

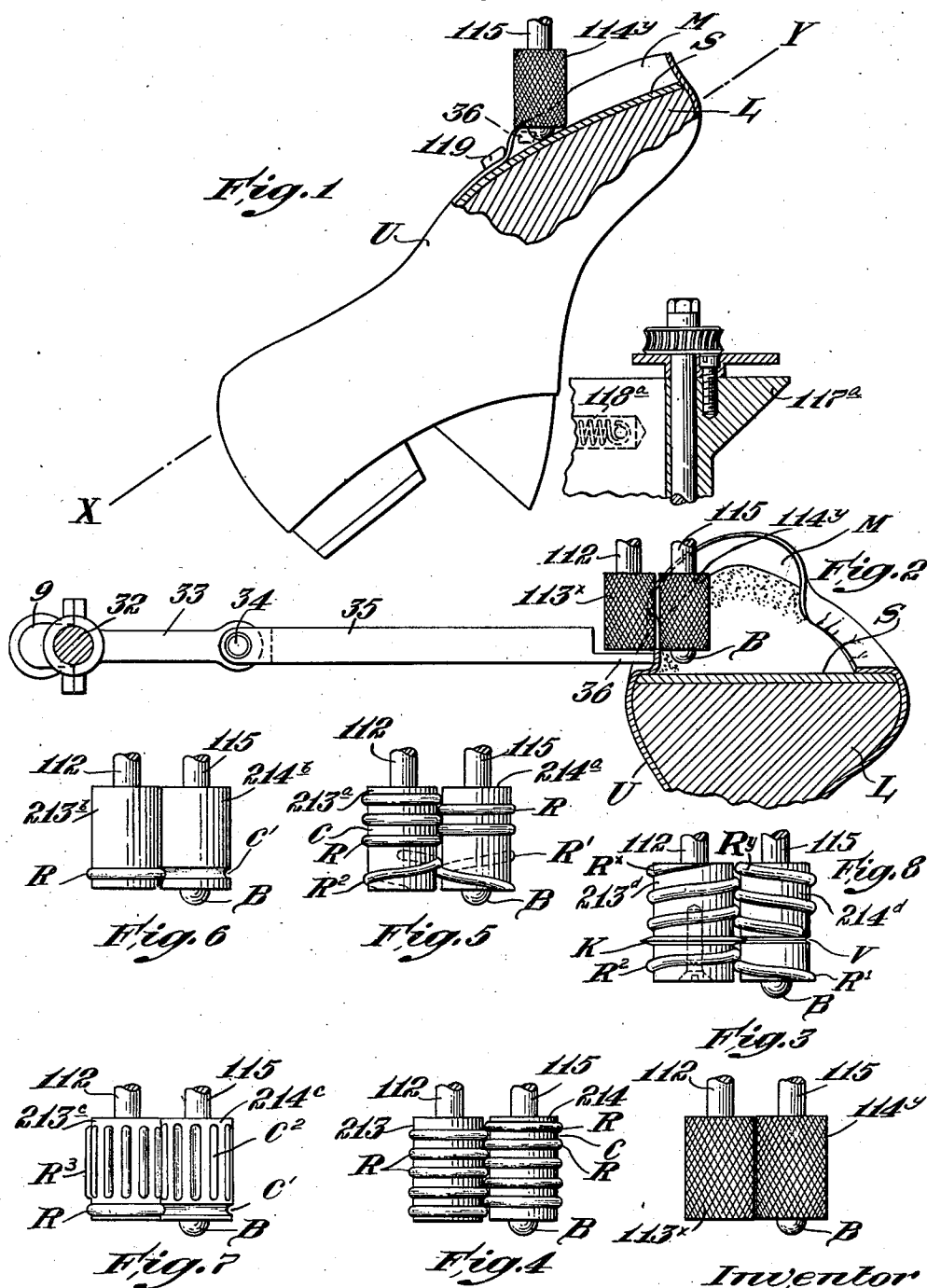
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SHOE LASTING APPARATUS

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SHOE LASTING APPARATUS

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8 Claims. (Cl. 12-7)

This invention pertains to the manufacture of footwear, relating more especially to novel and improved shoe lasting apparatus, the present application being a continuation-in-part of the copending application for Letters Patent, Serial No. 352,479, filed on August 14, 1940, by Jacob S. Kamborian, upon which Patent No. 2,251,285 was granted on August 5, 1941.

