SHOE UPPER DRAFTING APPARATUS

Inventor: Harold Albert Boddy, Leicester, England
Assignee: Ralphs Unified Limited, Leicester, England
Filed: June 2, 1969
Appl. No.: 829,214

Foreign Application Priority Data
June 4, 1968 Great Britain 26,540

U.S. Cl. .12/8.8, 12/127
Int. Cl. .A43d 21/00, A43d 3/00
Field of Search .12/10.1, 145, 8.8, 10.5, 124, 12/126, 127

References Cited
UNITED STATES PATENTS
3,025,541 3/1962 Weinschenk 12/10.1
3,097,379 7/1963 Hawkins 12/10.1
3,144,670 8/1964 Kamborlan et al. 12/145
2,026,539 1/1936 Jorgensen 12/8.8
2,263,488 11/1941 Cross 12/127
3,376,591 4/1968 Gilbride 12/8.8

Apparatus for applying a drafting pull to a shoe upper on a last-carried bottom uppermost on a support which enables the last to pivot heightwise of the last about its heel end portion comprises a pair of piners for gripping opposite sides of the forepart of the upper. The piners can be swung towards and away from each other. The piners are mounted on a carriage for movement lengthwise of the last, relative to the last and a member is provided for pressing on the bottom of the last to cause the last to pivot about the support, so that the upper can be drafted lengthwise of the last and across the last.

12 Claims, 6 Drawing Figures
3,638,263

SHOE UPPER DRAFTING APPARATUS

This invention relates to shoe upper drafting apparatus for applying a drafting pull to a shoe upper in the course of a shaping operation on an end part of the shoe. The term "shoe" is used herein to include all articles of outer footwear.

According to this invention there is provided apparatus for applying a drafting pull to a shoe upper on a last comprising means for gripping the forepart of the shoe upper material at each side of the last and means operable to move the gripping means and the last relative to each other in directions lengthwise of the last and means operable to move at least the forepart of the last lengthwise of the last, whereby the upper material can be drawn lengthwise of the last and across the last.

According to a preferred feature of the invention, said means operable to move the forepart of the lastighthine of the last comprises means for swiveling the last in a direction lengthwise of the last relative to the gripping means. Said means for swiveling the last may conveniently comprise an arm which is operable to press upon the bottom of the last to swivel the last, the last being supported on a fulcrum spaced lengthwise of the last from the gripping means.

According to another preferred feature of the invention, resilient means is provided for urging the gripping means into a predetermined position in a direction lengthwise of the last with a predetermined loading for limiting the force applied through the shoe upper between the last and the gripping means in the said direction lengthwise of the last.

According to another preferred feature of the invention, the apparatus further comprises means operable to move the gripping means at opposite sides of the last towards and away from each other.

On embodiment of the invention will now be described by way of example as applied in a machine adapted to perform both heel moulding and seat lastling operations. The description makes reference to the accompanying drawings, in which:

FIG. 1 is a side elevation of a drafting apparatus according to the invention shown in position on the last post of the lastling machine.

FIG. 2 is a plan of the drafting apparatus shown in FIG. 1.

FIG. 3 is a part sectional view on the plane 3--3 of FIG. 2.

FIG. 4 is a fragmentary sectional view on the plane 4--4 of FIG. 2.

FIG. 5 is a side view of a toe support assembly constituting part of the apparatus shown in FIGS. 1 and 3, and

FIG. 6 is a sectional view on the plane 6--6 of FIG. 5.

The lastling machine which is adapted to perform the heel moulding and seat lastling operations other than drafting may be as described in our U.S. Pat. No. 958,212.

The shoe upper is carried on a last which is supported on a locating pin at the upper end of a last post, and the last post is pivotable about its lower end between a forward position in which the upper is placed on the last by the operator and is drafted and a rearward heel moulding and lastling position in which an upper on the last is engaged with a female mould.

