April 25, 1967 J. L. FORMA 3,315,288

METHOD OF SHOE MAKING

Filed Sept. 25, 1964

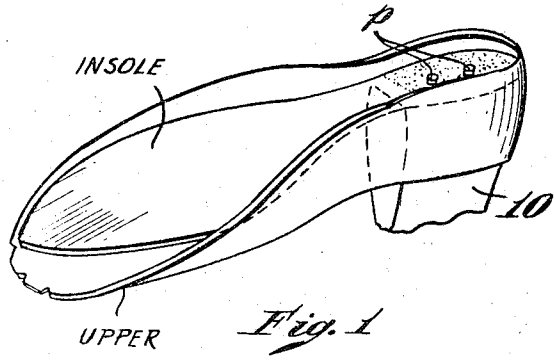


Fig. 1

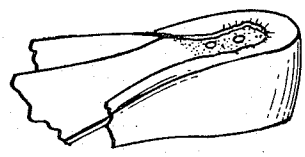


Fig. 2

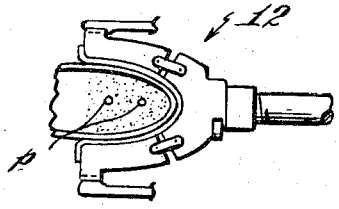


Fig. 3

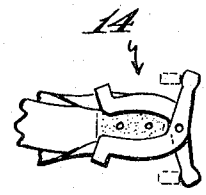


Fig. 4

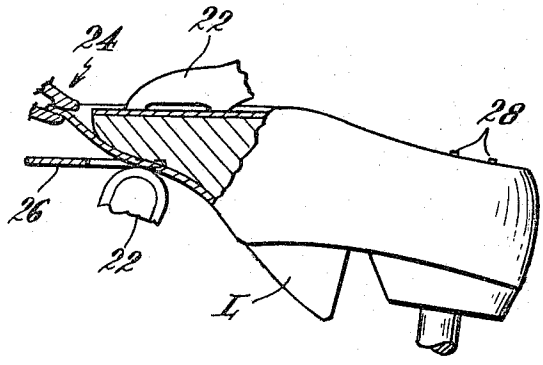


Fig. 5

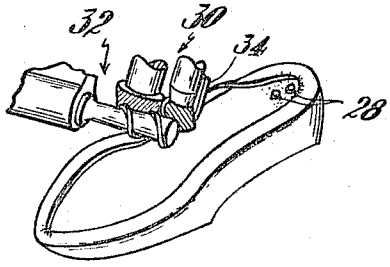


Fig. 6

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United States Patent Office 3,315,288 Patented Apr. 25, 1967

3,315,288

METHOD OF SHOE MAKING

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Filed Sept. 25, 1964, Ser. No. 399,203
9 Claims. (Cl. 12—145)

This invention relates to the manufacture of shoes and has for its principal objects to provide for effecting lasting of shoes without having to employ tacks to secure the insole or upper to the last, thus eliminating tack-driving implements and tack-pulling devices, damage to the last, last replacement costs, and shoe inspection costs; to provide for simultaneously shaping the heel end of the upper closely to the contour of the heel end of the last and attaching the heel end of the upper to the heel end of the insole by adhesive prior to toe and side lasting operations thereby eliminating the need for assembling operations and machines and tack or staple lasting machines for fastening the heel end of the upper to the heel end of the insole; to provide for holding the assembled upper and insole against movement relative to the bottom of the last during pulling over and toe lasting operations thereby eliminating forward displacement of the heel end of the upper relative to the last, buckling of the insole, and loss of the heel line; and to provide a method which enables faster and better shoe making with fewer machines.

