

The invention further provides in a lasting machine novel means adapted for use in the practice of the method. In the construction herein shown the toe wipers of a bed-lasting machine are provided with a plurality of openings extending through them to expose portions of the overwiped margin of the upper, and a gang of heated perforating tools are supported for movement to penetrate through the exposed portions of the upper and into the insole as and for the purposes above described. As further illustrated, mechanism is provided for forcing the tools through the upper and into the insole, the depth of pentration of the tools into the insole being limited by the wipers.

The novel method and the novel mechanical features of the invention will now be more particularly described with reference to the accompanying drawings and thereafter pointed out in the claims.

In the drawings,

Fig. 1 is a perspective view of a portion of a bed-lasting machine in which features of the invention are embodied, illustrating how the perforating tools are forced into the shoe in the practice of the novel method;

Fig. 2 is a plan view of the forepart of the shoe and of the toe wipers in their overwiping positions, showing the perforating tools in section and illustrating diagrammatically the relation of their holders to the wipers;

Fig. 3 shows portions of the structure in elevation, with parts of the wipers and the shoe broken away to illustrate the relation of the perforating tools to the upper and the insole;

Fig. 4 is a view of the shoe and the wipers in vertical section, with two of the perforating tools and their holder shown in elevation;

Fig. 5 is a vertical section on an enlarged scale, illustrating more clearly by reference to one of the tools how the tools act on the shoe; and

Fig. 6 is a plan view of the forepart portion of the shoe after the toe end has been lasted by the method of this invention.

The drawings will be recognized as showing certain portions of a bed-lasting machine of a well-known type, comprising a toe rest **2** for supporting the forepart of a shoe and last, toe wipers **4** for wiping the marginal portion of the toe end of the upper **6** inwardly over an insole **8** on the last, and a toe band **10** sometimes provided for clamping the upper about the toe exteriorly of the shoe bottom. Features of the general organization of such a machine are shown and described in various United States Letters Patent, including Letters Patent No. 1,284,870, granted on November 12, 1918 upon an application of Matthias Brock.

The illustrated shoe is one of that type in which the margin of the upper in lasted position lies

throughout its width in generally parallel relation to the bottom of the last. In lasting the toe end of such a shoe with adhesive it is the common practice to trim the margins of all the layers of the upper materials except the outer layer so that the margin of the outer layer will lie next to the bottom face of the insole at least nearly as far outward as the edge of the insole, the layers thus trimmed comprising, for example, a toe box and a lining. The drawings accordingly illustrate the toe as lasted in this manner, but it is to be understood that such trimming is not essential to the accomplishment of the objects of the invention. The trimming is usually done after the margins of all the layers have been wiped preliminarily inward over the insole by the wipers 4 and after the wipers have been retracted. An adhesive is then applied preferably both to the margin of the outer layer of the upper materials and to the insole around the toe end, so that when the wipers are again operated to wipe the margin of the outer layer into lasted position a film of adhesive 12 (Fig. 5) will lie between the margin of that layer and the insole for securing the toe end of the upper in lasted position. The adhesive may consist of rubber latex or any other suitable adhesive adapted to be dried or set by heat.

For purposes of this invention the wipers 4 are provided with a plurality of openings 14 extending through them to expose small portions of the overwiped margin of the upper, and in the straight edges 16 of the wipers at the end of the toe there are also provided oppositely facing curved recesses 18 (Fig. 2). While the wipers are holding the margin of the upper in its final overwiped position a plurality of heated perforating tools or awls 20 are moved by the operator into the openings 14 in the wipers, one of the tools entering the space provided by the curved recesses 18, and the tools are forced through the margin of the upper and into the insole. Preferably these tools are sufficiently blunt at their ends to deflect portions of the upper adjacent thereto into the openings which they form in the insole, as illustrated in Fig. 5, and as they penetrate through the upper they apply their heat directly to the adhesive lying between the insole and these deflected portions of the upper. In the locations adjacent to the tools, therefore, the adhesive is quickly dried or set, so that the tools need remain only a few seconds in their operating positions. When the tools are withdrawn the wipers may be immediately retracted from the shoe without any danger of displacement of the upper from properly lasted position, since the margin of the upper will be securely held by the adhesive thus subjected to the action of heat, the portions of the upper deflected into the openings in the insole affording increased insurance against displacement.

