April 6, 1948. J. S. KAMBORIAN 2,438,918

METHOD OF AND APPARATUS FOR USE IN LASTING FOOTWEAR

Filed Sept. 28, 1944

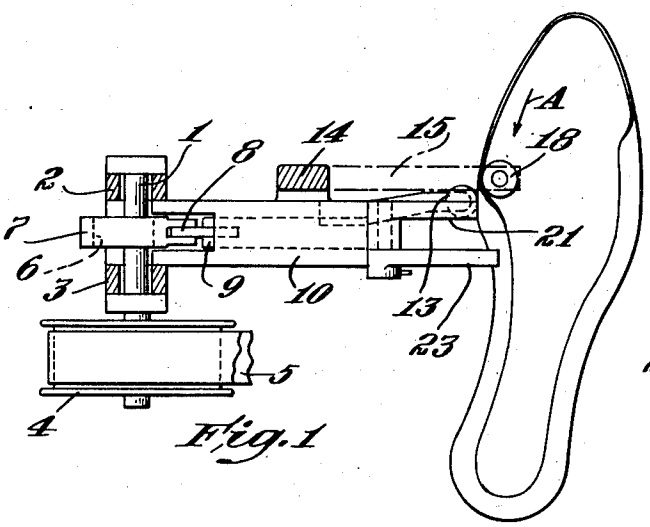


Fig. 1

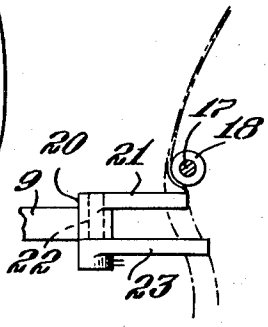


Fig. 4

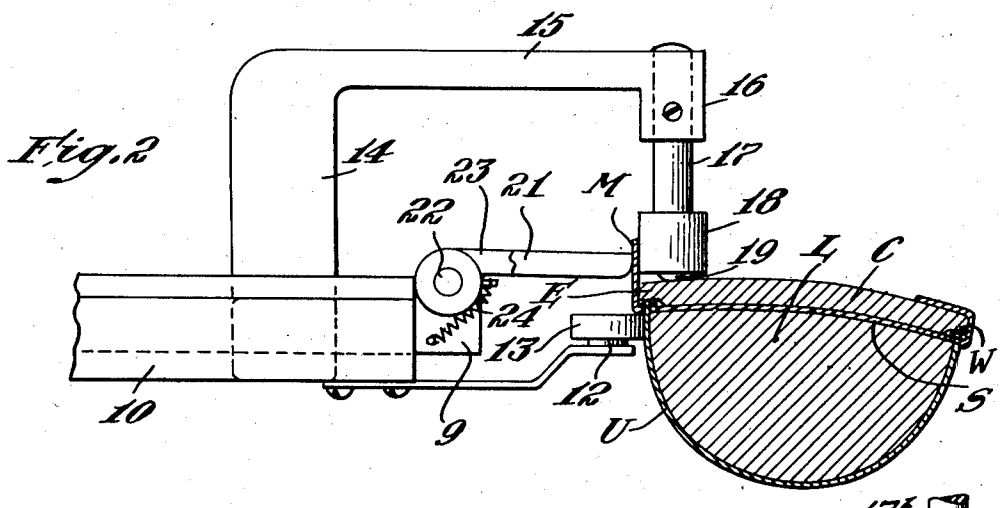


Fig. 2

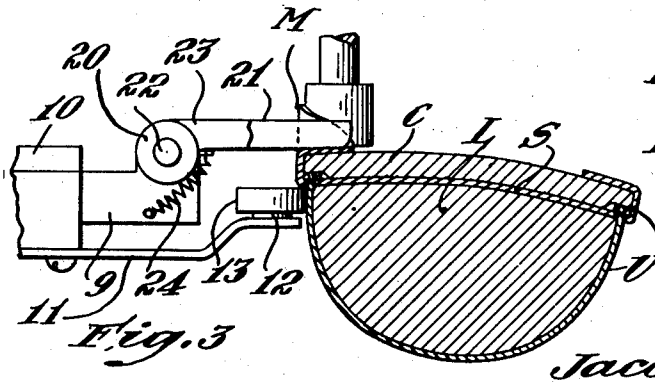


Fig. 3

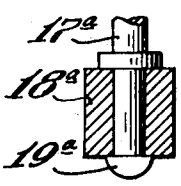


Fig. 5

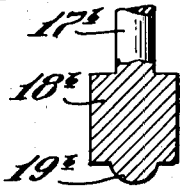


Fig. 6

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METHOD OF AND APPARATUS FOR USE IN LASTING FOOTWEAR

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Application September 28, 1944, Serial No. 556,108

18 Claims. (Cl. 12—1)

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This invention pertains to the manufacture of footwear and relates more especially to a novel method of lasting shoes and to novel apparatus useful in the practice of the invention.

The patent to Kamborian, No. 2,251,284, dated August 5, 1941, describes apparatus for lasting shoes wherein a pair of oppositely turning rolls grip the margin of the upper between them while vibratory wiper means turns the upper margin inwardly over the shoe bottom and subjects it to pressure so as to cause it to adhere to the exposed surface of the shoe bottom. Machines of this type have been proven very successful commercially, particularly when it is requisite to stretch the upper snugly about the last, but I have now discovered that for certain specific purposes the aforesaid machines are unnecessarily complex. When, as suggested, it is requisite to stretch the upper very snugly about the last, gripping rolls or their equivalent are essential but in making shoes, for instance of the so-called "force-lasted" type, where the last is forced into the upper after the latter has been associated with and permanently united to the sock lining, the only operation which resembles ordinary lasting is that of drawing the wrapper about the edge of the middle sole and laying its margin down over the exposed surface of the middle sole. This operation does not necessitate the application of heavy updrawing stress to the wrapper, so that in performing this particular operation the principal function of the rolls of the aforesaid lasting machine is to advance the shoe relatively to the upper. The present invention provides a novel method of lasting, applicable to the