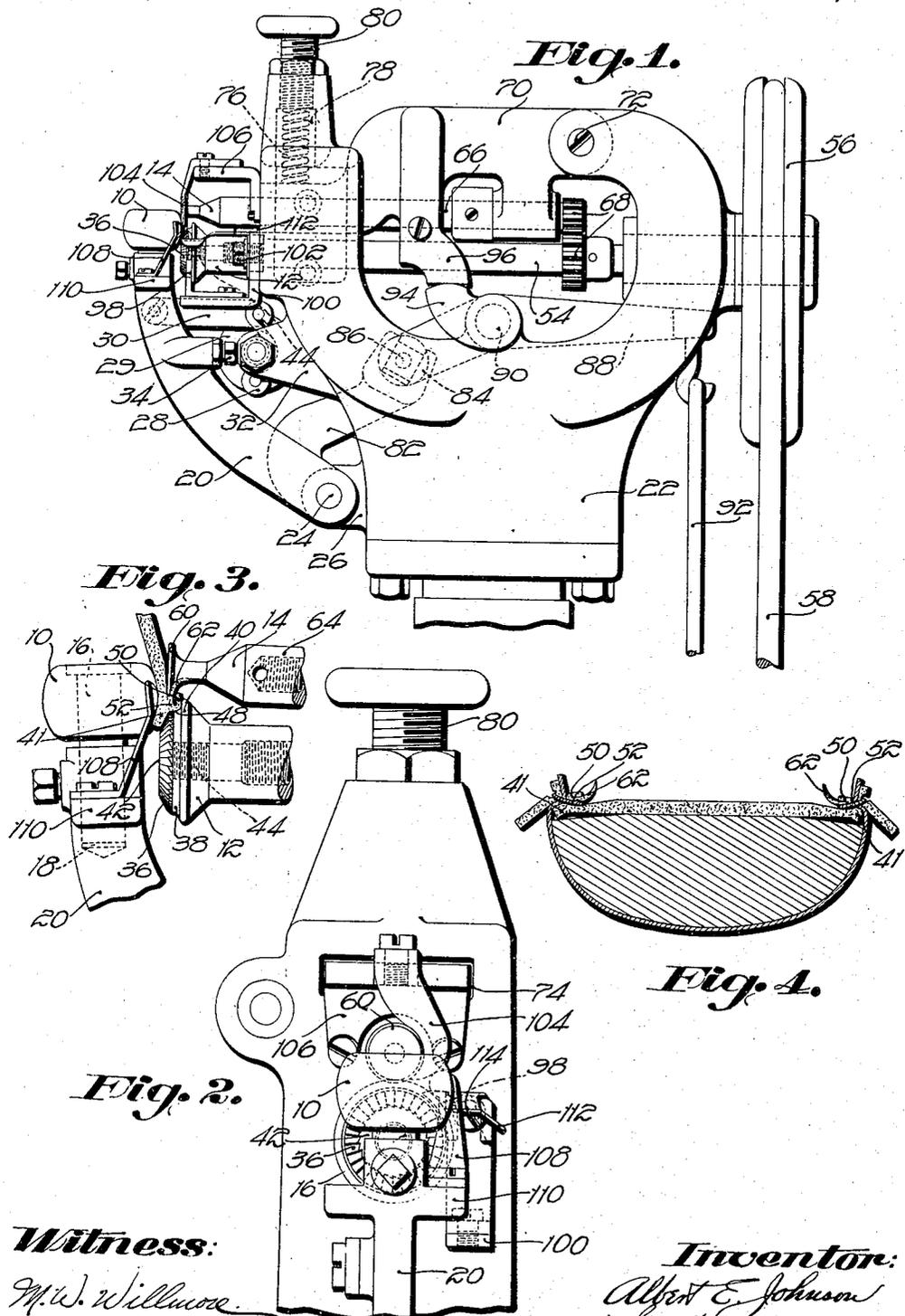


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 INSOLE FITTING MACHINE.
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INSOLE-FITTING MACHINE.

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To all whom it may concern:

Be it known that I, ALBERT E. JOHNSON, a citizen of the United States, residing at Beverly, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Insole-Fitting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to insole fitting machines, and more particularly to machines for fitting solid insoles for the lasting and insole stitching operations.