The perforating tools 20 are fast in a block or holder 22 secured by screws 24 to another block 26 in which are mounted two electrical heating units 28 for maintaining the tools in a heated condition. The block 26 is secured to a plate 30 between which and the block is interposed a layer 32 of heat-insulating material. The plate 30 has thereon a pair of ears 34 pivotally mounted on a rod 36 which is supported in an arm 38. The arm 38 is mounted for swinging movements in a vertical plane on a rod 40 supported in a bracket 42 fast on a cover plate 44 extending over portions of the toe wiper operating mechanism. On the forward end of the arm 38 is a handle 46 for manipulating it. By use of this handle the arm may be swung upwardly and past the vertical to a position determined by engagement of a lug 48 thereon with the bracket 42, and by gravity the arm maintains this position, with the perforating tools 20 well away from the wipers and the shoe, while the wipers are being used to wipe the upper into lasted position. Thereafter the operator swings the arm 38 downwardly to carry the tools into the openings 14 in the wipers and against the portions of the overwiped margin of the upper exposed by these openings, guiding the tools into these openings by properly controlling the swinging of the plate 30 and the parts supported thereon about the rod 36. The tools are then forced through the margin of the upper and into the insole, as and for the purposes hereinbefore described, by the depressing action of an arm 50 on the top of the arm 38. The arm 50 corresponds generally to the holddown-supporting arm with which machines of the illustrated type are commonly provided, and is mounted in a holder 52 which can turn with the arm about a vertical post 54. This post is operated by a treadle (not shown) substantially as disclosed in United States Letters Patent No. 1,120,822, granted on December 5, 1914, upon an application of E. L. Keyes. It will be understood that after the operator has positioned the tools 20 in the openings in the wipers he swings the arm 50 to a position in which its forward end is over the arm 38 and against a lug 56 on this arm, and then by depressing the treadle imparts to the tools their operative movements, their movements being limited by engagement of the holder 22 with the top of the wipers 4, as illustrated in Figs. 3, 4, and 5. After the tools have remained in their operative positions long enough to apply the heat as required to the adhesive, the operator releases the treadle and returns the arm 38 to its idle position. He then retracts the toe wipers and removes the shoe from the machine.

Having described the 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 shoes which consists in laying the margin of an upper inwardly over an insole with an adhesive between said margin and the insole, and thereafter perforating said margin and forcing a portion thereof adjacent to the perforation into the insole while also applying heat directly to the adhesive adjacent to the perforation.

2. That improvement in methods of making shoes which consists in laying the margin of an upper inwardly over an insole with an adhesive between said margin and the insole, and while maintaining the margin of the upper in overlaid position forcing through said margin and into the insole a heated perforating tool acting to deflect a portion of the upper adjacent thereto into the insole while applying heat directly to the adhesive adjacent to the perforation made by the tool in the upper.

3. That improvement in methods of making shoes which consists in laying the margin of an upper inwardly over an insole with an adhesive between said margin and the insole, and while holding the overlaid margin of the upper pressed upon the insole forcing through said margin a heated perforating tool acting to apply heat directly to the adhesive between the upper and the insole.

4. That improvement in methods of making shoes which consists in laying the margin of an

upper inwardly over an insole around an end of the insole with an adhesive between said margin and the insole, and while holding the overlaid margin of the upper pressed upon the insole around the end thereof forcing through said margin and into the insole a gang of perforating tools acting to deflect portions of the upper adjacent thereto into the insole.

