

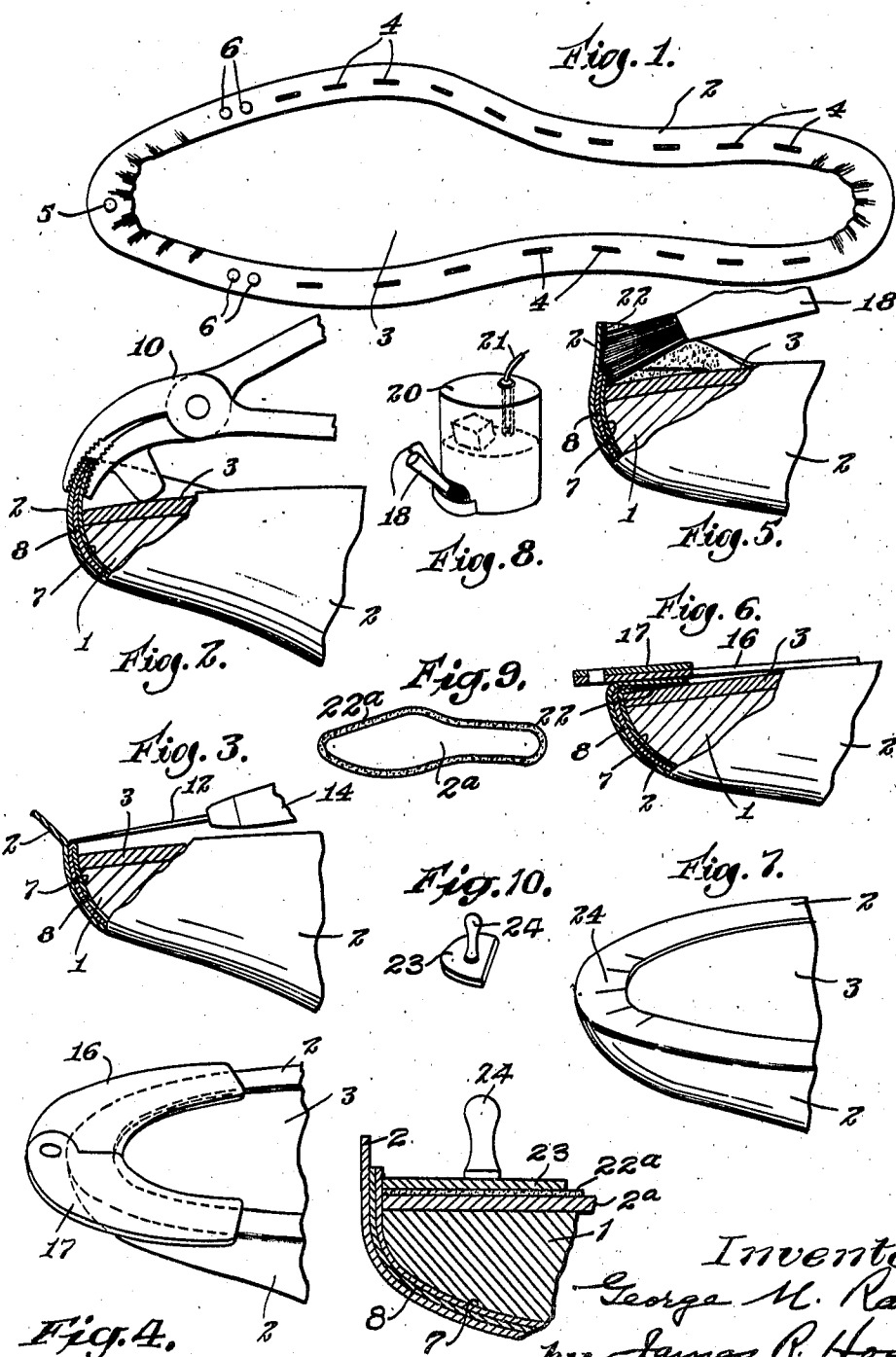
Jan. 29, 1935.