The usual type of welt insole has formed on its marginal edge, a lip and a channel and a between-substance between the lip and the channel. The lip is generally turned up or removed to form a shoulder into which to draw the upper and welt by the insole. The shoulder on the insole determines the outline of the base of the upper, so that it is necessary that the upper be tightly drawn into the shoulder to give the proper appearance to a shoe. The proper depth of shoulder for supporting the upper varies for different kinds of insoles and upper stock, but for regular work the depth of the shoulder is about $\frac{3}{8}$ of an inch. If the shoulder is not of sufficient depth to give a good backing for the insole stitching operation, the upper will often not be drawn down into the shoulder and when the welt is beaten out, the insole will be visible and the outline of the base of the upper will be irregular.

In the manufacture of high grade welt shoes it is necessary to use a thin, flexible insole, so that, when a comparatively heavy outsole is attached to the insole, the shoe bottom will be flexible and yielding. The average thickness of solid insoles is about $\frac{1}{8}$ of an inch, so that, in channeling the insole, the lip is not cut with a thickness of the depth of the regular shoulder, because to do so would leave a very flimsy, thin feather and a weak sole edge. Also, if the insole were placed in the between-substance of a thin insole having such a deep shoulder cut, the insole would form a ridge on the face of the insole, which is not desirable on the inside of a shoe. To avoid this difficulty, the lip is cut with a thickness about one-half

of the depth of a regular shoulder and then turned up to form a shoulder into which to draw the upper. This, however, leaves a very shallow between-substance for supporting the insole, and the between-substance has to be made wide to give sufficient support to the insole. With a wide between-substance, it is difficult to get the upper tightly fastened in the shoulder, because the shoe is tipped on the channel guide of an insole sewing machine and the needle does not properly pierce the between-substance. Further, the insole is positioned with a curved needle which penetrates deeply into a wide between-substance and lays the thread on a curve. When the welt is beaten out for attachment of the outsole, there is a tendency to straighten the insole threads and loosen the attachment of the upper in the shoulder. Also, the deeper the thread is placed in the insole, the more is the tendency to form a ridge on the upper surface of the insole with the insole.

The primary object of the present invention is to provide a machine for fitting insoles by which a comparatively thin insole will be provided with a substantial shoulder and a narrow between-substance, without making the lip and channel cuts so deep that a ridge will be formed on the surface of the insole by the insole.

In accordance with this object, one feature of the invention contemplates the provision in a sole-fitting machine, of a feather-molding roll and lip-setting and channel flap turning rolls opposite the molding roll, the lip-setting roll having a face for compressing the lip against the between-substance to build up a substantial shoulder. With the lip compressed against the between-substance, the between-substance will be reinforced for supporting the insole, and the lip on the between-substance will add sufficient strength so that the insole will not be torn out of the between-substance when the welt is beaten, preparatory to attaching the outsole. With the lip to reinforce the between-substance, the between-substance, can be made comparatively narrow and still give sufficient support to the insole.

The insole is attached to the bottom of a last during the manufacture of the shoe and the outline of the sole and the bottom of the

last approximately coincide. The insole should conform closely to the bottom of the last, which often has a distinct transverse curvature. The feather of a thin insole is not very rigid and if it does not hug tightly to the bottom of the last, it often happens that it will be folded up against the lip by the upper as it is lasted in. While in this position the insole will pass through the feather and upper and make a defective shoe. Many shoes have a stiff box toe, which is placed under the upper to give a definite shape to the toe of a shoe. The box toe has a hardening composition which is rendered flexible during the lasting operation to allow it to be conformed to the shape of the last. The toe portion of the upper and the box toe are drawn in by a series of wipers and if the feather of the insole does not hug tightly to the bottom of the last the wipers will engage the feather and buckle the insole. The box toe will harden and will be attached, along with the upper, to the buckled insole so that when the shoe is removed from the last the insole will retain its buckled shape.

Another object of the invention is to provide a machine for fitting insoles to conform to the shape of the last in such a manner that they will not be disfigured when the upper is lasted in.

With this object in view, another feature of the invention contemplates the provision in an insole fitting machine, of a feather-molding roll for engaging the feather of an insole, lip-setting and channel flap-turning rolls opposite the molding roll, and means to compress the feather, between-substance, and lip between the feather-molding and the lip-setting roll to offset the sole and dish the bottom of the insole.

Other features of the invention consist in certain constructions and combinations of parts for guiding and supporting the insole during the molding operation which are hereinafter described and set forth in the claims.

The various features of the invention are illustrated in the accompanying drawings, in which Figure 1 is a view in side elevation showing the head of an insole fitting machine embodying the preferred form of the invention; Fig. 2 is a front elevation of the machine shown in Fig. 1; Fig. 3 is a detail view showing the insole fitting rolls in the position in which they operate upon an insole; and Fig. 4 is a vertical sectional view of a welt shoe showing a section of the improved insole fitted by the machine.