manufacture of certain types of shoe, and especially to the performance of the operation involved in stretching and inwiping the wrapper of a force-lasted shoe, and may be performed merely by the use of wiping means (assisted by appropriate means for controlling and guiding the shoe and the margin of the wrapper as the latter approaches the wiping-in position). The principal object of the present invention is to provide a novel method of and means whereby certain types of lasting may be performed, in particular the operation involved in the disposal of the margin of the wrapper of a force-lasted shoe inwardly over the bottom of the middle sole. Other and further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a more or less diagrammatic plan view, partly in horizontal section, illustrating apparatus useful in the practice of the present invention;

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Fig. 2 is a side elevation, partly in vertical section and partly broken away and to somewhat larger scale than Fig. 1, showing the apparatus of Fig. 1 with the parts in the position which they occupy at the beginning of the advance stroke of the in-wiping wiper;

Fig. 3 is a view similar to Fig. 2 showing the parts at the conclusion of the in-wiping stroke of the wiper;

Fig. 4 is a fragmentary diagrammatic plan view showing the relation of the in-wiping and pressing wipers;

Fig. 5 is a fragmentary vertical section illustrating a modified form of abutment; and

Fig. 6 is a similar view, showing a further modified form of abutment.

While the novel procedure of the present invention may be accomplished by the use of hand-actuated implements, it is more facilely practiced by the employment of power driven mechanism which, for example, may in general particularly resemble that of the aforesaid Kamborian patent, but so modified as to eliminate the upper gripping rolls and to substitute an upper controlling abutment for one of said rolls.

The apparatus herein disclosed as an example of suitable means for practicing the improved process may be, in general, similar to that disclosed in the patent to Kamborian, No. 2,251,284, dated August 5, 1941, at least in respect to the means for guiding the driving and wiping means, and reference may be had to that patent for details respecting the general machine construction not herein illustrated.