G. M. RAY

1,989,607

PROCESS OF MANUFACTURING BOOTS AND SHOES

Original Filed Oct. 17, 1930



Inventor
George M. Ray
by James R. Hodder
Attorney

UNITED STATES PATENT OFFICE

1,989,607

PROCESS OF MANUFACTURING BOOTS
AND SHOES

George M. Ray, Newton, Mass., assignor, by mesne
assignments, to Northern Machine Co., Inc.,
Boston, Mass., a corporation of Massachusetts

Application October 17, 1930, Serial No. 489,385
Renewed May 23, 1933

7 Claims. (Cl. 12—145)

My present invention is an improved process in the manufacture of boots and shoes, and is directed particularly to the production of shoes of the McKay type, for example, shoes lasted by the so-called Littleway process type.

In the present manufacture of such boots and shoes, the upper material and insole are assembled on a last, the upper is then pulled over, the shoe placed on a bed lasting machine and the lasting operation completed. A considerable degree of skill, effort and care is required, particularly at the toe portion, in pulling, stretching, plaiting and wrinkling the surplus upper material around the toe, holding the same in lasted position by lasting tacks, usually permanently driven into the shoe, and then subjecting the plaited and wrinkled upper materials around the toe to trimming, and pounding by mechanically operated smoothing devices to permit the outsole to be laid smoothly thereover. Heretofore it has been attempted to hold these toe plaits by cement but this method, in accordance with most prior proposals, has required considerable effort and an abnormally long time to hold the lasted upper while the cement hardened or set. Furthermore, such usual types of cements have had to be applied and allowed to dry slightly to become "tacky" before the same would stick and hold properly. A further method employed pyroxylin cement, necessitating the use of metal plates, through which tacks were driven. When the cement had "set", the tacks were drawn and the plates removed. This method required a large variety of sizes and styles of plates to fit different lasts, involving considerable expense—all of which are entirely eliminated by my present process.

Another method used is that of driving a row of large tacks around the toe to hold the lasted portion in position until the cement has set, at which time they are pulled out. By my method the expense for the tacks is eliminated, as well as the expense and effort of removing same.

An important feature of my present invention, beside obviating the difficulties above noted, saves all delay and time heretofore required when cement is used to hold the toe, and furthermore, effects an immediate smoothing and practically an ironing operation on the plaited layers of the upper materials at the toe portion of a shoe. Thus my present process eliminates the necessity for pounding, beating or like operations and consequent repeated handling of the shoe.

Furthermore, all the toe tacks in a shoe of this type are eliminated, and hence I am enabled

to produce a tackless shoe structure of the McKay, Littleway, or the like, type, eliminating the tacks along the forepart formerly required.

In carrying out my invention, I have discovered that by the use of a hot adhesive applied to the toe portion of the shoe, I can secure a very quick-acting means to hold the upper and insole together, and one wherein the softening and beneficial effect of the heat also acts on the upper materials at the toe portion to produce a holding, smoothing, and practically hot ironing action. This can be accomplished by the single operation of applying the hot adhesive to the toe and wiping over the same in a bed lasting machine, the hot liquid adhesive and the pressure of the bed lasting machine wipers being sufficient to effect both the ironing, smoothing and holding action required on the adhesive, while, for example, the operator is lasting the heel portion of the shoe.

Therefore, no delay is involved, and no separate holding and clamping devices are required, as have been employed where lasting the toe portion by cement in prior processes was attempted.

Furthermore, the toe of the shoe thus treated by the heat and adhesive, and the ironing action of the lasting machine wipers on the upper while thus hot and permeated by the hot adhesive, effects an automatic smoothing and ironing action, thereby eliminating the necessity for subsequent pounding, beating out or smoothing operations.

An important advantage of my process is the doing away with the metal clinching plate on the toe of the last, thus utilizing a welt type of last if desired, saving the expense of plates and the fittings.

