Method of and Apparatus for Lasting Shoes

Inventor
Albert Kamborian
METHOD OF AND APPARATUS FOR LASTING SHOES

Filed March 16, 1937

3 Sheets-Sheet 2

Inventor

Albert Kamborian

by

Henry Washburn
U.S. Patents.
METHOD OF AND APPARATUS FOR LASTING SHOES

Albert Kamborian, West Newton, Mass., assignor,
by mesne assignments, to General Research,
Inc., Boston, Mass., a corporation of Massachu-
setts

Application March 16, 1937, Serial No. 131,128

21 Claims. (Cl. 12—14)

The present invention relates to the manufac-
ture of footwear, and more particularly to an im-
proved method of lasting and to novel appliances
useful in the practice of such method. While of
more general utility, the invention is herein par-
tically described with reference to its applica-
tion to the so-called "cement lasting" process,
in which the margin of the upper material is
turned in against the under surface of the insole
and secured thereto by adhesive rather than by
fasteners, such as tacks, staples, or the like.

In lasting footwear on a commercial or factory
basis, it is now common, after the insole and up-
ner have been assembled on the last, and after the
upper has been properly spindled, to pull over the
toe and forepart of the upper and temporarily
secure its margin to the last by means of a few
(from three to seven) pulling-over tacks. The
last with the pulled-over upper is then shank
lasted and placed in a bed-lasting machine, with
the bottom of the last uppermost. In this ma-
chine the upper is subjected to a wiping operation
by means of which the toe portion of the upper
and, in accordance with some practices, the heel
portion as well, is smoothed about the last and
the marginal portion of the upper is turned in and
causéd to lie flat against the bottom surface of
the insole.

Preparatory to this wiping operation, most and
usually all of the pulling-over tacks are with-
drawn, and at some intermediate stage in the
wiping process, any surplus material at the toe,
such for example as portions of the toe stiffener,
toe liner, and upper, are trimmed away. At the
heel the upper material is also wiped in, although
whereas at the toe the in-wiped margin of the
upper is secured in place by adhesive, the in-
turned margin is usually secured at the heel by
means of permanently inserted tacks. After the
toe has been wiped in, the forepart, that is to
say that portion of the upper extending from the
toe to the shank, is also lastcd in. While this
latter operation may be done as a part of the side
lasting process, it is common, when lasting by
means of cement, to last the forepart in the bed
machine, the operator pulling the upper inwardly
at the sides and back of the forepart by means of
hand-actuated lasting pincers thereby to remove
the slackness in the upper material over the arch
of the last.

As adjunctive to the above method of procedure
and to insure a flat bottom, it has become com-
mmon to iron the in-turned margin of the upper by
means of a heated presser device. Sometimes the
presser device is inserted beneath the wipers,
which are first raised for this purpose, and the
wipers are then forcibly moved downwardly onto
the presser so as to press its hot surface against
the marginal material and thus to set the latter
firmly in place. In accordance with other prac-
tices, the wipers are wholly retracted and the
pressing device is forced down against the shoe
bottom, either by means of a special appliance
adjunctive to the bed-lasting machine, or the
partially lasted shoe is removed from the bed-
lastmg machine to an ironing machine comprising
heated pressure-applying elements actuated
either by foot or by power. Commonly the force
exerted by the pressure-applying device has been
substantially perpendicular to the shoe bottom,
with the result that in some instances the upper
is squeezed out along the edge of the insole so as
no longer to hug the last closely and form the
sharp, well-defined angle at the level of the bot-
tom of the insole which is desired in fine foot-
wear. To avoid this difficulty, it has heretofore
been proposed to provide presser means compris-
ing relatively movable parts designed to move
inwardly with reference to the margin of the
insole while exerting the requisite downward
pressure, thus acting on the inturned margin with
a wiper-like inward movement so as to prevent
the upper from bulging at the edges of the insole.

While such devices do to some extent accom-
plish the desired result, it is characteristic of all
such prior pressure-applying and heating means
that it is necessary to lift and/or retract the
wipers before the pressure-applying device can be
disposed in operative relation to the wiper-in-
 marginal material. While this may be of little con-
sequence, when making shoes of the cheaper
grades, it has been found in lasting fine footwear,
where it is essential that the upper be drawn as
tight as possible about the last, that during the
interval, however slight, while the wipers are re-
tracted from out of contact with the in-wiped
material and the upper is thus left free, the upper
tends to draw back and sometimes to shift on the
last, with the result that at the end of the pressing
operation the upper is no longer snugly and per-
fectedly fitted to the last. This is so serious a defect
that some manufacturers insist upon the rather
troublesome practice of putting in temporary
tacks to hold the upper securely in place during
the pressing operation and until such operation
has been fully completed.