In the illustrated embodiment of the invention a channeled insole is molded and compressed between a feather-molding roll 10, a lip-setting roll 12 and a channel flap-turning roll 14. The feather-molding roll has a convex molding face and is mounted

to freely rotate upon a pin 16 which is adjustable in a socket 18 in the upper end of a pressing arm 20 which is pivotally mounted in the head of the machine frame 22. The arm 20 is fixed on a shaft 24 which is rotatably mounted in a bearing 26 formed on the front of the machine head 22. The arm 20 is normally pressed against the machine head by a strong torsioned spring 28 which is connected by a link 30 with the arm 20. The spring 28 is attached to a plate 29 mounted on a boss 32 formed on the front of the machine head. To prevent the molding roll 10 from coming into contact with the lip-setting roll a set screw 34 is mounted in the arm 20 and arranged to contact with the boss 32.

The lip-setting roll 12 consists of a feather-feeding face 36, a shoulder-forming face 38, and a lip-setting face 40. The feather-feeding face 36 consists of a series of feeding teeth which engage the feather 41 of the insole, to feed the insole through the machine. The feeding teeth are formed upon a plate 42 which has a stem 44 threaded into the end of the lip-setting roll. The face 38 forms the shoulder 48 of the insole, and is arranged in a plane substantially normal to the plane of the sole opposite the between-substance while it is supported in the rolls. This shoulder-forming face with the lip-setting face 40 cooperates in setting the lip 50 back upon the between-substance 52. The lip-setting face is arranged in a plane substantially parallel to the plane of the face of the sole opposite the between-substance while it is supported in the rolls. The lip-setting roll is threaded upon the forward end of a driving shaft 54 which is journaled in the machine head. A driving pulley 56 is mounted on the shaft 54 and is arranged to be connected with the driving power by a belt 58 to positively drive the lip-setting roll.

The channel flap-turning roll 14 has a face 60 which rides in the bottom of the channel of the insole and turns the channel flap 62 back to prepare it for the insole stitching operation. The channel flap-turning roll is formed on a shank 64 which is threaded upon the end of a floating shaft 66. The shaft 66 is positively driven from the shaft 54 by a pair of intermeshing gears 68, one of which is fixed on each of the shafts. The floating shaft is journaled in a frame 70, the rear end of which swings on a pivot 72 and the forward end projects through a slot 74 in the front of the machine head. The channel flap-turning roll 14 is normally pressed toward the lip-setting roll by means of a spring 76 which is mounted in a socket 78 of the machine head and compressed between an adjusting screw 80 and the top of the frame 70.

With the construction described above,

the lip-setting and channel flap-turning rolls will be positively driven to feed the insole. While the insole is advancing through the rolls, the lip 50 will be turned back upon the between-substance, and the channel flap 62 raised up from the body of the insole. The spring 76 will compress the between-substance between the face 60 on the channel flap-turning roll and the face 38 on the lip-setting roll. The spring 28 will compress the feather 41, between-substance 52, lip 50, and the bottom of the channel between the feather-molding roll 10 and the channel flap-turning roll 14 and the faces 36, 38 and 40 on the lip-setting roll. The compression of the spring 28 in cooperation with the molding faces of the rolls will offset the sole edge to conform it to the shape of the feather-molding roll, and thus dish the bottom of the insole.

The springs 28 and 76 normally hold the feather-molding and channel flap-turning rolls pressed toward the lip-setting roll, and, in order to facilitate the insertion of an insole between the rolls, the feather-molding and channel flap-turning rolls are arranged to move away from the lip-setting roll. To retract the feather-molding roll, an arm 82 is fixed on the shaft 24, Fig. 1, and moves with the pressing arm 20. The arm 82 is provided with a yoke 84 which embraces a block 86 pivoted on the end of a lever 88 which is mounted on a shaft 90. The lever 88 is connected by means of a rod 92 with a foot treadle by which the roll may be manually operated. To move the channel-turning roll away from the lip-setting roll, an arm 94 is fixed on the shaft 90 and engages a boss 96 secured to the swinging frame 70. By this arrangement, a movement of the lever 88 by the treadle connected with the rod 92 will swing the frame 70 about its axis 72 and lift the roll 14 away from the lip-setting roll and at the same time the feather-molding roll will be moved away from the lip-setting roll by its connections with the lever 88.