It is also possible, if so desired, to apply the adhesive I use to the innersole before same is tacked on the last. When used this way the assembling and pulling over is done as usual. At the toe lasting a special heating iron is applied to the surface of the adhesive just before the final wipe of the wipers. By placing the hot iron on the adhesive a few seconds, the adhesive is liquefied and will adhere to the lasted upper when it is wiped in.

Referring to the drawing illustrating a preferred embodiment of my invention,

Fig. 1 is a plan view of a lasted Littleway shoe showing the usual staples and the pulling-over tacks;

Fig. 2 is a view of the toe portion, particularly in cross-section after the pulling-over tacks at the toe have been removed and a hand lasting tool being operated to effect the further fitting, pulling, and plaiting of toe material;

Fig. 3 is a similar fragmentary view of the toe portion showing the step of removing the surplus lining material;

Fig. 4 is a fragmentary view in perspective illustrating the first lasting wiping operations in the bed lasting machine;

Fig. 5 shows one mode of applying the hot adhesive to the toe portion of the upper materials and insole;

Fig. 6 illustrates the final step in the wiping operation;

Fig. 7 indicates the completed lasted toe portion of the shoe, illustrating the ironing effect of the lasting wipers in combination with the hot adhesive;

Fig. 8 is a diagrammatic view of a heater containing hot adhesive and a pair of brushes for applying same to the toe portion;

Fig. 9 is a bottom view, to small scale, illustrating an insole prepared for use in lasting a shoe in accordance with another embodiment of my invention;

Fig. 10 is a perspective view, to small scale, illustrating a heating iron which may be used with the insole of Fig. 8; and

Fig. 11 is a view similar to Fig. 5, but illustrating that embodiment of the invention in which the adhesive cement is first applied to the border of the insole as shown in Fig. 8 and allowed to dry, and is later softened and made tacky by the application of a hot iron such, for example, as is shown in Fig. 9.

As shown in Fig. 1 the upper materials 2 and the insole 3 have been assembled on a last 1 (Fig. 2), and the shank and rear portions have been lasted in any desired manner, for example by the use of staples 4 in accordance with the well known Littleway process. The toe portion has been subjected to the usual pulling-over machine operation in which temporary pulling-over tacks are applied, some of such tacks 6 being located at the sides of the forepart and one or more of such tacks 5 being located at the forward end of the toe portion. Thereupon the shoe is fitted to the bed lasting machine jack, the lasting wipers for the toe end are adjusted, and the operator pulls out the tacks 5 and may then subject the upper to the further fitting and lasting action of hand lasting pinchers 10. These are the usual steps and frequently, before the partially lasted shoe, as shown in Fig. 1, is fitted to the bed lasting machine, it is subjected to the toe steaming operation to soften the box toe materials. The toe portion usually comprises the outside or upper material 2, as illustrated, a lining of canvas or the like 7, and an intermediate layer 8, constituting the box toe or stiffener. After preliminary lasting and wiping actions at the toe, when the stretch of the upper materials has been taken out and the upper pulled snugly to the toe of the last, it is desirable to trim off the surplus lining and box toe materials, opening out the margin of the upper 2 for this purpose, and to cut off the surplus lining and stiffener material with a blade 12 of a hand trimming knife 14, shown in Fig. 3.

Thereafter, the toe wipers 16 and 17 of the bed lasting machine are moved inwardly over the shoe bottom and the toe portion of the upper 2 and remaining shorter portions of the lining 7 and box toe 8 are wiped over, as illustrated in Fig. 4 onto the bottom of the insole. Thereupon the wipers are backed off and the inside of the upper 2, the adjacent part of the insole 3 at the toe portion, as well as the lining 7, and box toe 8, are treated with a coating of hot adhesive