Referring to the drawings, the numeral 1 designates a horizontal wiper-actuating shaft mounted in bearings at 2 and 3 in the machine frame, and provided at one end with a pulley 4 which receives a driving belt 5 driven by any suitable source of power. Mounted on the shaft 1, between the bearings 2 and 3, is an eccentric 6 having the eccentric strap 7 which is connected, by means of a link or connecting rod 8, to the rear end of a slide 9 mounted to slide horizontally in a fixed elongate guide 10 forming a part of the machine frame. To the forward end of this fixed guide 10 there is secured a forwardly extended bracket 11 which supports a vertical stub shaft or pin 12 on which is mounted to turn freely a gauge roll 13 designed to contact the outer surface of the shoe upper U at a point immediately below the inseam W which connects the sock lining or insole S to the upper. Since the shoe is lasted bottom up, such expressions as "up," "down," "above," "below," etc., as herein

applied to the shoe parts, are to be understood with reference to the shoe as thus inverted.

The machine frame is also provided with a post 14 having the overhanging forwardly directed arm 15 provided at its forward end with a sleeve portion 16 which receives, preferably adjustably, the upper end of a rigid supporting member 17. The lower part of this supporting member 17 is shaped to provide a suitable spindle on which turns the abutment roll 18. Preferably the lower end of this roll 18 is furnished with a downwardly directed axial, rounded boss 19 designed to contact the exposed surface of the cushion or middle sole C of the shoe, and to constitute a hold-down to prevent upward movement of the shoe as a whole. This hold-down cooperates with the gauge roll 13 to assist the operator in holding the shoe in proper position for the performance of the lasting operation, it being noted that the boss 19 is of but slight depth so that the lower end of the roll is very close to the bottom of the shoe. The roll 18 is preferably cylindrical and has a smooth substantially vertical peripheral surface designed to contact the inner surface of the lasting margin M of the shoe upper. As here illustrated, this lasting margin is constituted by a wrapper element secured to the sock lining S and to the upper U at or adjacent to the inseam W. However, in lasting shoes of the usual type (as contrasted with the force-lasted shoe here specifically illustrated), or even some types of force lasted shoe, the lasting margin M may form an integral portion of the shoe upper.

The slide 9 is provided at its forward end with a transverse head portion 20 (Fig. 4) to which is rigidly secured the in-wiping wiper element 21. This wiper element is narrow in the horizontal direction but sufficiently deep vertically to insure the desired rigidity. It is so arranged that as the slide 9 is rapidly vibrated back and forth by the eccentric 6, the forward end of the wiper 21 moves in and out across the edge E of the shoe bottom, with one of the vertical faces of the wiper close (nearly tangent) to the peripheral surface of the abutment roll 18. The head 20 of the slide 9 is provided with bearings for a shaft 22 having secured to one of its ends a pressing wiper 23. This pressing wiper 23 is parallel to but spaced from the in-wiping wiper 21, and its forward end is constantly urged downwardly by a spring 24, the forward ends of both wipers being smoothly rounded so as to ride over the edge portion of the shoe bottom as the wiper advances, the pressing wiper engaging the material which has been bent inwardly by the first wiper and pressing the marginal material of the upper downwardly into firm contact with the exposed bottom of the shoe.

Instead of the abutment illustrated in Fig. 2, an arrangement such as shown in Fig. 5 may be provided wherein the support 17^a is shaped at its lower end to provide the hold-down element 19^a and to form a support and spindle for the abutment roll 18^a. As a further modification, illustrated in Fig. 6, the abutment member may be merely a smooth surfaced portion of the support 17^b, integral with the latter, and fixed and immovable—the hold-down element 19^b being integral with the part 18^b.