It is further to be noted that in accordance
with the usual method above referred to of lasting
the forepart, the upper is drawn upwardly and
inwardly by the use of hand-lasting pincers at the

2,210,586
ball portion with the object of removing slackness across the forepart or arch of the last, such pincers being applied first at one side of the shoe and then at the other. This mode of alternate pulling at opposite sides tends to shift the upper out of its exact properly spindled relation upon the last, as well as to twist it unevenly, the accuracy of the final result depending almost wholly upon the skill and care of the operator.

Furthermore, at the heel portion of the shoe where the upper is drawn over onto the flange of the counter, minute wrinkles and creases frequently appear just where the quarter portion of the upper passes over the edge of the insole, and these creases and wrinkles can not be removed, if at all, in the final finishing operation except by the expenditure of excessive time and labor.

Principal objects of the present invention are to provide an improved method of lasting and apparatus useful in the performance of such method, whereby the above difficulties may be overcome and the common defects just referred to substantially prevented. To this end it is proposed to employ pressure and/or heat in such a manner as to insure smooth fitting of the upper about the last at the toe and heel, as well as accurate and uniform lasting at the forepart and ball portion, and to insure adequate adhesion of the inturned margin of the upper at the toe, forepart and heel, and to accomplish all of the above desirable results without necessarily removing the shoe from the bed-lasting machine.

In the preferred embodiment of the invention, the heat and pressure requisite for obtaining the desired result is applied at the toe and/or the forepart at least, by the use of wiper devices, although at the heel, heated presser means other than wipers is regarded as desirable.

It has long been recognized that it is not permissible, as a practical matter, to heat the usual toe wipers to any such degree of heat as to enable them effectively to set the wiped-in portion of the upper, since if heated to a temperature sufficient for the purpose, the edges of the wipers, as they move upwardly in contact with the upper before moving inwardly over the bottom of the insole, will mar, and in many cases wholly ruin, some of the more delicate upper materials.

It is accordingly a further object of the invention to provide a method of and apparatus useful in pressing and setting the turned-in margin of the upper against the bottom of the insole, operating upon the general principle of the usual toe wipers and capable of applying the desired degree of heat and ironing pressure but without danger of damaging the most delicate upper materials and without requiring that the usual wipers be first lifted or retracted so as to release the upper material even instantaneously in preparation for the application of the pressing and setting devices.

Further objects of the invention are to provide means operative to prevent surplus upper material, wiped-in over the insole, from being stuck down to the latter by the lasting cement; to provide adjustable means for tensioning the upper at the ball of the shoe whereby the tensioning means may be adjusted to accommodate shoes of different widths or styles; to provide improved means for holding the last stationary during the lasting operation, thereby to insure accuracy of operation of the forepart pressing and setting devices; and to provide means for actuating said pressing and setting devices whereby to insure sufficient pressure at the ball portion of the shoe.

Other objects and advantages of the invention will be made manifest in the following more detailed description and by reference to the accompanying drawings, wherein:

Fig. 1 is a plan view, partly in horizontal section, illustrating an early stage in the bed-lasting operation as carried out in accordance with the present invention, and diagrammatically illustrating certain novel appliances useful in the practice of the process.

Figs. 2, 3 and 4 are fragmentary plan views illustrating one means of support for the relatively movable setting and pressing devices.

Figs. 5, 6 and 7 are fragmentary transverse sections at the ball portion of the shoe illustrating successive steps in the process of lasting this portion of the upper.

Fig. 8 is a fragmentary sectional view substantially on the line 2—2 of Fig. 3.

Fig. 9 is a horizontal section, substantially on the line 5—5 of Fig. 2.

Fig. 10 is a fragmentary plan view, of diagrammatic character, illustrating devices for wiping the upper at the heel portion of the shoe, and also showing, in plan, a heating and pressing device in accordance with the present invention.

Fig. 11 is a fragmentary side elevation, partly in vertical section, showing the parts illustrated in Fig. 10.

Fig. 12 is a perspective view showing the heel pressing and heating device of the present invention removed from the bed-lasting machine.

Fig. 13 is a fragmentary perspective view, to small scale, showing the rear or quarter portion of the dressing tool and indicating the wrinkles or creases which commonly appear at this part of the shoe as a result of the heel lasting operation.

Figs. 14 and 15 are fragmentary transverse sections illustrating the action of the wiper-actuating means adjacent to the ball of the last.

Fig. 16 is a fragmentary side elevation illustrating improved means for positioning the last in a bed-lasting machine.

Fig. 17 is a fragmentary plan view, partly in horizontal section, illustrating the improved gripper device for use in lasting the ball portion of the shoe.