As herein illustrated, the method comprises placing the upper about the back part of a back part molding machine provided with male and female mold parts and wipers, with its margin projecting beyond the bottom of the male part, applying shaping pressure to the heel end of the upper by bringing the female part into engagement therewith to shape the upper to the male part, inserting the heel end of an insole within the projecting margin, aligning the tip of the upper with the tip of the insole and then while holding the tips aligned wiping the projecting margin inwardly and adhesively securing it to the insole. Positioning of the insole relative to the back part of the upper to insure the aforesaid alignment is preferably effected by prepunching the heel end of the insole with holes and providing pins at the bottom of the male part for engagement with the holes. The assembly of the upper and insole is now transferred to a last on a toe lasting machine. In the toe lasting machine the lasting margin at the tip is pulled upwardly by pulling over grippers relative to the wipers and since the tip of the insole is prevented from moving forwardly by contact with the upstanding margin of the upper which, in turn, is embraced by the wipers, the forward stress applied by the pulling over operation tends to and may displace the heel end forwardly by buckling the insole. In accordance with this method, forward displacement of the upper relative to the bottom of the last is prevented, on the one hand, by providing pins at the heel end of the last for engagement with the holes in the insole and, on the other hand, by providing a sufficiently stiff insole so that forward pull on the upper during the pulling over operation will not cause the insole to buckle. The lasting margin is wiped inwardly by means of the toe lasting wipers and adhesively secured to the insole. Following the toe lasting operation the assembly is removed from the toe lasting machine and completed by presenting it to a side lasting machine by means of which the marginal portions of the upper between the heel and toe are progressively laid down and adhesively attached to the insole.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. 1 is a perspective of the upper portion of a shoe situated bottom up with an insole in the position it would occupy prior to wiping the lasting margin at the heel end into engagement with the insole;

FIG. 2 is a perspective of the heel end of the upper and insole after the heel end has been shaped and the lasting margin wiped inwardly and adhered to the insole;

FIG. 3 is a plan view of the back part molding machine showing the male and female mold parts engaged to shape the upper to the male part;

FIG. 4 shows the wipers of the back part molding machine advanced to fold the lasting margin at the heel end against the insole;

FIG. 5 is an elevation of the assembly applied to a last and transferred to a toe lasting machine, showing the forward end of the last with the upper and insole mounted thereon engaged with the wipers and showing the pulling over grippers engaged with the lasting margin; and

FIG. 6 is a perspective of the assembly of the last after it has been removed from the toe lasting machine and presented to the side lasting machine for performing the side lasting operation.

The shoe making operations which form the subject matter of this invention for the manufacture of shoes without the necessity of using tacks or other fastening means for securing the insole and upper to the last preparatory to the lasting operations are performed by means of back molding machines of the type disclosed in United States Patent Nos. 2,915,763 and 3,007,182; toe lasting machines of the type disclosed in United States Patents Nos. 2,768,396 and 3,022,527; and side lasting machines of the type disclosed in United States Patents Nos. 2,571,140 and 2,915,763. In each of these machines the attachment of the lasting margin to the insole is effected by means of adhesive.

The back part molding machine as shown in Patent No. 3,007,182 has a rigid male mold **10**, an articulated three-part female mold **12** cooperable with the male mold to shape the back part of the upper about the male mold, and wipers **14** movable parallel to the bottom of the male mold to fold the lasting margin at the heel end inwardly into engagement with the heel end of an insole placed on the bottom of the male mold. In accordance with the practice of the method herein illustrated, the female mold is displaced rearwardly of the male mold together with the wipers, the upper is placed about the male mold with its lasting margin projecting upwardly beyond the bottom of the male mold and with the back line of the upper centered on the male mold, the female mold is brought forwardly into engagement with the back part of the upper so as to shape it to the male mold, the heel end of an insole is inserted within the upwardly projecting lasting margin and oriented to align it with the bottom of the male mold, the tip of the insole is aligned with the tip of the upper, and then the wipers are moved forwardly and inwardly to fold the lasting margin into engagement with the insole. To effect attachment of the lasting margin to the insole the latter is preferably precoated with an adhesive which is rendered adhesive by suitable means, for example by a heating element placed close to its surface just before the lasting margin is folded inwardly into engagement therewith. A pressure-sensitive may be employed is desired. In order to insure proper positioning of the insole on the male mold it is desirable to prepunch the heel end of the insole with one or more holes and to provide correspondingly positioned pins *p* on the bottom of the male mold with which the holes in the insole may be engaged. As herein shown, these holes are disposed along the median line of the heel in spaced relation; however the holes may be placed transversely of the insole or at any other desirable position. The pins will, of course, be placed on the bottom of the male mold in positions correpsonding to the holes in the insole.

