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METHOD OF AND MACHINE FOR SOFTENING SHOE STIFFENERS

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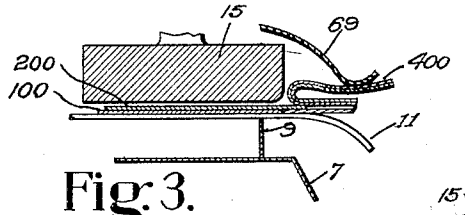


Fig. 3.

Fig. 2.

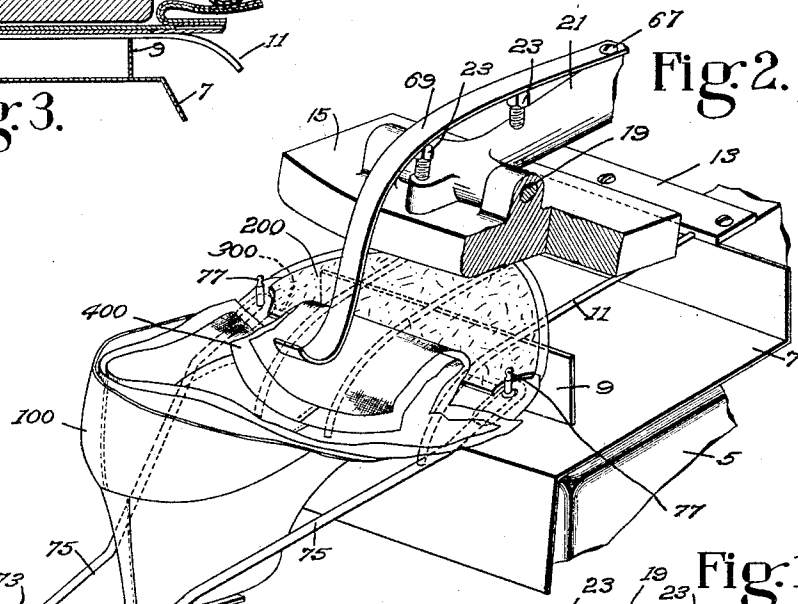
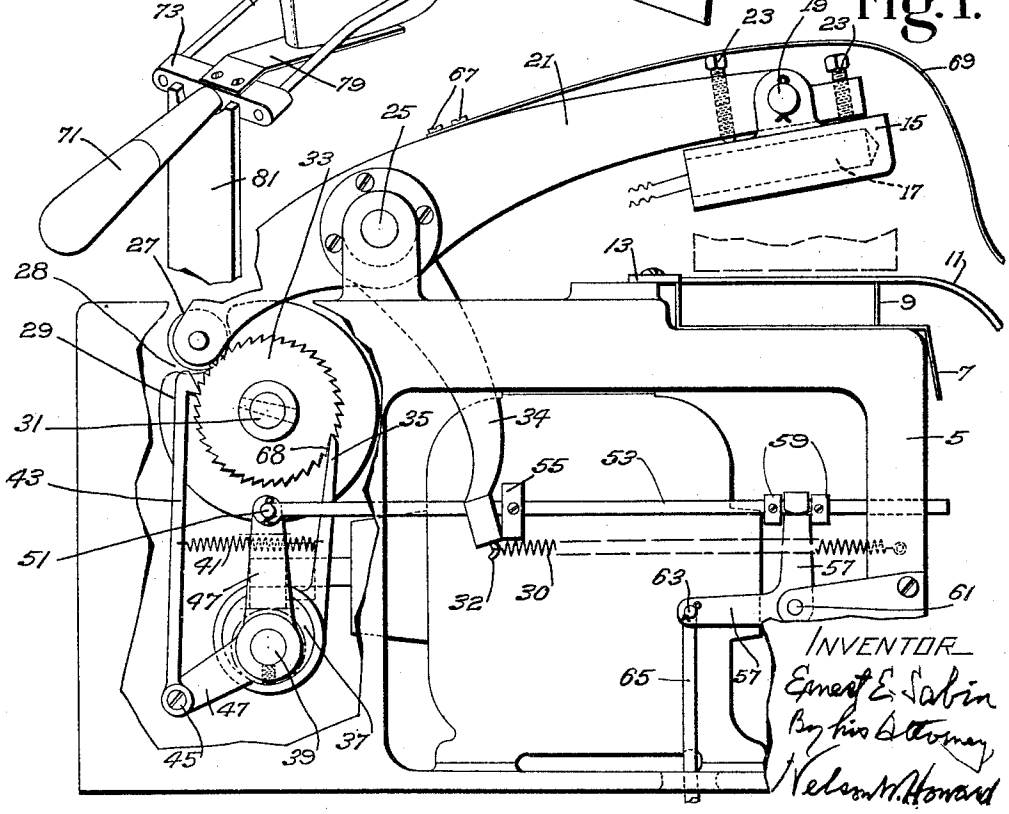


Fig. 1.