Fig. 18 is a perspective view, to small scale, showing a pair of long wiper plates directly hinged together; and

Fig. 19 is a fragmentary section substantially on the line 6—6 of Fig. 18, showing how the free end of the long wiper blade may be flexed downwardly.

Referring to the drawings (Fig. 2), the numeral 1 designates a last having assembled therewith the insole 2 and the upper 3; being assumed that at the commencement of the operation herein more specifically described, the upper 3 has been properly spindled on the last and that the shank has been lasted. It is further
assumed that the last with the assembled upper and insole has been mounted in a bed-lasting machine having suitable means for supporting the last, such supporting means preferably being of the improved type hereinafter more fully described. The machine is also provided with relatively movable devices which are commonly used in machines of this character. These wipers are moved in and out by a hand lever (not shown) to wipe the marginal portion of the upper materials inwardly over the insole. It is to be understood that these wipers are movable heightwise of the shoe as usual by means of a treadle (not shown) and that the wipers 4 are utilized to wipe the upper heightwise of the toe before wiping it inwardly over the insole. The wipers 4 may also be forcibly pressed downwardly toward the shoe bottom, after they have been moved inwardly over the insole by the hand lever. As usual, these wipers 4, when in use, are substantially at the normal room temperature, being heretofore referred to as "cold wipers" to distinguish from the heated pressing and setting devices hereinbefore described and illustrated.

In accordance with the present invention, the bed-lasting machine is furnished with heated means for heating and setting the wiped-in marginal material of the upper at the toe and forepart of the shoe, preferably as far back as the forward end of the last, such setting and pressing means being distinct and separate from the wipers 4. As here illustrated by way of example, the improved pressing and setting means consists of a pair of elongate plates or wiper-like members 5 (Figs. 1, 2 and 3) pivotally connected at their forward ends to a plate-like support 12 (Fig. 19) which may be moved axially of the last toward and from the toe portion of the latter. The wipers 6 are disposed in substantially the same plane as the support 12 (the several parts being in a horizontal plane just above the plane of the bottom surface of the insole when they are in operative position) and are disposed immediately beneath and, when retracted, may be kept slightly spaced, if desired, from the wipers 4. Preferably, the inner edges of the support 12 and the auxiliary wipers or presser devices 6 are upwardly beveled as illustrated at 9 (Fig. 6) to enable them to slide upwardly over the rounded edge of the upper where the latter turns inwardly over the insole, so that in their inner portions they are inoperative when the edges of the marginal portion 23 of the upper (Fig. 3). The support 12 and the pressing and setting members 5 may be actuated in any suitable manner, either by hand and foot operated devices (not shown), similar to those employed for actuating the wipers 4, or by power driven means, if preferred. The free rearward ends of the elongate setting members 5 are swung inwardly over the shoe bottom as such setting members are moved rearwardly from the position of Fig. 1 to that of Fig. 3.

To insures the application of adequate setting pressure by the free rear ends of the members 5, it is proposed to employ auxiliary actuating devices such as diagrammatically indicated in Figs. 3, 14 and 15. Such actuating means comprises pusher devices 9 arranged at opposite sides of the last and designed to be moved inwardly simultaneously toward the last by appropriately operating connections, such pusher devices engaging the outer edges of the members 5 and assisting the primary actuating devices in pushing them in and over the bottom of the insole so as to wipe-in the marginal material of the upper as above described. With each pusher 9 is associated a presser device 10 slidably related to its associated pusher 9 and preferably having a beveled inner edge 11. As the pusher 9 is advanced to push the member 5 inwardly, the corresponding presser device 10 moves inwardly but at a faster rate so as to ride up onto the wiper member 5 and exert heavy downward pressure upon the latter as the wiper 5 moves inwardly so as to insure a proper setting of the wipe-in material against the bottom of the insole.

In their normally retracted positions, the setting members 5 preferably do not contact either with the outer surface of the shoe upper or with the wipers 4, and in such retracted positions, these setting members may be disposed in heat-transferring relation to underlying fixed heater plates (not shown) electrically or otherwise heated. However, it is preferably to mount a housing 7 (Fig. 4) upon each of the members 5 and to install within this housing electrically heated coils designed to heat the members 5 hot at all times and ready for instant use. To provide for variation in the heat supplied, a rheostat (not shown) may be connected into the heating circuit in well known manner.