After the upper and insole have been shaped and attached, as just described, the assembly is removed from the back part molding machine and placed on a last L, the latter being, in turn, supported in a toe lasting machine (FIG. 5), such as referred to above, which is provided, among other things, with means **22** for supporting the last with its toe adjacent pulling over devices **24** and wipers **26**. The back part molding machine is designed to impart substantially the exact shape of the last to the back part of the upper upon which the shoe is to be lasted prior to the toe and side lasting operations and the assembly is placed over the last without tacking the insole or the upper to the last. During the pulling over operation, however, the pulling over devices **24** not only pull the upper upwardly about the surface of the last relative to the bottom but forwardly from the heel end toward the toe and since there are no securing tacks and the tip of the insole is prevented from moving forwardly by engagement with the upstanding margin of the upper and the embracing wipers, the pulling may actually displace the heel end of the upper forwardly relative to the last thus buckling the insole and spoiling the heel line. In accordance with this invention, the foregoing can be overcome, on the one hand, by provision of a pair pins **28** on the bottom of the last with which the holes in the insole already made for the purpose of positioning the insole in the back part molding machine may be engaged to prevent forward movement of the heel end of the insole and, on the other hand, by using an insole which is quite stiff, the former being the preferred method.

Having anchored the insole to the last by means of the pins or employing a stiff insole so that the forward pull does not buckle it, the lasting margin at the toe is wiped in a conventional fashion by means of the toe wipers and secured by activation of an adhesive already applied to the insole, or by the application of adhesive just before the wiping operation.

The last with the upper heel seat lasted to the heel end of the insole and toe lasted to the toe end of the insole is now removed from the toe lasting machine and presented to the side lasting machine (FIG. 6). This machine is provided with rotating rolls **30** and **32** for progressively gripping, pulling and wiping the lasting margin inwardly over the bottom along the sides of the shoe and with means in the form of a nozzle **34** for injecting adhesive into the angle between the lasting margin and the bottom of the insole just before the margin is laid down to effect adhesion to the insole. Optionally, the nozzle may be omitted and a pressure-sensitive adhesive employed which will adhere the margin to the insole by the application of the wiping in pressure.

The lasting operation is now completed and the shoe is ready for the customary bottom-attaching operations. Throughout the method of lasting, as explained above, neither the insole nor the upper is attached to the last, the upper and insole being held properly aligned for the toe and side lasting operations partly by the premolding and lasting of the heel end of the insole to the heel end of the upper and partly by the positioning pins or by the employment of an insole which is stiff enough to resist buckling during the pulling over operation.

Since the entire lasting operation is performed without the use of tacks for securing the insole to the bottom of the last and the upper to the last, lasting damage is eliminated, tack-applying and removing implements and/or machines are eliminated and inspection to insure the absence of stray tacks in the finished shoes is eliminated. The method also provides improved shaping of the upper to the last, elimination of assembling operations, preserves the true line at the heel of the shoe and enables faster and better shoe making with fewer machines.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. The method of shoe manufacturing comprising attaching the lasting margin at the heel end of an upper, which has been premolded to the shape of the heel end of the last upon which it is to be lasted, to the heel end of an insole containing a prepunched hole at the heel end, comprising providing a last with a positioning pin at the heel end, mounting the assembled upper and insole on the last with the hole at the heel end of the insole engaged with the positioning pin on the bottom of the last to prevent forward movement of the back part of the upper and the rear end of the insole on the last, pulling the lasting margin at the toe upwardly and forwardly on the last to cause the upper to conform snugly to the last, adhesively lasting the margin at the toe to the insole, and then adhesively lasting the marginal edges of the upper intermediate the heel and toe to the insole.