Referring now to FIGS. 1 and 2 of the drawings, the upper portion of the last post is shown at 10 and has a hollow boss 11 to which one end of a pneumatic or hydraulic actuator can be pivotally connected for moving the last post into its forward and rearward positions. A member 12 having a locating pin 13 projecting upward therefrom is pivotally secured to the upper end of the last post by a transverse pivot pin 14. The member 12 is biased into its uppermost position in which it is shown in FIG. 1 by a coil spring and can be depressed against the spring force to bring the axis of pin 13 to bring the heel portion of the bottom of the last into a plane generally parallel to the wipers. The heel thereof is shown in chain lines at 15 is mounted on the pin 13 with the bottom of the last uppermost, the pin being accommodated in a socket in the heel portion of the last.

A slide 20 is pivotally mounted through pivot pin 21 on the last post 10 for swiveling movement about an axis 22 and provides a guideway extending parallel to axis 22 for a support member 23 which is pivotally secured to the shoe upper.

A support member 23a which produce the drafting pull is fixed by one end to the support member 23 and projects at right angles forwards therefrom. At least a part of the length of the upper surface of said bar 23a has a flat thereon which is provided with recesses spaced along its length for receiving a screw tip. A transverse support member 23a is adjustably mounted on said bar 25 and a screw extending downwardly thereinto is arranged to seat in one of the indentations so as to locate member 23a on bar 25.

Two guide bars 24 and 26 are fixed by one end to the transverse support bar 23a and extend at right angles forward therefrom. At their ends remote from the support member 23a, the guide bars 24 and 26 are located relative to one another by a crossmember 27 secured to the support bar 25. A carriage 28 is slidably mounted on the bars and is traversable along the bars by two double-acting pneumatic piston and cylinder motors 29 which are respectively pivotally connected between lateral extensions of the transverse support bar 23a and a tail portion 28a of the carriage. Tension springs 32 are connected between projections 33 on the crossmember 23a and anchorages 34 which are engaged in slots in anchorages pieces 35 secured to the carriage extension 28a. Springs 32 operate to urge the carriage 28 towards the support member 23. The spring force can be adjusted according to the size of the last 15 by engaging alternative reduced-diameter positions 36 in member 34 with the slot in the anchorages member 35. Movement of the carriage 28 leftward as viewed in FIG. 1 is limited by an adjustable screwed engagement with crossmember 27 and which carries a buffer 39 for cushioning the blow if the carriage comes up against the stop screw. A second adjustable stop screw 40 is in screw-threaded engagement with an upwardly projecting extension 41 of the carriage and is guided in an aperture in the crossmember 27. Screw 40 has an abutment element 42 secured on its free end, and checks rightward movement of the carriage, as viewed in FIG. 1, when element 42 comes into abutment with the support member 23.

An upwardly projecting limb 41a of the carriage extension 41 provides at its upper end a pivot pin 44 for an assembly 45 for gripping opposite side edge portions of the shoe upper. Pivot pin 44 is held in a member 46 (see FIGS. 1, 2 and 4) which has a rearwardly projecting 47 fixed thereto by one end. A block 48 is slidably mounted on the shaft 47 and has one end of each of two links 49 pivotally secured thereto by a pivot bolt 50. The opposite ends of links 49 are respectively pivotally connected to two pivot arms 51 which are secured to the member 46 by pivot bolts 52. Twin levers 56 are pivotally connected at their upper ends to opposite sides of a member 57 which is mounted on a plate element 46a secured to member 46. The levers 56 extend forwardly through slots in the member 48 and are pivotally connected at their lower ends to a double-acting piston and cylinder motor 54 which at its other end is pivotally mounted on a second limb of carriage extension 41. Operation of the piston and cylinder motor 54 causes levers 56 to move the member 48 along shaft 47. The levers 56 are suitably contoured at the parts where they engage member 48 and adjacent thereto so as to avoid fouling other parts attached to said member 48.