In accordance with the present invention, it is proposed to tension the upper over the forepart or arch of the last at the ball portion by a substantially direct upward pull applied equally and simultaneously at opposite sides of the shoe. For performing this step in the operation, the bed-lasting machine is provided with an arm 16 (Fig. 5) which may, if desired, be supported to swing in a horizontal plane and which has a vertically elongate boss 11 at its free end having a vertical bore which may be positioned directly above the ball portion of the last when the latter is mounted in the machine. Within the bore in the boss 11 is arranged a sleeve member 12 which may be moved up and down in the boss 11 and which is furnished at its lower end with guides for a pair of oppositely directed relatively movable sliding arms 15, each provided at its outer end with a gripper device. Each gripper device preferably comprises a fixed gripper jaw 15 and a pivoted jaw 16, each jaw 16 having an inwardly extending rigid arm 15. The adjacent ends of these arms 15 are pivotally connected by means of a pin so that the lower end of an actuating rod 17 adapted to slide within the sleeve 12. At its upper end this rod 17 is connected by pin and slot connections at 18 to a lever 19 fulcrumed at 20 to a suitable support, such lever having an arm 21 to which is connected an actuating rod or chain 22 leading to a treadle or other suitable device for manipulation by the operator. It is desirable to provide a spring 23 which tends to move the rod 17 and the gripper devices downwardly so as to bring the gripping devices into proximity to the upperstanding margins of the pulled-in upper.

As illustrated in Figs. 5, 6, 7 and 17, the inner, fixed jaw 16 of each gripper device preferably is provided with an elongate guard member 14 designed to extend a substantial distance along the margin of the forepart and to constitute a limiting stop engageable with the insole thereby to limit downward movement of the gripper jaw 15. When the stop 14 thus contacts the insole, it firmly holds the insole against the last bottom so as to prevent the insole from buckling, even if it be very thin and flimsy, while a fur-
other slight downward movement of the rod 17, occasioned by the spring 25, swings each jaw 16 open to its fullest extent in readiness to receive the upper between it and the fixed jaw. Prefer- 28 enably the recess 14 of its outer surface (Fig. 5), said recess having a curved inner wall 15 for a purpose hereinafter to be described.

When the wiper members 5 move inwardly and engage the upper material, they first bend such material inwardly slightly, where it is tensioned by the grippers, and cramp it firmly against the edge of the insole, as shown in Fig. 5. The gripper devices are then allowed to descend, and when the members 14 engage the bottom of the insole, the jaws are opened, thus releasing the upper for further in-wiping by the members 8. As the latter continue to move in, they wipe the margin of the upper over onto the bottom of the insole as shown in Fig. 6, but surplus material at the extreme inner edge of the wiped-in margin curls up as shown at C (Fig. 6) over the curved surface 14 so that it is not stuck down by the lastig cement and remains standing up after the wipping operation is completed, as shown in Fig. 7, and is then trimmed off by the operator.

The lateral spacing of the gripping members 12 is such that it may be adjusted by actuation of a rotatable collar member 60 (Figs. 2 and 9), which is supported on the lower part of the sleeve 12 and which is provided with an annular portion 61 which may be manually grasped and rotated. The lower flange of this member 60 is provided with cam slots 55 which engage pins 60 extending upwardly from the members 12 so that the members 12 may be moved simultaneously toward and from each other by rotation of the part 60.

A further feature of the present invention concerns the lasting of the heel portion of the shoe. Referring to Figs. 10 to 13, wherein certain usual elements of the heel lasting parts of a bed-lasting machine are illustrated, as well as certain adjunctive features in accordance with the present invention, the character 144 represents heel lasting wipers of substantially usual construction mounted on a suitable support 8 and actuated by means such as commonly used in machines of this character.

In accordance with the present invention, the heel lasting, which is sometimes employed, is replaced by the quarter setting and pressing device 24. This setting and pressing device comprises relatively movable side members 25 and 26 hinged together by means of pivotal connections 27 having a vertical axis, the inner surfaces 30 of the members 25 and 26 being of such contour as collectively to conform with substantial exactitude to the rear or quarter portion of the last upon which the shoe is to be lasted. The members 25 and 26 are preferably of such vertical depth as to contact with substantially the entirety the quarter portion of the upper from the free edge of the latter to the point at which the upper turns inwardly over the edge of the insole. The upper surfaces of the members 25 and 26, as viewed in Fig. 11, substantially contact with the under surfaces of the wipers 4. The members 25 and 26 are furnished with outstanding lugs to which are connected actuating devices 30 whereby the members 25 and 26 may be swung inwardly and pressed with heavy pressure against the upper material at the quarter of the shoe.

In accordance with this invention, these presser members 25 and 26 are substantially of some rigid material, for example, metal; a moulded synthetic resin; hard rubber; or the like, and are furnished with one or more cavities within which are disposed heating coils 31, preferably electrically heated.

As indicated in Fig. 12, the upper and inner 5 edges 33 of the members 25 and 26 form acute angles and are adapted to enter into the crevice formed between the flat surfaces of the wipers 4 and the wiped-in material of the quarter so as to apply pressure to that portion of the upper which extends about the edge of the insole.