In the patent just referred to, there is disclosed and claimed a shoe lasting machine having a pair of constantly rotating rolls constituting gripping means for updrawing the material of the shoe upper, said rolls acting in cooperation with wiping means to stretch the margin of the upper and lay it down in lasted position upon the insole. These updrawing rolls, as described in said application, are designed not only to stretch the shoe upper material in an upward direction, but also to exert a feeding action for progressing the work during the continuance of the operation, and in order to obtain the positive updrawing pull upon the upper material, these rolls, as claimed in said copending application, are provided with oppositely pitched helical ribs, the ribs extending substantially from end to end of each roll. However, it was suggested in said copending application that cylindrical rolls externally knurled if desired, but unprovided with helical ribs, might acceptably perform the desired function upon certain classes of work. The present invention pertains to improvements in upper gripping and feeding rolls of the general type disclosed in said application, and designed for use in cooperation with a rapidly vibrating wiper which contacts the upper material at a point which is intermediate the shoe bottom and the place at which the marginal material is gripped by the rolls.

Experiment has shown that for certain classes of work, in particular when the upper material is very light and thin, or when perfection in lasting is not essential, the desired results may be obtained if the rolls merely grip and hold the margin of the upper while feeding it along, instead of actually updrawing it. By merely holding it tight while the vibrating wiper engages the upper between the plane of the shoe bottom and the nip of the rolls, the wiper, by its rapidly repeated impacts, stretches the upper material and then lays it over the shoe bottom as the material is released by the rolls. Uninterrupted progress of the operation along the length of the shoe and without at any time releasing the marginal material from between the rolls is made possible by tipping the shoe at such an angle as to cause fresh portions

of the marginal material to feed into the bite of the rolls as fast as the material is released by the rolls after it has been stretched by the wiper.

While smooth cylindrical rolls may be employed or cylindrical rolls which merely have a knurled or otherwise roughened surface, it has been found preferable to provide the rolls with elements, for instance complementary ribs and grooves whereby the rolls may obtain a positive grip upon the upper material, although they do not exert any updrawing action.

In the accompanying drawing wherein certain desirable embodiments of the invention have been illustrated by way of example,

Fig. 1 is a diagrammatic side elevation of a shoe upper and insole mounted upon a last, with certain parts in vertical section, showing the shoe in the position of lasting by the employment of a pair of cylindrical rolls and a wiper in accordance with the present invention;

Fig. 2 is a transverse section through the forepart of a last having a shoe upper and insole mounted thereon, and showing diagrammatically and fragmentally portions of a lasting machine embodying a pair of cylindrical work gripping rolls and an upper stretching wiper;

Fig. 3 is an elevation to somewhat larger scale, illustrating a pair of rolls such as shown in Figs. 1 and 2, but without showing other parts of the mechanism;

Fig. 4 is a view similar to Fig. 3, but showing rolls of modified construction;

Fig. 5 is another view similar to Fig. 3, showing a further modification;

Figs. 6 and 7 are views similar to Fig. 3 but showing other modifications; and

Fig. 8 is a view generally similar to Fig. 5, but showing trimming means associated with the rolls.

Referring to the drawing, the numbers 112 and 115 designate a pair of parallel shafts corresponding to the similarly numbered parts shown and described in the aforesaid patent, these shafts being constantly rotated in opposite directions by suitable mechanism, for example such as that shown in said patent. The shaft 112 is mounted in normally fixed bearings while the shaft 115 turns in bearings carried by a horizontally sliding part 117^a which is urged to the left, as viewed in Fig. 2, by springs 118^a thus tending to move the shaft 115 bodily toward the shaft 112. On the lower end of the shaft 112 is mounted a cylindrical roll 113^a and on the lower end of the shaft 115 is mounted the cylindrical roll 114^a, these rolls being shown in Figs. 1, 2 and 3 as

having knurled peripheral surfaces. The forward roll 114^v is preferably furnished with a downwardly directed, substantially hemispherical axial boss B for contact with the surface of the insole S of the shoe.