5. That improvement in methods of making shoes which consists in laying the margin of an upper inwardly over an insole around an end of the insole with an adhesive between said margin and the insole, and while holding the overlaid margin of the upper pressed upon the insole around the end thereof forcing through said margin a gang of heated tools acting to apply heat directly to the adhesive which they encounter as they penetrate through the upper.

6. That improvement in methods of making shoes which consists in wiping the margin of an upper inwardly over an insole around the toe end of the insole with an adhesive between said margin and the insole by the use of wipers having a plurality of openings extending through them, and while holding the margin of the upper pressed upon the insole by said wipers perforating the portions of the upper exposed by the openings in the wipers and applying heat directly to the adhesive encountered at the perforations.

7. That improvement in methods of making shoes which consists in wiping the margin of an upper inwardly over an insole around the toe end of the insole with an adhesive between said margin and the insole by the use of wipers having a plurality of openings extending through them, and while holding the margin of the upper pressed upon the insole by said wipers forcing through the portions of the upper exposed by the openings in the wipers and into the insole a gang of perforating tools acting to deflect portions of the upper adjacent thereto into the insole.

8. That improvement in methods of making shoes which consists in wiping the margin of an upper inwardly over an insole around the toe end of the insole with an adhesive between said margin and the insole by the use of wipers having a plurality of openings extending through them, and while holding the margin of the upper pressed upon the insole by said wipers forcing through the portions of the upper exposed by the openings in the wipers and into the insole a gang of heated perforating tools acting to deflect portions of the upper adjacent thereto into the insole and to apply heat directly to the adhesive which they encounter as they penetrate through the upper.

9. In a lasting machine, means for laying the margin of an upper inwardly over an insole with an adhesive between said margin and the insole, a perforating tool movable to penetrate through the overlaid margin of the upper, and means for heating said tool for applying heat to the adhesive encountered by the tool in penetrating through the upper.

10. In a lasting machine, means for laying the margin of an upper inwardly over an insole with an adhesive between said margin and the insole, perforating means movable to penetrate through the overlaid margin of the upper and into the insole and formed to deflect portions of the upper adjacent thereto into the insole, and means for heating said perforating means for applying heat to the adhesive encountered in penetrating through the upper.

11. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole, and a gang of perforating tools movable to penetrate through the overwiped margin of the upper and into the insole, said tools being formed to deflect portions of the upper adjacent thereto into the insole.

12. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole, and a gang of heated perforating tools movable to penetrate through the overwiped margin of the upper.

13. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole with an adhesive between said margin and the insole, a gang of perforating tools movable to penetrate through the overwiped margin of the upper and into the insole, said tools being formed to deflect portions of the upper adjacent thereto into the insole, and means for heating said tools for applying heat to the adhesive adjacent to the perforations made by the tools in the upper.

14. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole with an adhesive between said margin and the insole, said wipers having a plurality of openings extending through them, and a gang of perforating tools movable to penetrate through the portions of the upper exposed by the openings in the wipers and into the insole, said tools being formed to deflect portions of the upper adjacent thereto into the insole.

15. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole, said wipers having a plurality of openings extending through them, and a gang of heated perforating tools movable to penetrate through the portions of the upper exposed by the openings in the wipers.

16. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole, a gang of perforating tools movable to penetrate through the overwiped margin of the upper, a member movable to carry said tools into or out of position to operate on the shoe, and another member movable into contact with said tool-carrying member to force the tools through the margin of the upper.

17. In a lasting machine, wipers for wiping the margin of an upper inwardly over an insole around an end of the insole, said wipers having a plurality of openings extending through them, a gang of perforating tools movable to penetrate through the portions of the upper exposed by the openings in the wipers, an arm supporting said tools and movable to carry them into the openings in the wipers, and another arm arranged to act on said tool-supporting arm to force the tools through the margin of the upper.

AUGUST R. SCHOENKY.