In order that the several operations above described, may be performed with the desired certainty and accuracy, it is necessary that the last be held firmly in position so that it can not rock laterally. In accordance with the present invention, and as indicated in Fig. 16, the last is mounted on the usual spindle X and at its forward the lasted upper rests on the usual toe pad P. Since the spindle socket in the last is often worn and enlarged, the engagement of the last with the spindle X can not be depended upon to support the last so as to prevent it from rocking sidewise. Accordingly the present invention contemplates the provision of a last positioner 34 having a wide or transversely elongate forward surface designed to engage the rear surface 35 of the forward portion of the last substantially from one side of the last to the other. The positioner 34 is pivoted at 29 to a bracket 37 projecting forwardly from the spindle post 28 and has a downwardly directed portion 38 engageable by an adjustable and preferably yieldingly mounted arm 40 forming a rearward continuation of a wedge member 41 which moves rearwardly during the operation of the machine thereby to lift the toe pad P. During such rearward movement, the arm 40 engages the part 38 and thus swings the member 34 into pressure contact with the downwardly and rearwardly inclined flat surface 35 of the last so as to prevent the last from rocking laterally. A spring 42 tends to swing the member 34 rearwardly to facilitate placing the last on the spindle X.

In performing the lasting operation in accordance with the present invention, and assuming that the previously pulled-over shoe has been placed in the bed-lasting machine as above described, the inner surface of the upper 33 is contacted by the wipers 4 and the upper along the forepart and ball is first preferably coated with adhesive. The gripper devices 8 are then moved downwardly so as to receive the jaws of the upper at the ball portion. The operator then pulls the rod 22 downwarly, the first effect of which is to swing the arms 16 upwardly, thus closing the jaws upon the margins of the upper material at the ball portion only of the shoe. Further movement of the actuating rod 22 then lifts the closed grippers so that they concomitantly stretch the upper up side and across the forepart or arch of the last at the ball portion of the shoe, the pull being of substantially equal intensity at opposite edges of the upper. Any pulling-over tacks still remaining at the toe are now removed and the cold toe-lasting wipers 4 are then operated in the usual way to wipe-in the upper material over the bottom of the insole in the usual way.

Incidental to the toe wiping, the surplus material at the toe is trimmed away and the opposed surfaces of the margin of the upper and the insole are coated with adhesive.

With the upper still stretched upwardly by 75
the grippers and with the cold toe-wipers still advanced and holding the upper, the support &s which carries the adjacent edge portion 8 of the members 5, comes into contact with the tensioned upper material just where the latter bends over the insole, and the beveled edges 6 of the support and the parts 8 ride up over this curved surface of the upper material, raising the usual toe wipers 4 as the members 5 and 8 advance, it being noted that as these members advance beneath the wipers 4 they exert a very heavy wedging action and downward pressure against the wiped-in upper material so that there is no possibility that the latter can draw back. On the contrary, the inward movement of these members 5 and 8, under the very heavy pressure exerted upon them by the inwardly positioned wipers 4, accentuates the previous wiping operation, insuring an extremely snug fit of the upper material about the edge of the insole. To assist in the inward movement of the members 5, the members 8 move in from opposite sides of the last, and the presser device 35 move in over the rear ends of the parts 8 as above described, thereby insuring firm downward pressure of the parts 8 against the wiped-in material. In this connection it may be noted, that by the employment of devices such as the presser elements 8, (of which more than two may be employed if necessary) it is permissible, if desired, to make the wipers 5 of flexible material so that they may flex longitudinally and conform to the longitudinal curvature of the shoe bottom.

As the members 5 and 8 are heated to such a temperature as to be effective for setting the upper material, and as these heated surfaces are applied with such intimate contact to the upper material, the pressing and setting operation may be accomplished in a minimum of time and with the utmost certainty of result. Since the up-wiping operation is performed wholly by the wipers 4, which are cold, the principal function of the members 5 and 8 is to set the wiped-in upper material, although they have the supplemental function, as above noted, of assisting in the actual ironing of the margins of the upper. Thus, although the members 5 and 8 may be highly heated, there is no possibility of damaging the upper by contact with the exposed surface of the latter.

Since the heat is so effectively applied and under so heavy a pressure, the members 5 and 8 need only be left in operative position for a very short period of time and are then fully retracted so that the wipers 4 do not become unduly heated by contact with the inner portions of the wiper members 5.

While as hereinabove described the support for the wipers 8 functions as a wiper at the extreme toe, it is contemplated that the wipers 5 themselves may be so shaped as to contact the margin of the insole against the extreme toe as well as at the forepart and ball.