The machine also comprises a driven shaft 9 provided with a crank or eccentric 32 to which is connected one end of the connecting rod 33, the opposite end of which is pivotally secured at 34 to one end of a horizontally sliding part 35 suitably guided to move in a horizontal path and provided at its forward end with the inwiping wiper 36. The same slide 35 may also, if desired, carry the pressing wiper 119 (Fig. 1). The above parts are all similar to correspondingly numbered parts disclosed in the aforesaid patent to which reference may be had for a further description, the only substantial difference being that in the aforesaid patent the rolls carried by the shafts 112 and 115 are provided with oppositely pitched helical ribs whereas in accordance with the arrangement specifically shown in Figs. 1, 2 and 3 the cylindrical rolls are unprovided with ribs, but have roughened or knurled surfaces.

In the operation of this device, the shoe is held in an inclined position as indicated in Fig. 1, the longitudinal axis of the shoe extending more or less in the direction of the line X—Y. As illustrated, the last L has mounted thereon the upper U and insole S, the margin M of the upper extending upwardly from the surface of the insole as seen in Fig. 1. In beginning the lasting operation the operator preferably first moves the roll 114^v away from the roll 113^x and by proper manipulation of the shoe catches a portion of the margin M between the rolls thereupon permitting the rolls to approach and grip the upper material between them. By holding the shoe in inclined position of Fig. 1 the marginal material will feed between the rolls while the rolls progress the shoe longitudinally, the marginal material escaping from the left side of the rolls as viewed in Fig. 1 as the operation progresses. The inwiping wiper 35 is disposed just below the plane of the lower ends of the rolls and just to the left of the plane of the axes of rolls as viewed in Fig. 1. This wiper is vibrated very rapidly, for instance 500 or more vibrations per minute, and its end engages that portion of the margin which lies between the plane of the bottom of the insole and the point at which the upper is gripped between the rolls. After first engaging the marginal material between the rolls, the operator preferably pushes the shoe rearwardly toward the free end of the wiper so that the marginal material is partially bent over the edge of the insole as shown in Fig. 2. As the wiper engages the upper material, its rapidly repeated impacts stretch the upper material, the insole being held from rising by contact with the boss B and the edge portion of the marginal material being firmly gripped between the rolls. The consequence of this action is to stretch the upper material snugly about the last and to push it inwardly over the last bottom and to lay it down against the insole as fast as the upper material escapes from between the nip of the rolls. It will be understood that suitable adhesive may have previously been applied to the inner surface of the margin and/or to the insole or that it may be applied substantially simultaneously with the inwiping action, as may be preferred. The result of the operation is to stretch the margin and cause it to adhere to the insole, such adhesion being further insured, if desired, by the action of a pressing wiper

119 which, as suggested in the aforementioned patent, may be heated and may be caused to bear with ironing pressure upon the wiped-in marginal material.

While rolls such as shown in Fig. 3 are useful, it may be desirable, in dealing with certain types of upper material, to provide an even more positive grip. Thus as shown in Fig. 4, the cylindrical rolls 212 and 214 are provided with peripheral ribs R disposed in planes perpendicular to the axes of the rolls. These ribs are so arranged that the space between adjacent ribs of one roll provides a channel C complementary to a rib on the opposite roll. These ribs and channels receive the upper material between them and provide a positive grip which enables the wiper to stretch the upper material to the maximum possible extent without danger that it will be pulled out from between the rolls.

In Fig. 5 a further modification is illustrated wherein the cylindrical rolls 213^a and 214^a are provided at their upper portions with ribs R and channels C such as those shown in Fig. 4 but wherein the lower portions of the rolls are provided with helical ribs R² and R¹, respectively of opposite pitch designed to provide a slight amount of positive updraw whereby the marginal material is positively fed into the grip of the ribs R and channels C.

In Fig. 6 the cylindrical rolls 213^b and 214^b are shown as having smooth upper portions, the roll 213^b being provided with a peripheral rib R like those shown in Fig. 4, while the roll 214^b is furnished with a complementary channel C' consisting of a groove in the periphery of the roll.

In Fig. 7 the cylindrical rolls 213^c and 214^c are furnished at their lower parts with a rib R and channel C' respectively like those shown in Fig. 6, while the upper portions of these rolls are furnished respectively with preferably spaced, longitudinally extending ribs R³ and complementary longitudinally extending channels or indentations C².