In the operation of the apparatus, and assuming that the eccentric 6 is turned so as to vibrate the head 20 and the wiper elements 21 and 23 very rapidly, for example at a rate of from 400 to 500 strokes per minute, the operator will place the shoe mounted (on the last L) substantially in the position illustrated in Fig. 2 so that the gauge roll 13 contacts the side of the shoe upper and so that the hold-down device 19 engages the upper surface of the cushion sole C, and with the upstanding lasting margin M contacting the periphery of the roll 18. The operator uninterruptedly moves the shoe in the direction of the arrow A, so as continually to bring new portions of the lasting margin M into contact with the roll 18. As the shoe is thus progressively moved forward, the wiper 21 engages the lasting margin M, and since the abutment roll 18, at its point of contact with the margin, tends to hold the margin in upright position, that is to say substantially perpendicular to the shoe bottom and thus opposes free inward bending of the lasting margin, the inward thrust of the end of the wiper 21 against the marginal material closely adjacent to the roll 18 bends the material sharply around the periphery of the roll 18 (Fig. 3), and thus exerts a substantial updrawing stress on the marginal material such as to draw it tightly about the outer edge of the cushion sole C. The material M is thus bent inwardly and downwardly over the marginal portion of the cushion sole, and, as the shoe is moved along that portion of the marginal material, which has been partially wiped in and then released by the wiper 21, is engaged by the pressing wiper 23 and firmly pressed down against the shoe bottom as the pressing wiper advances inwardly across the edge of the bottom. The two wipers 21 and 23 move in and out simultaneously, the wiper 23 engaging the partially wiped in material after the latter has been disengaged by the wiper 21. However, it is contemplated that alternate movement of two wiper elements may be employed with desirable results under certain conditions. The stressing, wiping and pressing of the lasting margin thus continues uninterruptedly along the periphery of the shoe bottom so long as the operator continues to move the shoe relatively to the abutment roll. The operator may thus begin at a given point along the shoe bottom and complete the lasting of the entire shoe without interruption, or, if preferred, may perform the lasting operation for a given distance at one side of the shoe and then shift to the other side of the shoe, it being noted, however, that while the shoe is in the field of operation of the wiping elements, and is being progressed, the wiping elements engage successive portions of the upper at very closely spaced points along the periphery of the upper, so that during the actual lasting, the upper is never substantially freed from engagement with the wipers sufficiently long to permit it to retract from its wiped-in position. It is to be understood that the lasting margin M and the marginal portion of the cushion sole C will have been coated with a suitable adhesive prior to the beginning of the lasting operation, at least in accordance with a preferred procedure. However, it is contemplated that adhesive may be applied in any desired manner to the inner surface of the lasting margin and/or to the marginal portion of the cushion sole during the in-wiping operation, if desired.

While one desirable form of apparatus has herein been disclosed by way of example, it is to be understood that the invention is not necessarily limited to this particular apparatus, but that apparatus of equivalent type, falling within the terms of the claims is to be regarded as within the scope of the invention, and that in so far as the method is concerned, it is contemplated that the method may be performed

by manually actuated means as well as by the apparatus herein disclosed or by the use of other appropriate mechanical means.

I claim:

1. A machine of the class described comprising a hold-down engageable with a bottom surface of the shoe, an abutment element associated with the hold-down and which has a cylindrically curved surface engageable with the inner surface of the upturned marginal portion of the upper and so arranged as to tend to hold said marginal portion upright, a wiper element movable transversely across the edge of the shoe bottom in a path closely adjacent to the line of contact of the marginal portion with the abutment element, and means for moving the wiper element, the abutment being so located relatively to the wiper path that as the wiper advances it bends the marginal material around the abutment.

2. A lasting machine having, in combination, a reciprocating lasting-in wiper, a pressing wiper operative to exert pressure upon the wiped-in upper material, means for rapidly reciprocating the wipers, a hold-down engageable with the shoe bottom, and an abutment having a smooth substantially vertical surface curved in horizontal section and engageable with the inner surface of the margin of the upper just in advance, in a direction of movement of the shoe, of the path of the lasting-in wiper and about which the upper material is bent by the lasting-in wiper as the latter moves inwardly.