In lasting the heel portion of the shoe in accordance with the present invention, the wipers 4 are manipulated as is usual to wipe-in the marginal portion of the upper at the heel. After this material has been thus wiped in, the wipers may be retained in their innermost position, and the pressing and setting members 28 and 29 are then swung inwardly about their pivotal axis at 27 so as to press with heat pressure such quarter portion of the upper. As indicated in Fig. 13, the result of the wiping operation is quite commonly to form minute wrinkles W just where the material of the upper begins to bend over the edge of the insole, but by the use of the heated setting and pressing device, the pressing of such wrinkles, even if formed at the inception of the wiping operation, may be effectively smoothed out so as to become invisible.

Since in the actuation of the setting and pressing device 24 there may be some tendency to produce a fullness in the upper material in the region of the edge of the insole, it may be preferred, after the presser device has been brought into intimate contact with the quarter, to lift and retract the wipers 4 and then after the pressure of the pressing and setting device 24 has been fully applied, to move the wipers inwardly again so as to take up any slack and smooth the marginal material down very flat against the bottom of the insole. This marginal material may now be permanently secured in place, if desired, by means of tacks, or any other appropriate fastening means may be employed. After the upper has thus been secured in position, the pressing and setting device 24 is retracted, the wipers are lifted, and the shoe may be removed from the lasting machine.

In Figs. 16 and 19 long wiping and setting plates 8 are shown, said plates being designed to function like the plates 5 above described and being provided with heater elements 7 so that they may be preheated to the desired temperature. The plates 8 are directly hinged together at H like the usual toe wiper plates and may be secured to an appropriate support in the same way as the ordinary toe wipers. As illustrated, the free ends 8 of the plates 8 are turned inwardly toward each other so as to reach well across the rear of the ball and, as above suggested, these plates may be longitudinally flexible so that, when subjected to the action of the presser device 35 they will flex as shown at 8" (Fig. 19) so as to conform to the curvature of the shoe bottom.

While certain desirable embodiments of the invention have herein been described by way of example, and certain apparatus useful in the practice of the improved process, it is to be understood that the invention is not necessarily limited to the method steps herein described nor to the order of steps suggested as preferable, and that other and equivalent appliances may be employed in the practice of the process, all as may fall within the scope of the appended claims.

I claim:

1. That method of lasting the toe portion of a shoe upper which has been assembled with an insole upon a last and pulled over, which comprises as steps wiping the marginal portion of the upper onto the bottom of the insole by the use of cold wiping means, and forcing heated setting devices inwardly between said wiping means and the wiped-in upper material without substantially relaxing the holding stress upon the inturned marginal material of the upper; first, and then

2. That method of lasting the toe portion of a shoe upper which has been assembled with an insole upon a last and pulled over, which comprises as steps wiping the marginal portion of the upper onto the bottom of the insole by the use of cold wiping means, leaving such wiping means in holding engagement with the wiped-in upper.
material, and forcing a plurality of heated setting elements inwardly in convergent directions from the margin of the insole between the wiping means and the wiped-in marginal material.

3. That method of lasting the toe portion of a shoe upper which has been assembled with an insole upon a last and pulled over, which comprises as steps wiping the marginal portion of the upper onto the bottom of the insole by the use of relatively movable cold wipers, and without substantially relaxing the downward pressure exerted by the wipers, forcing a plurality of heated setting plates with a wiping action inwardly over the shoe bottom and between the wiped-in marginal material and the cold wipers.

4. That method of lasting an end portion of a shoe upper which has been assembled with an insole upon a last and pulled over, which comprises as steps wiping the marginal portion of the upper onto the bottom of the insole by the use of relatively movable cold wipers, and without substantially relaxing the downward pressure exerted by said wipers, introducing between them and the wiped-in marginal material a previously heated, heated setting element.

5. That method of lasting a portion of a shoe upper which has been assembled with an insole upon a last and pulled over, which comprises as steps wiping the margin of said portion of the upper onto the bottom of the insole by the use of relatively movable wipers, and without substantially relaxing the downward pressure exerted by said wipers, forcing other and previously heated and normally retracted wipers inwardly between the aforesaid wipers and the inturbed marginal material.

6. That method of bed-lasting the forepart portion of a shoe upper which has been assembled with an insole upon a last and pulled-over and into which pulling-over tacks have been inserted, which includes as steps simultaneously seizing the edge portions of the upper at opposite sides of the shoe at the ball portion only, pulling the seized portions of the upper at the ball in a direction substantially perpendicular to the bottom of the insole and with substantially equal tension thereby snugly to draw the upper across the growth of the last, removing any remaining pulling-over tacks at the toe, causing wiping means to engage the tensioned upper at opposite sides respectively of the shoe and to initiate the wiping-in of the tensioned upper material over the insole, relaxing the pulling tension on the marginal part of the upper, and completing the wiping-in operation at the forepart.