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UNITED STATES PATENT OFFICE

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METHOD OF AND MACHINE FOR SOFTENING SHOE STIFFENERS

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This invention relates to the softening of stiffeners used in the manufacture of boots and shoes and more particularly to the softening of thermoplastic stiffeners, that is, stiffeners which at ordinary temperatures are hard and resilient but may be softened by subjecting them to heat.

A box-toe stiffener of this type which has gone into extensive use consists of a piece of absorbent fabric impregnated with a thermoplastic substance such, for example, as a mixture of asphaltum and Montan wax. Such stiffeners are commonly fastened by staples or stitches along one of their margins to the toe portions of the uppers in which they are to be incorporated, this fastening operation being performed in the stitching-room, and the uppers with the stiffeners attached to them delivered to the pulling-over operator. Prior to the pulling-over operation it is necessary to heat the stiffeners in order to render them soft and pliable; and a common procedure has been to lay the toe portion of an upper upon a plate, to turn back the lining so as to expose the stiffener, and then to cause a heated plate to descend upon the stiffener and hold it and the upper pressed for an interval against the supporting plate. In carrying out this procedure there is danger of overheating the leather or fabric upper since, after the machine has been in use for a time, the lower supporting plate heats up considerably.

In one aspect, the invention relates to a method of softening a stiffener by holding the upper on which the stiffener is superposed in contact with a relatively cool medium and subjecting the exposed side of the stiffener to radiant heat. Inasmuch as the source of supply of heat is not in contact with the stiffener and the upper is not only shielded by the stiffener from the radiant heat but is subjected on the side opposite the stiffener to a cooling action, the liability of overheating the upper is obviated.

In another aspect the invention relates to a machine by which this and similar methods may be practised. The illustrated machine comprises a support upon which a stiffener or the toe portion of an upper having a stiffener superposed thereon may be placed, said support consisting of a plurality of spaced wires to permit free access of relatively cool air to the under side of the upper, and a heated member which is moved into a position close to but out of contact with the stiffener and held in this position until the heat radiated by it renders the stiffener soft and pliable.

Referring now to the accompanying drawings,

Figure 1 is a side elevation of a machine by use of which the method involving radiant heat may be practised;

Figure 2 is a perspective of a portion of the machine showing an upper on the support just preparatory to the descent of the heated member, and

Figure 3 is a detail in section showing the relative positions of the work and the operative parts of the machine during the heating operation.

The machine comprises a base 5 having a depressed portion at its forward end which may have an apron 7 disposed in it as shown. Extending upward from the apron is a thin plate 9, and extending over and partly supported by the plate are a plurality of supporting members 11 of small cross-section. These members may be made of wire, are preferably curved downward at their forward ends, and at their rear ends are fastened to the frame of the machine by a clamping plate 13. These wires form a skeleton support for the toe portion of the upper 100 of a shoe and for the box-toe stiffener 200 which is herein shown as fastened to the upper by stitches 300, the lining 400 having been turned back to expose the stiffener.

Normally held in raised position above the support, as shown in Figure 2, and in full lines in Figure 1, is a member 15 which may be heated in any suitable manner as, for example, by an electric heat unit 17. This member is pivoted at 19 to the forward end of a lever 21 and is held in adjusted angular position on the lever by screws 23 which are threaded through the lever and contact with the heated member 15, one on each side of the pivot 19. These screws are commonly so adjusted that, when the heated member has de-

scended to the position shown in Figure 3, its lower face is substantially parallel to and spaced slightly from the adjacent face of the stiffener 200.