2. The method of shoe manufacture comprising adhesively heel seat lasting the heel end of an upper which has been premolded to the shape of the heel end of the last upon which the shoe is to be made, to an insole containing prepunched holes therein for positioning the insole relative to the upper during such adhesive heel seat lasting, comprising providing the last with positioning pins at the heel end, placing the assembled upper and insole on the last with the holes in the insole engaged with the positioning pins on the last bottom, pulling the marginal portion of the upper at the toe forwardly relative to the heel end to conform the upper to the last, adhesively lasting the lasting margin at the toe onto the insole, and then adhesively lasting the marginal edges at the sides of the upper onto the insole.

3. The method of cement lasting the entire bottom of a shoe without employing tacks, comprising providing male and female mold parts cooperable to shape the back part of a shoe, providing the male mold part with a locating pin on the bottom, placing an upper about the male mold part with its margin projecting beyond the bottom thereof, and an insole containing a locating hole in it on the bottom within the lasting margin and in engagement with the locating pin to position the heel end of the insole within the back part of the upper, applying molding pressure to the back part of the upper to conform it to the shape of the last upon which the shoe is to be made, cement lasting the margin of the upper at the back part to the insole, removing the assembly from the male mold part, providing a last with a locating pin at the heel end for engagement with the insole to position the latter with its ends coinciding with the ends of the last, placing the assembly on the last with the insole engaged with said positioning pin, pulling the lasting margin of the upper at the toe upwardly and forwardly to conform the upper to the last, cement lasting the marginal edge of the upper at the toe to the toe of the insole, and cement lasting the marginal edges of the sides of the upper to the insole intermediate the heel and toe.

4. The method of cement lasting shoes without fastening the insole or upper to the last, comprising adhesively attaching the back part of an upper, which has been premolded to the shape of the last upon which the shoe is to be made, to an insole containing a prepunched hole at the heel end thereof for positioning the sole relative to the upper during the back part attaching operation, to cause the tip of the insole and upper to coincide, providing a last with a positioning pin at the bottom, transferring the assembly to said last and engaging the hole in the insole with said positioning pin at the heel end to position the assembly with the ends of the heel and toe coinciding with the ends of the last, pulling the upper at the toe upwardly and forwardly to cause the upper to conform to the last, wiping the marginal edge of the upper at the toe inwardly against the bottom of the insole at the toe and adhesively attaching it thereto, and then adhesively lasting the lasting margin of the upper along the sides to the insole.

5. The method of lasting shoes comprising placing the

back part of an upper about the male part of a back part molding machine with the marginal portion of the upper projecting beyond the bottom of the male part, advancing the female part of the machine into engagement with the back part of the upper to conform it to the male part, inserting the heel of an insole provided with a hardenable adhesive within the projecting margin against the bottom of the male part, aligning the tip of the insole with the tip of the upper, while holding the insole and upper aligned activating the adhesive and wiping the projecting margin inwardly over the heel end of the insole to cause it to adhere to the insole, removing the assembly from the back part molding machine, placing the assembly on a last in a toe lasting machine with the ends of the insole coinciding with the ends of the last, constraining the back part of the upper against forward movement relative to the bottom of the last without attaching the insole or upper thereto, applying pulling over forces to the marginal edge of the upper at the toe to conform the upper to the last, adhesively lasting the upper at the toe to the insole, and then side lasting the marginal portion of the upper to the insole intermediate the heel and toe.

6. The method according to claim **5**, wherein constraint of the assembly on the last is afforded by employing a relatively stiff insole.

7. A method according to claim **5**, wherein constraint of the assembly on the last is afforded by employing one or more pins on the bottom of the last at the heel end and by providing the insole with holes for engagement with the pins.

8. A method according to claim **5**, wherein the heel of the insole is held within the margin projecting from the male part by one or more pins on the male part and a corresponding number of holes in the insole engaged with the pins.

9. A method according to claim **1**, comprising providing a last with a positioning pin at the heel end located at a distance from the end of the last corresponding to the distance that the hole in the insole is from the end of the insole.

References Cited by the Examiner

UNITED STATES PATENTS

1,809,364	6/1931	Tweedie	12—145
1,976,036	10/1934	Pym et al.	12—145
2,885,699	5/1959	Ronza	12—145
3,130,430	4/1964	Kamborian	12—145

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