7. That method of bed-lasting the forepart portion of a shoe upper which has been assembled with an insole upon a last and pulled-over and into which pulling-over tacks have been inserted, which includes as steps pulling the upper material at opposite sides of the last at the ball portion only directly upward away from the bottom of the insole and with substantially equal force at opposite sides thereby to tension the upper snugly about the arch of the last, and, after the upper has been so tensioned, removing any remaining pulling-over tacks at the toe, and simultaneously wiping-in the upper at opposite sides of the forepart.

8. That method of bed-lasting the forepart portion of a shoe upper which has been assembled with an insole upon a last and pulled-over and into which pulling-over tacks have been inserted, which includes as steps seizing the edge portion of the upper at opposite sides of the last adjacent to the ball only of the last, simultaneously pulling said seized portions upward away from the bottom of the last, and pulling the upper portion of the upper at the ball inwardly across the arch of the last, removing any remaining pulling-over tacks at the toe, and thereafter, without removing the shoe from the bed-lasting machine, wiping the marginal portions of the tensioned sole by the use of relatively movable cold wipers, and, by the use of heat and pressure, setting such wiped-in portions by the use of heat and pressure.

9. That method of bed-lasting the forepart portion of a shoe upper which has been assembled with an insole upon a last and pulled-over and into which pulling-over tacks have been inserted, which includes as steps seizing the edge portion of the upper at opposite sides of the last adjacent to the ball portion only, simultaneously pulling the seized portions upward away from the last bottom and with substantially equal force thereby to tension the upper across the arch of the last, removing any remaining pulling-over tacks at the toe and thereafter causing wiping means to move inwardly at opposite sides of the last and to exert a wiping action upon the marginal material of the upper from the toe portion of the last un-interrupted substantially to the tensioned portion at both sides of the shoe simultaneously.

10. That method of bed-lasting the forepart portion of a shoe upper which has been assembled with an insole upon a last and pulled-over and into which pulling-over tacks have been inserted, which includes as steps pulling the upper at opposite sides of the last simultaneously and with substantially equal force at the ball portion only in such a direction as to tension the upper snugly about the arch of the last, removing any remaining pulling-over tacks at the toe, wiping-in the toe portion of the upper by means of relatively movable cold wipers, and, without removing the shoe from the bed-lasting machine, causing preheated wiping means to move inwardly and simultaneously to exert a wiping action upon the marginal upper material from the toe portion of the last substantially to the Shank portion at both sides of the shoe thereby to set the marginal material flat against the bottom of the insole.

11. Method of lasting a shoe upper which has been pulled over a last having an insole attached to its bottom surface, which comprises as steps applying cement to the inner surface of the marginal portion of the upper along the forepart portion, simultaneously gripping and tensioning the material at opposite sides of the ball portion, removing any remaining pulling-over tacks at the toe, up-wiping the toe portion of the upper by means of cold wipers, trimming away surplus material at the toe and applying adhesive to the marginal material at the toe, completing the in-wiping operation, moving preheated wipingmeans, extending around the forepart from the Shank on one side to the Shank on the other, inwardly over the bottom of the insole in a plane between that of the upper surface of the operatively positioned and fully advanced cold wipers and the upper surface of the in-wiped toe material, causing the said heated wiping means to exert forward pressure on the in-wiped marginal material, turning up the in-wiped marginal material at the forepart, and trimming off such up-turned material.

12. Method of lasting a shoe upper which has been pulled over a last having an insole attached to its bottom surface, which comprises as steps applying cement to the inner surface of the mar-
gin of the upper along the forepart portion, simultaneoulsly gripping and tensioning the material at opposite sides of the ball portion, removing any remaining pulling-over tacks at the toe, up-wiping the toe portion of the upper by means of cold wipers, trimming away surplus material at the toe after wiping-in the upper marginal material at the toe, completing the in-wiping operation, moving preheated wiping means, extending around the forepart from the Shank on one side to the Shank on the other, inwardly over the bottom of the Insole in a plane between that of the under surfaces of the fully advanced cold wipers and the upper surface of the wiped-in toe surface, causing the said heated wiping means to exert heavy downward pressure on the in-wiped marginal material, causing surplus material to curl upwardly during such inward movement of the heated wipers, and trimming off such curved-up material.