The lever 21 is pivoted at 25 to the frame of the machine and has at its rear end a roll 27 which normally rests in a depression 28 in a cam 29, the construction being such that, when the cam is rotated once in the direction indicated by the arrow, the heated member 15 is brought down into the position shown in Figure 3, in which it lies close to but out of contact with the stiffener 200, is held in that position for an interval and is then returned to initial position. The cam is fast to a shaft 31 to which is also fast a ratchet 33, said ratchet having on its periphery a flat place or long tooth at the locality in which it is shown as being in engagement with a pawl 35. The pawl is continuously reciprocated from an eccentric 37 on a continuously rotating shaft 39, but is ineffective to rotate the ratchet 33 as long as the pawl is in engagement with the flat place on the ratchet, since the throw of the pawl is insufficient to cause it to pick up the adjacent tooth 68. The pawl is held in contact with the ratchet by a tension spring 41 which connects the pawl with a detent 43, the detent being pivoted at 45 to one arm of a bell-crank lever 47, rotatably mounted on the shaft 49, the other upright arm of which is pivoted at 51 to the inner end of a rod 53. When this rod is pushed to the left, the detent is pulled down, thereby rotating the ratchet 33 far enough to permit the pawl 35 to engage the tooth 68 of the ratchet. The roll 27 is held against the cam and normally in the depression 28 by a tension spring 30 fastened at one end to the frame of the machine and at the other to a hook 32 on the end of an arm 34 which is rigid with the lever 21. The rod 53 has adjustably fastened to it a collar 55 which, when the rod is pushed to the left, engages the arm 34 and rocks the lever 21 in a clockwise direction, thereby lowering the heated member 15 and raising the roll 27 so as to facilitate its riding up on the high portion of the cam 29. The rod is pushed to the left by a bell-crank lever 57 which engages the rod loosely between two collars 59 adjustably fastened to the rod. This lever is pivoted to the frame of the machine at 61 and has pivoted at 63 to the free end of its horizontal arm the upper end of a treadle rod 65 the lower end of which is connected to a treadle, not shown, a spring, also not shown, tending to maintain the rod in its upper position as shown. Before the shoe upper is presented to the machine, the lining 400 is turned back, as has been described, to expose the stiffener and, in order to hold the lining in this position during the operation of the machine, there is fastened to the lever 21 by screws 67 one end of a lining holder in the form of a leaf spring 69 which rests upon the head of one of the screws 23, and the free end of which engages the turned-back lining, as shown in Figure 2.

In the operation of the machine, the upper of a shoe with the lining turned back is placed with its toe portion on the supporting wires 11 in the manner shown in Figure 2 and the treadle depressed and then released. Depression of the treadle swings the lever 21 in a clockwise direction, thereby moving the roll 27 out of the depression 28, and causes the detent 43 to rotate the ratchet 33 in the direction indicated by the arrow sufficiently to permit the continuously reciprocating pawl 35 to engage the tooth 68. There is then imparted to the ratchet wheel and cam a single revolution, the heated member 15 being held in the position shown in Figure 3, close to but out of contact with the stiffener 200 for an interval, during which the heat radiated from the member 15 renders the stiffener soft and plastic. During this softening operation, the lining is held turned back by the member 69. The shoe upper may then be removed and pulled over, lasted or moulded to impart the desired shape to the toe portion which, upon cooling, maintains the shape imparted to it. It should be particularly noted that the softening of the stiffener is accomplished by radiant heat and that the toe portion of the upper of the shoe is supported by the small wires 11 so that there is a cool air space beneath it.

In the manufacture of shoes in accordance with the procedure disclosed in applications Ser. No. 476,659, filed June 11, 1921, in the name of George E. Warren, and Ser. No. 487,394, filed July 25, 1921, in the name of William C. Baxter, jig holes are provided in certain parts of boots and shoes to facilitate the assembling of the parts and the presentation of certain assembled parts to machines which operate upon them, the latter application disclosing and claiming a forked holder having upright pins at the ends of the arms of the fork adapted to enter jig holes opposite localities in the margin of the toe portion of the upper, said holder being adapted to facilitate the presentation of the toe portion of the upper to a moulding machine. A similar holder is illustrated in Figure 2 of the present application, said holder comprising a handle 71, a cross-piece 73 and two arms 75 each having near its outer end an upright pin 77 adapted to engage a jig hole formed in the toe portion of the upper. The present holder has extending from the cross-piece 73 a sheet metal member 79 adapted to extend under the rear portion of the upper of the shoe; and, in order to facilitate proper positioning of the holder with respect to the machine, a standard 81 has at its upper end a recess to receive the handle 71. When, therefore, the holder is in the position shown with the

handle in the recess and the cross-piece 73 in engagement with the standard, the upper of the shoe is properly positioned with respect to the machine; and, after the box-toe has been softened the upper, still upon the holder, may be transferred from the softening machine to a toe moulding or other machine for operating upon the softened stiffener.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. The method of softening a thermoplastic stiffener which is superposed upon a portion of the upper of a shoe which comprises holding the exposed side of the upper in contact with a relatively cool medium and subjecting the exposed side of the stiffener to radiant heat.

