STRETCHING LEATHER BLANKS.

In order to facilitate the stretching and to give permanence to it, another feature of the invention comprises tearing or crushing or performing both operations upon the fibres of the blank at the locality where the stretching is done. Again referring to sole blanks, a stress may be exerted upon the shank portion while at the same time the fibres of that portion are more or less torn or crushed.

In general, then, the invention is concerned with increasing the size of a sole blank after it has been cut out although it should be understood that the invention in some of its aspects is not limited to this use.

Referring now to the accompanying drawings,

Fig. 1 is a plan of a short sole blank which has been stretched, the dotted line showing the outline of the shank portion before the stretching was done.

Fig. 2 is a similar plan of a full length sole blank.

Fig. 3 is a perspective of a gage for positioning a sole in a stretching machine which will presently be described.

Fig. 4 is a perspective of a blank-engaging member for the same machine, and

Fig. 5 is an end elevation of the machine of which Figs. 3 and 4 represent parts.

In practising the invention, the sole or other blank is first die-cut out with a dimension, for example the length of the shank in a sole blank, less than is required for the shoe of which it is to become a part. This operation may be performed on an ordinary clicking machine by the use of a proper die. The blank is then preferably put into temper by being treated in the usual way with water. The tempered blank is then stretched in the desired locality and during this stretching the fibres may be more or less torn or crushed or both so that the elongation will be facilitated and rendered permanent.

An illustrative machine by which all these operations, except the die-cutting and wetting, may be performed at once is shown in Figs. 3, 4 and 5. A stationary shaft 7 has square ends which are received in square yokes (not shown) carried by the frame 9 of the machine. Rotatably mounted upon the shaft is a drum 11 having two diametrically opposite recesses which are approxi-
mately triangular in cross-section and extend from end to end of the drum. Since these two recesses and the elements associated with them are practically identical, only one recess with its associated elements will be described in detail, and reference numerals increased by one hundred will be applied to the corresponding elements of the other recess. Referring to the upper recess, as viewed in Fig. 5, it is bounded on two sides by walls 13, 15. Pivotcd to the drum at 17 and acted upon by opposed springs, two of which are shown at 19, is a supporting plate 21 which extends from end to end of the drum above the wall 13. Adjustably mounted upon this plate by means of a set screw 23 is a gage 25 having a slotted ear to receive the stem of the screw, said gage being shown complete in Fig. 3.

Pivotcd at each end of the drum about the axis 27 is a lever 29, said levers being connected by a bar 31 so that when the levers are swung in a clockwise direction about the axis 27, the bar presses the sole against the plate 21. The bar 31 and the plate 21 thus form a pair of jaws which grip the sole firmly, the springs 19 permitting the plate 21 to tip about its pivot 17 so as to provide for soles which are not uniform in thickness. The levers 29 are operated from two stationary cams fast to the shaft 7 near the opposite ends thereof, one of the cams being shown at 33, the cams co-operating with floating yokes one of which is shown at 35. Pivotcd to each yoke about the axis 37 is a link 39, each link being also pivotcd about the axis 27. The links 39 and levers 29 are loosely connected at their adjacent free ends by bolts 41 and are normally maintained separated at these ends by springs 43 which are coiled around the stems of the bolts. With this construction, revolution of the drum 11 about the shaft 7 will cause the yokes 35 to move bodily first in one direction and then in the other in a path which is transverse to the axis of the shaft 7. The effect of this will be to cause the axes 37 and 137 to approach and then to recede from the axis of the shaft; and this movement in turn will rock the levers 29 and 129 alternately to and fro about the axes 27 and 127. The drum is rotated continuously in the direction indicated by the arrow by a driving pinion 45 which meshes with a large gear 47, said gear being fast to the drum; and the stationary cams 33 and yokes 35 are so shaped that the two pairs of jaws, which have been described, will alternately open to permit presentation of the forward end of a sole, and then close and hold the sole firmly while its protruding end is dragged past a roller 49, the operation and function of which will now be described.

This roller 49 is fast to a shaft 51, the ends of which are rotatably mounted in journal boxes, one of which is shown at 53, said boxes being slidable in horizontal guideways formed in the frame of the machine. Heavy springs 55 tend at all times to urge the boxes, and with them the roller, toward the drum 11, the extent of movement of the boxes being limited by nuts 57 threaded upon screws 59 which are fast to the boxes and pass freely through boxes in an adjacent portion of the frame of the machine. A gear 61, fast to the shaft 51, meshes with the gear 47; and it should be noted that the gear 47 is of less diameter than the drum 11 so that the pitch line of the gears 61 and 47 is located inside the periphery of the drum. The effect of this construction is that the surface speed of the drum is slightly greater than that of the roller. Set into the roller is a curved plate 63 having teeth 65 formed on its operative face.