The effective length of the pillar 57 can be altered by means of an adjusting screw 59 so as to enable adjustment to be made of the initial spacing of the two pivot arms 51 from each other. An adjustable stop screw 60 provided with a locknut 61 is in threaded engagement with the element 46a and abuts the limb 41a of the carriage. A downwardly projecting arm 62 is secured to one side of member 46 and a projection 63 is pivotally connected between the lower end of arm 62 and a mounting 64 on the extension 41 of the carriage 28. A compression spring 65 encircling the piston rod of the pneumatic spring 63 to reinforce its action urges arm 62 and hence the entire pivot assembly 45 in an anticlockwise direction about the pivot pin 44 as it is shown in FIG. 1. Stop screw 60 limits this rotation, and serves to adjust the initial position of the assembly about the pivot pin 44.
3

A subassembly comprising a pair of pincers (see FIGS. 1, 2 and 3) is mounted on the free end of each pincer arm 51. Each subassembly is adjustable about the axis of its securing bolt 68 by means of an adjusting screw 69 which is in transverse threaded engagement with a pivot pin 71 on the arm 51. 

Screw 69 has its end coupled to a carrier element 72 for the pincers, element 72 constituting part of the subassembly. Carrier element 72 has a small single-acting piston and cylinder motor secured at one side thereof and the piston rod 72a extends through the carrier element and makes threaded engagement with one pincer element 75 of the pair and locked thereto by an locknut 76. The piston rod extends freely through the mating pincer element 77 and a compression spring 78 between the pincer elements urges the element 77 into axial abutment with a series of axially facing teeth on a washer 80 seated against the carrier 72. Pincer element 77 has secured therein a dowel pin 81 which is engageable between any two neighboring teeth on washer 80 to retain the element in a selected angular position about the axis of the piston rod. Two axially projecting slide rods 82 are secured in the element 77 and project slingly through apertures in the element 75 to prevent rotation of element 75 relative to element 77 and to prevent the required amount of upper material from entering the pincers in use. The gripping edge 75a of element 75 is downwardly inclined and the cooperating surfaces of the two pincer elements are formed with corresponding serrations to provide a firm grip on the material of the shoe upper. It will be appreciated that adjusting screw 60, adjusting screw 69 and the dowel pin 81 and toothed ring washer 80 enable the attitude of the pincers relative to a last to bottom to be adjusted as desired.

A curved lever 84 is mounted intermediate its end on the pivot pin 44, and a double-acting piston and cylinder motor 85 is pivotally connected between one end of the lever and a downward extension 86 of the carriage. The other end of lever 84 is rigidly secured to it the arm 87 of a push-down unit, and arm 87 has an endpiece 88 secured thereon which carries a pair of coxial rollers 89.

Arm 87 is secured in position on the lever 84 by a locating screw 90 mounted in a threaded boss on the lever and having its end engaged in a recess in the arm 87. Similar recesses (not shown) are spaced along the length of arm 87 to enable the effective length of the arm to be adjusted. Operation of the motor 85 moves the rollers 89 of the holddown unit towards and away from the upturned bottom of the last 15.

Referring now to FIGS. 5 and 6 a support is shown for the toe end portion of the last 15. The support unit, which is not shown in FIGS. 1 and 2, comprises a bracket 92 which is clamped to an extension sleeve 93 of the carriage 28 at a selected position by a pinch bolt 94. Extension sleeve 93 encircles the support bar 26. The stop screw 40 extends freely through an aperture in the bracket 92. A toe support unit 95 is mounted on the bracket 92 and its position is adjustable along a side way 92a in the bracket towards and away from the locating pin 13 to enable adjustment to be made for different lengths of show last. The support unit has an upper platform portion 96 which is concavely curved on its upper surface and provides a degree of location for the toe end portion of the last against lateral displacement. The platform 96 is mounted on a stem 97 which is slidable mounted in a barrel portion 98. A compression spring 99 urges the stem 97 upward with respect to the barrel 98 and a screw 100 having its head resting against the underside of the barrel 98 and having its opposite end in screwed engagement with the stem 97 limits the upward movement of the platform 96. 