applied by a brush 18 or in any desired manner. For this purpose I may provide a receptacle, shown at 20 in Fig. 8 and preferably a pair of brushes 18 so that one brush can be subjected to the softening and heating action, while the other is being used, conveniently an electrical heating unit 21 is employed to maintain the hot adhesive therein in a molten state and at the desired degree of heat and tackiness although other types of heating means may obviously be employed. The coating adhesive 22 thus applied is suitable for quick and immediate drying, and as soon as it has been applied the lasting wipers 16 and 17 are actuated to wipe upper materials over onto the insole 3, and the hot quick setting adhesive 22, while still hot and under the pressure of the lasting wipers, effects a holding and ironing action, leaving the finished toe as shown at 24 and eliminating the necessity of subsequent pounding, beating, or the like, operations.

I believe that my invention of a hot adhesive setting quickly while hot, and effecting a softening and ironing action on the upper 2 from heat applied on the reverse side, and hence without danger of marring the finish of the upper materials, is a distinct novelty and I wish to claim the same and the operation thereof herein broadly.

In accordance with another procedure within the scope of my invention, I may provide the border of the insole, preparatory to lasting, with a coating of adhesive or cement which is allowed substantially to dry prior to assemblage of the insole and upper upon the last. Such an insole 2^a (Fig. 9) with its border of cement 22^a is then assembled with the upper on a last in usual manner and the upper is pulled over and held in position by temporary pulling-over tacks. The last is then mounted in a bed lasting machine and after removing the pulling-over tacks (at least those at the extreme toe of the shoe) the wipers are actuated to wipe the margin of the upper smoothly about the toe of the last and inwardly in pleats over the insole. The wipers are now retracted and the upper is opened out and the surface material may, if desired, be trimmed off at this stage in the operation.

A hot iron 23 which may be of any shape or type (Fig. 10) and which may for convenience in handling be furnished with a handle 24, is now brought into heat transferring relation to the border 22^a of cement on the insole so as to make the cement tacky or even liquid, depending upon the type of cement employed. Preferably this cement is of the kind above referred to, adapted to harden and set very quickly upon cooling. As soon as the cement has been softened sufficiently, the iron is removed and the wipers are advanced inwardly to their final position, thus wiping the margin of the upper inwardly over the bottom of the insole and into contact with the border of sticky adhesive 22^a. The unheated wipers are maintained in their advanced position until the adhesive has set sufficiently to retain the upper in lasted position, the employment of cold or unheated wipers in combination with the quick setting thermoplastic cement greatly facilitating and speeding up the operation. The wipers are now removed and the shoe may be completed in accordance with any usual operation, it being noted that prior to the end lasting just described, the side lasting may be performed in any usual manner, for example, by the use of staples, tacks or other effective means.

After the completion of the lasting action, the toe portion 24 is usually sufficiently smooth and

ironed out to eliminate the subsequent handling and beating or pounding operation, although of course the upper could be subjected to same if desired. The outsole is then applied and McKay stitched or otherwise fastened, completing the permanent union of the insole and outsole, and the shoe is thereupon finished in the usual manner.

I claim:

1. In the manufacture of boots and shoes the process of securing the upper to the insole which includes the following steps, assembling the upper with the insole upon a last, pulling over the upper at the toe portion, subjecting that portion of the upper to the operation of unheated lasting wipers, withdrawing such wipers, softening the wiped-in upper material by the application of heat to its inner surface, and again advancing the wipers to iron the softened material into contact with the insole.

2. In the manufacture of boots and shoes, the process of securing the upper and lining to the insole which includes the following steps, assembling the upper and lining with the insole upon a last, pulling over the upper and lining at the toe portion, trimming that portion of the lining, subjecting the toe portion of the upper materials to the operation of unheated lasting wipers to wipe the margin of such material inwardly over the insole, withdrawing the wipers, applying hot adhesive to the inner surface of the marginal material of the upper, the adhesive being at such temperature as to soften and render more tractable said marginal material, advancing the wipers over said marginal material whereby to iron down the softened material, and holding the wipers in advanced work-engaging position until the adhesive has cooled sufficiently to set.