In Fig. 8 the cylindrical rolls 213^d and 214^d are furnished at their lower end portions with helical ribs R² and R¹, respectively like those illustrated in Fig. 5, such ribs being of opposite pitch and designed to provide a positive updraw. The rolls 213^d and 214^d, respectively, are also provided with a peripheral rib K (of wedge or V shape in transverse section, constituting a disk cutter whose edge is in a plane perpendicular to the axis of the roll) and with a peripheral groove V complementary to the cutter K and designed to receive the edge of the latter. The cutting rib K in cooperation with the groove V, acts to trim away surplus upper material which is drawn upwardly between the rolls by the action of the ribs R¹ and R². Preferably the cutter rib K is removable, being a separate part made, for example, from tool steel, and the lower part of the roll 213^d is independent of the upper part and removable to permit the cutter disk or rib K to be assembled between such lower part and the upper part of the roll. The cutter rib or disk may thus be removed for sharpening or for replacement.

Above the disk K and groove V the rolls 213^d and 214^d are preferably provided with oppositely pitched helical ribs R^x and R^y, respectively, which serve to steady the rolls and to maintain them in proper parallel relation, as well as to draw the severed material upwardly away from the cutting edge. Preferably the roll 213^d is of somewhat larger diameter than the roll 214^d in order to

facilitate the lasting of the toe portion of the upper. It is to be understood that the corresponding rear roll of the other pairs of rolls shown in the other figures of the drawing may likewise be of larger diameter than the complementary front roll, if desired. When the roll 213^d is of larger diameter than the roll 214^d, the peripheral speed of the knife-rib K is greater than that of the surfaces forming the walls of the groove V. This facilitates the trimming operation. While certain desirable embodiments of the invention have herein been illustrated by way of example, it is to be understood that the invention is not necessarily limited to these precise embodiments but is to be regarded as broadly inclusive of any and all equivalent constructions which fall within the terms of the appended claims.

I claim:

1. In a lasting machine, in combination, a rapidly vibrating wiper element and a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having substantially cylindrical work-engaging surfaces between which the marginal portion of the shoe upper is gripped, one roll having a peripheral channel and the peripheral surface of the other roll having a projecting rib complementary to said channel, the rib and channel lying in planes which are perpendicular to the axis of the respective rolls.

2. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having substantially cylindrical work-engaging surfaces between which the marginal portion of the shoe upper is gripped, the peripheral surface of one roll having channels therein and the peripheral surface of the other roll having ribs complementary to the channels thereby to provide positive gripping means for engagement with the marginal material of the upper, said ribs and channels extending parallel to the axes of the respective rolls.

3. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having substantially cylindrical work-engaging surfaces between which the marginal portion of the shoe upper is gripped, the peripheral surfaces of the rolls having complementary ribs and channels operative to provide a positive grip upon the marginal material of the upper when inserted between the rolls, certain of said ribs and channels being in planes perpendicular to the axes of the rolls and other of said ribs and channels being parallel to the axes of the rolls.

4. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having substantially cylindrical work-engaging surfaces between which the marginal portion of the shoe upper is gripped, the peripheral surfaces of the rolls having substantially smooth cylindrical portions operative to grip the marginal material of the upper between them, one roll also having a peripheral rib and the other roll having a complementary peripheral channel, the rib and channel being operative to provide a positive grip upon said upper material.

5. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having substantially cylindrical work-engaging surfaces between which the marginal portion of the shoe upper is gripped, one roll having a peripheral rib and the other roll having a complementary peripheral channel, said rib and channel being disposed in a plane perpendicular to the axes of the respective rolls, the respective rolls also having helically disposed ribs of opposite pitch.

6. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and having helically disposed ribs of opposite pitch, one of the rolls being provided with a peripheral rib disposed in a plane substantially perpendicular to the axis of the roll, said rib being of substantially V-shaped transverse section and constituting a trimming cutter.

7. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls being provided with complementary peripheral work-gripping ribs, one of the rolls having a peripheral groove and the other having a peripheral rib having a cutting edge cooperating with the wall of the groove to trim away surplus upper material.

8. In a lasting machine, in combination, a pair of oppositely rotating upper-gripping rolls, said rolls turning about parallel axes and one of the rolls being of greater diameter than the other, the larger roll having a peripheral rib shaped to form a trimming cutter, and the other roll having a peripheral groove for the reception of the edge of the trimming cutter, said rolls being provided with cooperating oppositely pitched intermeshing helical ribs operative to grip the marginal material of the upper which is severed by the cutter and to draw said severed material away from the cutting edge.

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