The unit 95 also includes a base part 101 which is engaged in the slideways 92a in the bracket and which has an externally threaded sleeve portion 102 projecting into the barrel 98 and carrying a stop nut 103 upon which the barrel rests. Pins 104 secured in the barrel extend through the sleeve portion 102 to prevent relative movement of the barrel 98 and base part 101. The height of the barrel and platform 96 can be adjusted by appropriate adjustment of the stop nut 103.

In operation of the mechanism, the last 15 carrying an insole secured on its upturned bottom surface and having a closed shoe upper disposed about it so that the lasting margin of the upper projects above the insole is mounted by its heel end portion on locating pin 13. The adjusting screw 69 is disposed for gripping the side edges of the forepart of the upper, the appropriate adjustment being made by means of the adjustable stop screw 40 of the carriage 28.

The initial spacing of the two pairs of pincer elements from each other is adjusted by means of screw 59 to allow the toe end portion of the last with the upper thereof to be depressed manually between the two pairs of pincer elements so that the toe portion of the upper depresses the platform 96 of the toe support unit, rotating the last about the pivot pin 14 on the last post, so that the free edge of the lasting margin is disposed with respect to the pincer elements 75, 77 when that the downward manual pressure on the last is released, the spring 99 in the toe support unit causes the toe end of the last to be raised again, so that the marginal portions of the upper enter between the pincer elements 75, 77 at opposite sides of the last to the extent allowed by the pins 82. According to the type of shoe upper material in use it may be necessary to maneuver the edge portion of the upper into the pincers manually.

A switch (not shown) is then operated which initiates a sequence of operations to draft the upper on the last. In this sequence of operations, the motors 74 are first operated to close the pincers on the edge parts of the forepart of the upper. The motor 85 is next operated to swing the push-down unit so that the rollers 89 on the end of the holddown arm engage the insole and press the last downwards between the pairs of pincers. The motors 28 are then operated to move the carriage and pincer elements leftward as viewed in FIG. 1 to apply a drafting pull to the upper so that the heel portion of the upper is pulled tightly against the heel portion of the last and so that a tension lengthwise of the last is applied to the parts of the upper between the heel and the pincers. While the lengthwise drafting pull is being applied by motors 28 the rollers 89 are traversing the insole towards the toe, and are applying a heightwise drafting pull to the shoe upper. The pneumatic spring 63 applies a predetermined force to the pincer assembly 45 which resists downward swivelng movement of the pincer assembly about the pivot pin 44, but when the tension exerted in the upper material applied by the heightwise portion thereof reaches a predetermined value, the force applied by the pneumatic spring 63 is overcome and the pincer assembly swings in a clockwise direction as viewed in FIG. 1 under the pressure exerted by the rollers 89, to prevent tearing of the shoe upper material. As the drafting pull applied by the motors 29 reaches its fullest extent which may if the upper material is strong enough be determined by the material itself or in the case of weaker materials be determined by the position of stop screw 38, motor 54 is operated to swivel the two pincer arms towards each other so that the shoe upper material lies smoothly round the upper parts of the last in the forepart region. The shoe upper is now correctly positioned on the last for seat lasting, and the last post is operated to move the last and shoe upper in this condition into the machine for the seat lasting and heel moulding operations to be carried out. It will be appreciated that the last post is raised into this position and that the position is determined by a presser foot which engages the seat part of the bottom of the last.

The drafting of the upper in the way described conforms the whole of the shoe upper from the heel to the pincers correctly to the upper profile of the last much as it will by the completed shoe and thereby ensures that the heel portions of the upper are in the correct position and stress prior to seat lasting.

It will be understood that in addition to the adjustments mentioned above, the apparatus can be used for lasts having different heel heights by means of the adjusting screw 26a which is operable to move the supporting member 23 and
3,638,263

hence the carriage 28 and pincer assembly 45 upward and downward with respect to the locating pin 13.

In addition it will be understood that the sequence of operations of the various elements of the mechanism may be varied by known pneumatic control means so that the ideal order of drafting the parts of a given upper may be set thereby to impart to the upper the best shape and conformity to the contour of a given last.

A further adjustment (not shown) may be provided for moving or extending the last post 10 to accommodate lasts with different depths of heel.