3. In the manufacture of boots and shoes, the process of securing the upper and lining to the insole which includes the following steps, applying to the margin of the insole around the toe an adhesive which is rendered soft and sticky by heat, but which sets hard very quickly when cooled below a predetermined temperature, assembling the upper and lining with the insole upon a last, pulling over the upper and lining at the toe portion, trimming that portion of the lining, wiping in the margin of the upper materials over the edge of the insole by the use of unheated wipers in a bed lasting machine, retracting the wipers, applying heat directly to the adhesive on the margin of the insole by introducing a heated member between the wiped-in upper material and the insole, thereby to liquefy the adhesive and soften the upper materials, and again advancing the wipers to iron the softened marginal material of the upper down into contact with the adhesive on the insole, and holding the unheated wipers in advanced position to cool the adhesive while maintaining the wiped-in upper material in contact therewith.

4. In the manufacture of boots and shoes, the process of securing the upper to the insole which includes the following steps,—applying to the border of the insole an adhesive which is rendered soft and sticky by heat, but which sets and becomes tenaciously adhesive very quickly when cooled below a predetermined temperature, permitting said adhesive to set, assembling the upper and insole upon a last, pulling over the upper, mounting the last in a bed lasting machine, removing a

portion at least of the pulling-over tacks, wiping the margin of the upper materials over the edge of the insole by the use of unheated wipers, retracting the wipers, applying heat to the adhesive along the border of the insole for a period of time sufficiently long to cause said adhesive to become sticky, ceasing to apply heat, and thereafter pressing the margin of the upper material into contact with the adhesive border of the insole and maintaining the pressure until the adhesive has substantially set.

5. In the manufacture of boots and shoes, the process of securing the upper to the insole which includes the following steps,—preparing an insole by applying to the border of the latter an adhesive which is rendered soft and sticky by heat, but which sets and becomes tenaciously adhesive very quickly when cooled below a predetermined temperature, permitting said adhesive substantially to set, assembling the upper and insole upon a last, pulling over the upper and securing it by temporary tacks, wiping in the margin of the upper material over the edge of the insole by the use of unheated wipers in a bed lasting machine after having removed a portion at least of the pulling-over tacks, retracting the wipers sufficiently to permit the wiped-in marginal material to be turned back to expose the coated border of the insole, turning such marginal material back, causing the adhesive along the border of the insole to become soft and sticky by the application of heat thereto, and laying the turned back marginal material down again and holding it in lasted position upon the adhesively coated border of the insole until the adhesive has set sufficiently to unite the upper to the insole.

6. In the manufacture of boots and shoes, the process of securing the upper and lining to the insole which includes the following steps,—preparing the insole by applying to the border thereof an adhesive which is rendered soft and sticky by heat, but which sets and becomes tenaciously adhesive when cooled below a predetermined temperature, assembling the upper and insole upon a last, pulling over the upper and securing it by temporary pulling-over tacks, mounting the last in a bed lasting machine having unheated wipers, removing a portion at least of the pulling-over tacks, wiping in the margin of the upper material over the edge of the insole by the use of said wipers, retracting the wipers and opening out the marginal portion of the upper material, trimming away superfluous upper material, applying a hot iron to the cement coated border of the insole to soften the cement and make it tacky, then removing the iron and advancing the wipers to press the margin of the upper into firm contact with the sticky border of the insole and retaining the wipers in said advanced position until the cement has set sufficiently to secure the upper in lasted position.

7. The improved process of manufacturing boots and shoes, which consists in preparing an insole with an adhesive coating, having a capacity to be rendered tacky by heat, assembling such prepared insole with the upper on a last, partially lasting the shoe, applying a heated iron to that portion only of the adhesive which it is desired to render tacky without removing the shoe from the lasting machine, completing the lasting, and finishing the shoe in any desired manner.

GEORGE M. RAY.