To assist the operator in guiding and handling an insole while it is being molded, a series of gages are provided to support the insole close to its point of operation. A lip-opening plow 98 is mounted directly in front of the lip-setting roll upon a bracket 100 which is attached to the machine head by a set screw 102. The lip-opening plow has a face which bears against the feather and a face which turns the lip to a position so that the faces 26 and 28 of the lip-setting roll can mold the lip back to form the shoulder. A channel-opening plow 104 is mounted directly in front of the channel flap-turning roll 14 upon a bracket 106 which projects forward from the machine head (see Fig. 2.) The channel-opening plow lifts the channel flap 62 up so that the

channel flap-turning face 60 may ride in the bottom of the channel and turn the flap back. A feather guide 108 is mounted upon a bracket 110 formed on the pressing arm 20. The feather guide is positioned directly in front of the feather-molding roll and coöperates with the plows 98 and 104 to properly guide the sole between the rolls. A sole edge guide 112 is secured to the machine head by the screw 102 and extends over to the side of the lip-setting plow. The guide 112 has a sole-engaging face 114, Fig. 2, upon which the edge of the sole rests while it is being fed through the machine. The gage yieldingly supports the sole and acts to hold it against the channel-turning roll so that, when the sole is being turned around the toe, it will overcome the tendency for the toothed face 36 to work upon the shoulder and lip of the insole. The guide 112 is not limited to use in an edge-molding machine, but obviously may be embodied in many other types of sole-fitting machines.

In Fig. 4 is illustrated a section of an insole molded in the improved machine and the relative position it occupies on the last while the upper is being lasted in and the insole placed therein. When the dish insole is attached to the bottom of the last, the lasting tacks will hold the central portion of the insole down in contact with the bottom of the last, and draw the edges of the feather down to tightly hug the bottom of the last. By molding the sole edge, the edges of the feather in contact with the last will be slightly removed from the edge of the last, and when the upper is drawn over the insole, it will contact only the upper edge of the insole. The feather is pressed against the bottom of the last at such an angle that it overcomes the tendency of the upper to turn the feather up against the lip. Also with the feather edges pressed closely in contact with the bottom of the last when the lasting wipers move in to draw in the upper, they will ride over the top of the feather and thereby all tendency to buckle the insole will be overcome.

Having thus described my invention, what is claimed as new is:

1. An insole-fitting machine having, in combination, a feather-molding roll, and lip-setting and channel flap turning rolls opposite the molding roll, the lip-setting roll having a feather feeding and compressing face, and a lip-setting face constructed and arranged to turn down upon and compress the lip against the between-substance.

2. An insole fitting machine having, in combination; a feather-molding roll having a molding face to engage the unlippped side of an insole opposite the feather to offset the edge of the sole; a lip-setting roll opposite the feather-molding roll and having a feather engaging face, a lip-setting face and

a shoulder forming face, a channel flap lifting roll opposite the feather-molding roll having a face for turning back the channel flap; and means for pressing the feather-molding and channel flap lifting rolls toward the lip-setting roll; the faces of said lip-setting roll being so arranged with relation to the face of the feather-molding roll that the feather, between-substance and lip of the sole will be compressed between them, and the faces of the lip-setting roll being so arranged with relation to the face of the channel flap lifting roll that the between-substance will be compressed between them.

3. An insole-fitting machine having, in combination, a feather-molding roll, lip-setting and channel flap turning rolls opposite the molding roll, a channel opening plow in front of the channel flap turning roll, a feather guide in front of the lip-setting roll, and a sole edge engaging guide in front of the molding roll.

4. An insole-fitting machine having, in combination, a feather-molding roll, lip-setting and channel flap turning rolls opposite the molding roll, and a sole edge guide for maintaining the sole against the pressure of the channel flap turning roll to keep the

channel flap turning roll in the bottom of the channel of the insole.

5. An insole-fitting machine having, in combination; a feather-molding roll having a convex surface for engaging the unlipped surface of an insole; a channel flap lifting roll opposite the feather-molding roll and having a face to ride in the channel and turn back the channel flap; a lip-setting roll opposite the feather-molding roll having a feeding face for engaging the feather, a shoulder forming face arranged substantially normal to the surface of the sole opposite the between-substance while it is supported in the rolls, and a lip-setting face arranged substantially parallel with said sole surface; and means for pressing the feather-molding and channel flap lifting rolls toward the lip-setting roll.

6. A sole fitting machine having, in combination, means for supporting and feeding a lipped sole including a roll having a toothed face for engaging the feather, and means for supporting and guiding the edge of the sole to prevent the toothed roll from working up on the shoulder and lip.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."