A mechanism (not shown) may be connected between the last post and the guide 20 for swiveling the drafting apparatus above pin 21 at each lasting operation alternately into two positions relative to the locating pin for adjusting the apparatus to receive left and right lasts.

I claim:

1. Apparatus for applying a drafting pull to a shoe upper on a last comprising means mounting the last for heightwise swiveling-movement about the heel end thereof, means for gripping the forepart of the shoe upper at each side thereof, means operable to move the gripping means in a direction away from and lengthwise of the last so as to apply a lengthwise drafting pull to the upper, means operable to swivel the last such that the toe end moves in a downward direction relative to and between the gripping means so as to apply a heightwise drafting pull to the upper, and means operable to move the gripping means towards each other, the various means cooperating to cause a drafting pull to be applied to the upper in the direction from the heel end towards the toe end of the last and across the forepart of the last.

2. Apparatus as claimed in claim 1 wherein the gripping means is mounted on a carriage which is guided for movement lengthwise of the last for drawing the upper material lengthwise of the last, and adjustable stop means is provided for adjusting the end positions of the carriage in its movement.

3. Apparatus as claimed in claim 1, wherein said means for swiveling the last comprises an arm which is operable to press upon the bottom of the last to swivel the last, the heel end of the last being supported on a fulcrum spaced lengthwise of the last from the gripping means.

4. Apparatus as claimed in claim 3, wherein the arm carries a roller or rollers for rolling engagement with the bottom of the last in a direction lengthwise of the last.

5. Apparatus as claimed in claim 1, wherein resilient means is provided for urging the last and the gripping means into predetermined relative positions in a direction heightwise of the last with a predetermined loading, thereby to limit the force applied through the shoe upper between the last and the gripping means in said direction heightwise of the last.

6. Apparatus as claimed in claim 5, wherein the gripping means are mounted for rotation about respective axes normal to the general plane of the bottom of the last for movement towards and away from each other.

7. Apparatus as claimed in claim 6, further comprising an actuating element mounted for rectilinear movement in a direction which extends at right angles to said axes and to a common perpendicular to said axes, and links coupling the actuating element to the two gripping means for rotating the gripping means about said respective axes.

8. Apparatus as claimed in claim 7, further comprising a piston and cylinder motor coupled through a lever to actuate said rectilinear movement of the actuating element and means for adjusting the position of the fulcrum of said lever in a direction parallel to the movement of the actuating element thereby to adjust the initial spacing of the gripping means from each other.

9. Apparatus as claimed in claim 1, wherein the gripping means comprises at each side of the last a pair or pincers which are angularly adjustable about an axis normal to the general plane of the bottom of the last.

10. Apparatus as claimed in claim 1, wherein the gripping means is adjustable to bring the gripping edges thereof into positions parallel to the respective adjacent edge portions of the last bottom.

11. A lasting machine comprising a last post which is movable into and out of a lasting position, a locating pin on the last post, a last mounted by the heel end part thereof on the locating pin with the bottom of the last uppermost for pivotal movement about an axis which extends parallel to the general plane of the bottom of the last and at right angles to the lengthwise dimension of the last, guide means secured to the last post and projecting parallel to the lengthwise dimension of the last, a carriage mounted for guided movement along the guide means, two pairs of pincers mounted on the carriage at opposite sides of the last for gripping edge portions of the forepart of a shoe upper carried by the last and operable to move towards and away from each other, means operable to swivel the last about the heel end part thereof in a direction heightwise of the last, whereby a drafting pull can be applied to a shoe upper on the last in directions from the heel towards the toe end of the last and across the forepart of the last.

12. Apparatus for applying a drafting pull to a shoe upper on a last, comprising means for gripping the forepart of the shoe upper material at each side thereof, means operable to move the gripping means and at least the forepart of the last relative to each other in directions lengthwise of the last and heightwise of the last, and means for limiting the force which can be applied through the shoe upper between the last and the gripping means in said direction heightwise of the last.

* * * * *