3. A lasting machine having, in combination, a reciprocating lasting-in wiper, a pressing wiper operative to exert pressure upon the wiped-in material, means for rapidly reciprocating the wipers, a hold-down engageable with the shoe bottom, and an abutment element located just in advance, in the direction of movement of the shoe, of the path of the lasting-in wiper and having a smooth, substantially vertical surface which engages the inner surface of the upstanding margin of the upper and about which the upper material is bent by the lasting-in wiper, said upper-engaging face of the abutment reaching down nearly to the exposed bottom surface of the shoe.

4. A lasting machine having a gauge designed to contact the outer side surface of the shoe upper, a hold-down designed to contact the exposed surface of the shoe bottom, an abutment having an element designed to engage the inner surface of the upstanding marginal portion of the upper and so located that the surface of said element at its point of contact with the inner surface of said marginal portion of the upper is very close to the vertical plane through the point of contact of the gauge with the upper, a wiper element which moves inwardly transversely of the edge of the last, the wiper element being arranged to engage the marginal material of the upper just to the rear of the abutment, as respects the direction of movement of the shoe, and to bend the marginal material about the abutment and to urge it inwardly and over the shoe bottom, and means for pressing the material, so urged inwardly by the wiper element, down onto the shoe bottom.

5. A lasting machine having a gauge designed to contact the outer side surface of the shoe upper, a hold-down designed to contact the exposed surface of the shoe bottom, a wiper element, and means for moving the wiper element inwardly transversely of the edge of the last, an abutment disposed just in advance of the wiper element, the abutment having an arcuate face which engages the inner surface of the lasting margin of the shoe upper and which tends to hold said margin, at the point of engagement, substantially perpendicular to the shoe bottom, the abutment being located just in advance of the wiper element, as respects the direction of movement of the shoe, that face of the wiper element which is nearest adjacent to the abutment being nearly tangent to the arcuate surface of the abutment, the wiper element being constructed and arranged to urge the marginal material inwardly and over the shoe bottom while bending it about the abutment, and a second wiper element operative to press the marginal material so urged inwardly by the first wiper downwardly against the shoe bottom.

6. A lasting machine having a narrow, vibratory wiper movable transversely across the edge of the shoe bottom, means for actuating the wiper, an abutment of substantially circular transverse section having its axis of curvature substantially perpendicular to the shoe bottom whose peripheral surface is smooth and arranged to contact the lasting margin of the upper at a point just in advance of the path of the wiper, in the direction of movement of the shoe, whereby the wiper partially wraps the lasting margin about the abutment as the wiper moves inwardly to urge the lasting margin inwardly over the shoe bottom, and pressing means operative to press the lasting margin downwardly over the shoe bottom after it has been released by the wiper.

7. A lasting machine having a narrow, vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, and an abutment fixed relatively to and just in advance of the path of the wiper as the shoe is progressed, the abutment engaging the inner surface of the lasting margin and tending to prevent the lasting margin from bending inwardly over the shoe bottom.

8. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, and abutment means having a substantially vertical surface at the point of contact with the inner surface of the lasting margin and being disposed in advance of the wiper, as respects the direction of movement of the shoe, said abutment means engaging the lasting margin at one side of the path of the wiper and opposing free inward bending of the marginal material by the wiper whereby the marginal material is subjected to an up-drawing stress as the wiper moves inwardly.

9. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, and a fixed abutment engaging the inner surface of the lasting margin at one side of the path of the wiper and which, by such engagement, opposes free inward bending of the

lasting margin whereby the upper is subjected to an updrawing stress as the wiper moves inwardly.

10. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, a freely rotatable abutment member arranged to engage the inner surface of the lasting margin just in advance of the path of the wiper and which, by such engagement, opposes free inward bending of the lasting margin whereby the upper is subjected to an updrawing stress as it is forced inwardly by the wiper.

11. A lasting machine having a narrow, vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, an abutment having a smooth, work-engaging surface which is substantially perpendicular to the shoe bottom and which is just in advance of the path of the wiper as the shoe is progressed, said abutment opposing free movement of the lasting margin inwardly by the wiper whereby the upper is subjected to an updrawing stress as the wiper moves inwardly.