2. The method of softening a thermoplastic stiffener which is superposed upon a portion of the upper of a shoe which comprises supporting the upper with the stiffener uppermost above an air space and subjecting the exposed side of the stiffener to radiant heat.

3. A machine for softening a thermoplastic shoe stiffener in the upper of a shoe having, in combination, a support for said upper, a heated member and means for producing relative movement of approach between said support and heated member to cause the heated member to lie close to but out of contact with the stiffener.

4. A machine for softening a thermoplastic shoe stiffener in the upper of a shoe having, in combination, a support for said upper, a heated member and means for producing relative movement of approach between said support and heated member to cause the heated member to lie close to but out of contact with the stiffener for holding the parts in such position for a predetermined interval, and for returning them to initial position.

5. A machine for softening a thermoplastic shoe stiffener in the upper of a shoe having, in combination, a skeleton support for said upper, a heated member and means for producing relative movement of approach between said support and heated member to cause the heated member to lie close to but out of contact with the stiffener.

6. A machine of the class described having, in combination, a support for a thermoplastic stiffener, a heated member, and means for causing relative movement of approach between the support and the heated member to cause the source of heat to lie close to but out of contact with the stiffener.

7. A machine of the class described, having, in combination, a support for a thermoplastic stiffener, a heated member, and means for causing relative movement of approach between the support and the heated member to cause the source of heat to lie close to but out of contact with the stiffener, for holding the member and support in this close relation for an interval and for thereafter causing relative movement of separation between the support and member.

8. A machine for softening a thermoplastic stiffener which is located between the upper and the lining of a shoe having, in combination, a support upon which the upper may be placed with the lining turned back to expose the stiffener, a heated member, means for causing said member to approach the support, and means for engaging the turned-back lining to hold it away from the heated member.

9. A machine for softening a thermoplastic stiffener which is located between the upper and the lining of a shoe having, in combination, a support upon which the upper may be placed with the lining turned back to expose the stiffener, a heated member, means for causing said member to approach the support, and means movable with the heated member for engaging the turned-back lining to hold it away from the heated member.

10. A machine for softening a thermoplastic stiffener which has been incorporated in the upper of a shoe having, in combination, a support for the upper consisting of a series of spaced members of small cross-section, a heated member, and means for producing relative movement of approach between said support and heated member.

11. A machine for softening a thermoplastic stiffener in the upper of a shoe having, in combination, means for supporting the upper with the stiffener uppermost, a heated member normally raised a considerable distance above the support to permit the upper to be placed upon and removed from the support, and means including a cam and a pawl and ratchet device for causing the heated member to move into a position close to but out of contact with the stiffener, to remain in that position for an interval and then to return to initial position.

12. A machine of the class described having, in combination, a work support, a heated member located above the support, a pivoted lever upon which the heated member is mounted a cam adapted, when rotated, to move the heated member into a position close to said support, to hold it in that position for an interval and then to return it to initial position and means for rotating said cam, said means comprising a continuously operated pawl, a ratchet having on its periphery a plain portion of a length as great as the extent of the strokes of the pawl whereby, when the pawl is in contact with this portion, the pawl is ineffective to rotate the ratchet, and operator-controlled means for rotating the ratchet sufficiently to cause the pawl to engage the teeth thereof.

13. A machine of the class described having, in combination, a support for the toe

portion of an upper, a heated member, means for causing relative movement of approach and separation between said support and member, a holder for the upper, and means for locating the holder in proper position with respect to the support.

14. A machine for softening a thermoplastic shoe stiffener which is superposed upon a portion of the upper of a shoe, having in combination, a support for said portion constructed and arranged to permit free access of air to the display side of the upper, and means spaced from the stiffener and the upper for subjecting the stiffener, on the other side of the upper, to radiant heat.

In testimony whereof I have signed my name to this specification.

ERNEST E. SABIN.