13. Method of lasting a shoe upper which has been pulled-over onto a last having an Insole attached to its bottom surface, which comprises as steps applying adhesion to the upper margin of the upper along the forepart portion, simultaneously gripping and tensioning the material at opposite sides of the ball portion, removing any remaining pulling-over tacks at the toe, up-wiping the toe portion of the upper by means of cold wipers, trimming away surplus material at the toe and applying adhesion to the marginal material at the toe, completing the in-wiping operation, moving preheated wiping means, extending around the forepart from the Shank on one side to the Shank on the other, inwardly over the bottom of the Insole in a plane between that of the under surfaces of the fully advanced cold wipers and the upper surface of the wiped-in toe material, causing the said heated wiping means to exert heavy downward pressure on the in-wiped marginal material, wiping-in the marginal material at the heel portion of the shoe and securing it to the Insole, and applying heat and pressure to the outer surface of the quarter portion of the upper to remove wrinkles.

14. Method of bed-lasting a shoe upper which has been pulled-over onto a last having an Insole attached to its bottom and into which pulling-over tacks have been inserted, said method comprising as steps lasting the Shank, applying adhesion to the inner surface of the margin of the upper along the forepart and ball, tensioning the upper about the last to remove slackness across the arch of the last by pull exerted simultaneously upon its opposite margins at the ball portion only and in a direction away from the last bottom, removing any remaining pulling-over tacks at the toe, and lasting-in the marginal material of the upper from the toe portion uninterruptedly to the Shank solely by the use of wiper means.

15. Method of bed-lasting a shoe upper which has been pulled-over onto a last having an Insole attached to its bottom and into which pulling-over tacks have been inserted, said method comprising as steps applying tension to the margin of the upper at the ball portion only in a direction away from the bottom of the last thereby to stretch the upper edge of the upper from the Shank on one side to the Shank on the other, causing the wiper means to move inwardly to cramp the tensioned upper against the edge of the Insole, releasing the edge of the upper from tension, and completing the inward movement of the wiping means.

16. Method of bed-lasting a shoe upper which has been pulled-over onto a last having an Insole attached to its bottom and into which pulling-over tacks have been inserted, said method comprising as steps seizing the edge portion of the upper at opposite sides of the shoe at the ball portion only, simultaneously applying tension at the opposite sides of the upper marginal material at the toe, completing the in-wiping operation, moving preheated wiping means, extending around the forepart from the Shank on one side to the Shank on the other, inwardly over the bottom of the Insole in a plane between that of the under surfaces of the fully advanced cold wipers and the upper surface of the wiped-in toe material, causing the said heated wiping means to exert heavy downward pressure on the in-wiped marginal material, causing surplus material to curl upwardly during such inward movement of the heated wipers, and trimming off such curved-up material.

17. Means for use in lasting shoes in a bed-lasting machine including devices for actuating movable wipers for wiping upper material inwardly over the bottom of the Insole, said lasting means comprising a pair of cold wipers operative to wipe-in the upper material at the toe of the shoe, and auxiliary preheated wipers disposed beneath said first-named wipers, and means for forcing said preheated wipers between the wiped-in marginal material of the upper and said first-named wipers.

18. Means for use in lasting shoes in a bed-lasting machine including devices for actuating movable wipers for wiping upper material inwardly over the bottom of the Insole, said lasting means comprising a pair of cold wipers, preheated wipers disposed in a horizontal plane just beneath said cold wipers, said preheated wipers disposed in a horizontal plane just beneath said cold wipers, said preheated wipers being made to advance said preheated wipers thereby to force them between the wiped-in upper material and the overlying cold wipers.

19. Means for use in lasting shoes in a bed-lasting machine including devices for actuating movable wipers for wiping upper material inwardly over the bottom of the Insole, said lasting means comprising a pair of cold wipers, preheated wipers disposed in a horizontal plane just beneath said cold wipers, said preheated wipers being made to advance said preheated wipers thereby to force them between the wiped-in upper material and the overlying cold wipers.

20. Means for use in lasting shoes in a bed-lasting machine including devices for actuating movable wipers for wiping upper material inwardly over the bottom of the Insole, said lasting means comprising a pair of cold wipers, preheated wipers disposed in a horizontal plane just beneath said cold wipers, said preheated wipers being made to advance said preheated wipers thereby to force them between the wiped-in upper material and the overlying cold wipers.

21. Apparatus for lasting shoes comprising gripper devices simultaneously engageable with the margin of the upper at opposite sides of the
shoe, and means for moving said gripper devices thereby to stretch the upper about the last, means for wiping-in the tensioned upper at opposite sides of the last, and means for limiting movement of the respective gripping devices toward the insole, each such limiting means having a recess provided with an inclined surface for engagement by the extreme edge of the wiped-in upper material thereby to deflect said edge upwardly away from the surface of the insole so as to prevent such edge from being stuck to the insole by the lasting cement.

ALBERT KAMBORIAN.