12. A lasting machine comprising a fixed abutment member having a smooth face for engagement with the inner surface of the lasting margin of the shoe upper, a gauge for contact with the outside surface of the upper at a point adjacent to but below the last bottom, a hold-down element engageable with the exposed bottom surface of the shoe, a reciprocating wiper element movable inwardly over the shoe bottom, the abutment being just in advance of the wiper path as the shoe is moved relatively to the abutment whereby the lasting margin is urged inwardly by the inward movement of the wiper and bent about the abutment, and means for pressing the marginal material downwardly against the shoe bottom after it is released by the wiper element.

13. A lasting machine comprising a rigid member shaped to provide a spindle, an abutment roll arranged to turn freely on the spindle, the lower end of the spindle being provided with a hold-down element designed to contact the shoe bottom, the abutment roll having a smooth peripheral surface designed to engage the inside of the lasting margin of the upper, a wiper for wiping in the marginal material, means operative to move the wiper back and forth in a path so located that the wiper engages the lasting margin immediately after it has been disengaged from the abutment roll by movement of the shoe relatively to said roll, a work pressing wiper which engages the marginal material after the latter has been disengaged by the first-named wiper, and means for moving both wipers.

14. A lasting machine comprising an abutment operative to engage the inner surface of the lasting margin of the upper and to hold said margin, at the point of engagement, substantially perpendicular to the bottom of the shoe, an in-wiping wiper, and means operative to vibrate said wiper back and forth in a path so located that the wiper engages the lasting margin immediately after the latter is disengaged from the abutment by the advance of the shoe relatively to the abutment, a work pressing wiper, and means whereby said work pressing wiper is vibrated, the abutment being so constructed and arranged as to engage the lasting margin at a point close to the shoe bottom so that the in-wiping wiper wraps the lasting margin partially about the abutment as the in-wiping wiper moves inwardly across the edge of the shoe bottom.

15. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom and means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, said wiper comprising two elements one of which wipes in the lasting margin over the bottom of the shoe and the other of which acts upon the wiped-in portion of the margin and presses it downwardly with firm contact with the bottom of the shoe, and a fixed abutment closely adjacent to the wiping-in wiper and about which the latter bends the lasting margin.

16. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, said wiper comprising two elements one of which wipes in the lasting margin over the bottom of the shoe and the other of which acts upon the wiped-in portion of the margin and presses it downwardly with firm contact with the bottom of the shoe and means for moving one of said wiper elements relative to the other of said elements, and a fixed abutment having an upright work-engaging surface closely adjacent to the path of the wiping-in wiper and about which the margin is bent by the latter.

17. A lasting machine having a vibratory wiper movable transversely across the edge of the shoe bottom, means for rapidly vibrating the wiper while the shoe is moved relatively to the path of the wiper so as progressively to present successive portions of the lasting margin for engagement by the wiper, said wiper comprising two elements one of which wipes in the lasting margin over the bottom of the shoe and the other of which acts upon the wiped-in portion of the margin and presses it downwardly with firm contact with the bottom of the shoe and means for moving said second named element relative to said first named element and an abutment, fixed relatively to the wiper and arranged to engage and to tend to hold the lasting margin in upright position, said abutment being so located relatively to the wiping-in wiper that the margin is wrapped partially about the abutment by the action of the latter wiper.

18. Method of lasting shoes which comprises as steps moving the shoe progressively past a wiper element while vibrating the wiper element rapidly in a predetermined path across the edge of the shoe bottom so that the wiper element tends to bend the lasting margin of the upper inwardly over the shoe bottom, the shoe being so progressed relatively to the wiper path that successive points of contact of the wiper element with the lasting margin are very close together, bending the lasting margin about an axis substantially perpendicular to the shoe bottom and

opposing free inward bending of the lasting margin about an axis substantially parallel to the shoe bottom and just in advance of each successive point of contact of the wiper element with the lasting margin whereby the wiper element acts to exert updrawing stress on the upper.

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