The operation of the machine is as follows: The operator stands at the right of the machine, as viewed in the figure, and, as a pair of the jaws open, places the forward end of a sole on the lower jaw or plate 21 with the edge of the sole abutting the position-controlling members of the gage 25. As the drum continues its rotation, the protruding rear portion of the sole passes between the drum 11 and the roller 49, the plate 63 being so located as to engage the sole. The points or teeth 65 enter the sole and, because of the relatively faster surface speed of the drum 11, exert a drag upon the sole. The effect of this treatment is to tear and crush the fibres more or less, to compress the portion operated upon and to set up a tensile stress in it. The length of that portion of the plate 63 which carries the teeth 65 is such and the plate so timed that the fibres breaking by tearing action is caused to take place in a selected locality of the blank so that the stretching will occur principally in that locality. The plate 63 first engages the sole at or near the junction of the forepart with the shank and then progressively applies a drag to the remaining portions of the shank so that the shank is drawn out by increments. In the case of a full length sole, the illustrative machine will produce the result shown in Fig. 2 in which the elongation has taken place principally in the shank, leaving the forepart practically unchanged and the heel part only slightly stretched if at all. In the case of a short sole, the result is shown in Fig. 1, all of the stretching having taken place in the shank portion.

In the specification, the statement has been made that the blank is cut with certain dimensions smaller than the requirements of the shoe of which it is to become a part. It will be understood that these
requirements" are different according to the type and style of the shoe and do not in general refer to the exact size of the sole in the finished shoe, since the blank may have to undergo rough rounding, edge trimming and other operations. It will be noted from an inspection of Figures 1 and 2 that the elongation of the blanks may result in narrowing them somewhat at the localities operated upon, but the loss in area due to narrowing is considerably less than the area gained by the elongation.

Having thus described our invention, what we claim as new and desirable to secure by Letters Patent of the United States is:

1. That improvement in methods of making shoes which comprises cutting out a blank with a dimension smaller than is required for the shoe of which it is to become a part, and then drawing out the blank to the required dimension by tensile stress applied to a selected locality of the blank.

2. That improvement in methods of making shoes which comprises cutting out a blank with a dimension smaller than is required for the shoe of which it is to become a part, and then tearing the fibres and drawing out the blank by tensile stress to the required dimension.

3. That improvement in methods of making shoes which comprises cutting out a blank with a dimension smaller than is required for the shoe of which it is to become a part, and then tearing and exerting pressure upon the fibres and drawing out the blank by tensile stress to the required dimension.

4. That improvement in methods of making shoes which comprises cutting out a blank with a dimension smaller than is required for the shoe of which it is to become a part and then stretching the blank at a portion which possesses unnecessary strength for the finished shoe.

5. That improvement in methods of making shoes which comprises cutting out a leather blank with a portion shorter than is required by the shoe of which it is to become a part and then tearing the fibres of and rolling that portion and thereby increasing its size.

6. That improvement in methods of making shoes which comprises cutting out a sole blank to a contour smaller than that required for the shoe of which it is to become a part, engaging it at separated localities and drawing out the blank by tensile stress to the required contour before applying it to the shoe.

7. That improvement in methods of making shoes which comprises cutting out a sole blank to a contour smaller than that required for the shoe of which it is to become a part, engaging it at separated localities and drawing out the blank by tensile stress to the required contour before applying it to the shoe.

8. That improvement in methods of making shoes which comprises cutting out a sole blank to a contour smaller than that required for the shoe of which it is to become a part, engaging it at separated localities and drawing out the blank by tensile stress to the required contour before applying it to the shoe.

9. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

10. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

11. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

12. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

13. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

14. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.

15. That improvement in methods of making shoes which comprises cutting out a sole blank to the dimensions required by the forepart of the shoe of which it is to become a part and shorter than the requirements of the Shank, and stretching the Shank portion while maintaining the shape of the forepart unchanged.
ments of the shank, clamping the forepart, breaking a portion of the fibres of the shank and rolling and pulling the shank to stretch it.

17. That improvement in methods of making shoes which comprises cutting out a sole blank, gripping the forepart, moving the blank in a predetermined path, and applying a resistance to the movement of the shank portions to stretch it.

18. That improvement in methods of stretching sole blanks each in a predetermined locality which comprises clamping a blank along the portion not to be stretched, moving the clamped portion of the blank in a predetermined manner, and exerting a drag on said predetermined locality of the blank to stretch it.

19. That improvement in methods of stretching sole blanks which comprises clamping one portion of the blank, moving said clamped portion in a predetermined path, and applying a drag progressively to different portions of the remainder of the blank to stretch it uniformly by increments.

20. That improvement in methods of stretching sole blanks which comprises gripping a portion of the blank which is not to be stretched, and applying tensile stress progressively to different portions of the remainder of the blank to stretch it by increments.

21. That improvement in methods of treating soles which comprises the steps of gripping the forepart of the sole and increasing the length of the shank portion by drawing it out to the required dimension.

In testimony whereof we have signed our names to this specification.

CHESTER HUNT.
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