Nov. 24, 1931. F. SAHR 1,833,229

MACHINE FOR LASTING SHOES

Filed Jan. 29, 1930 2 Sheets-Sheet 1

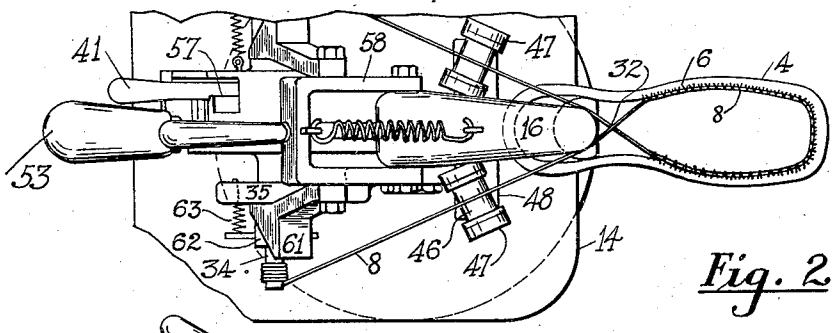


Fig. 2

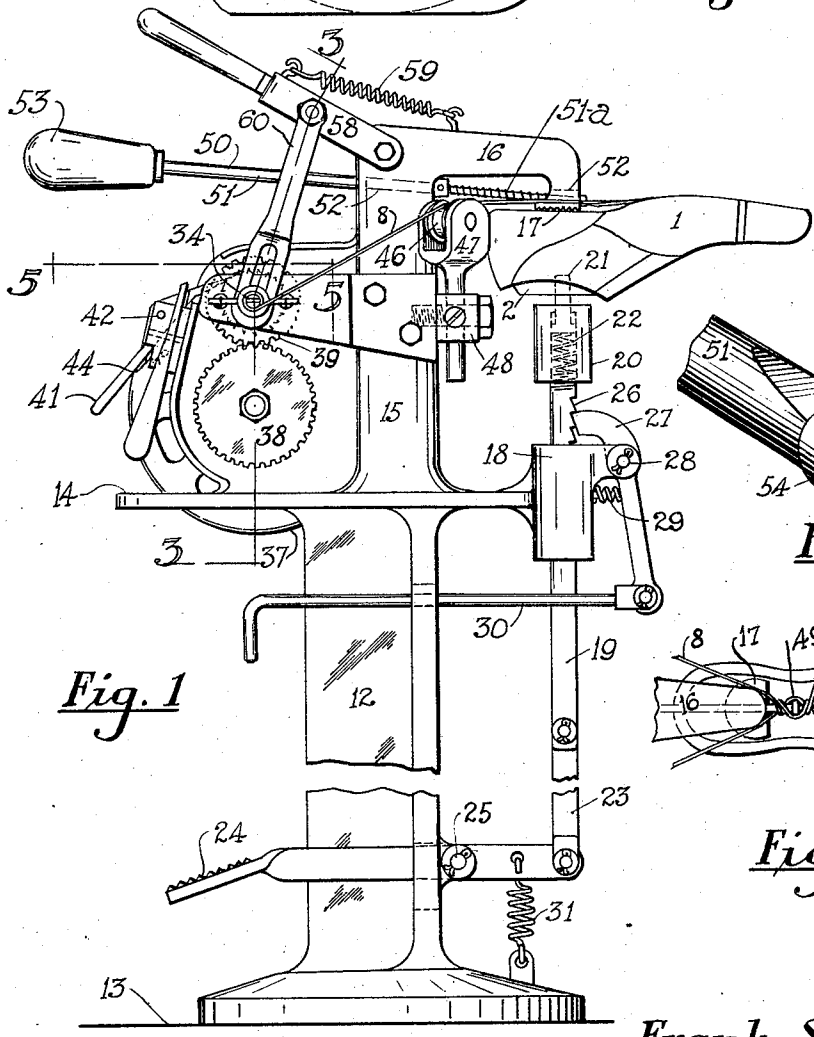


Fig. 1

Fig. 9

Fig. 10

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MACHINE FOR LASTING SHOES

Filed Jan. 29, 1930 2 Sheets-Sheet 2

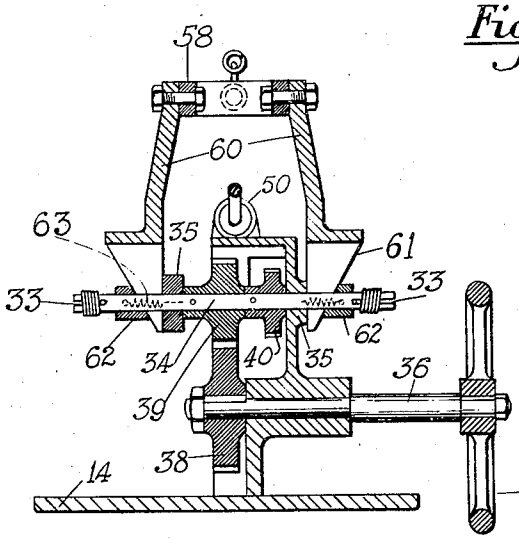


Fig. 3

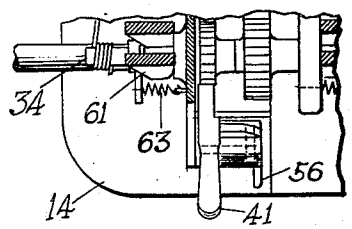


Fig. 5

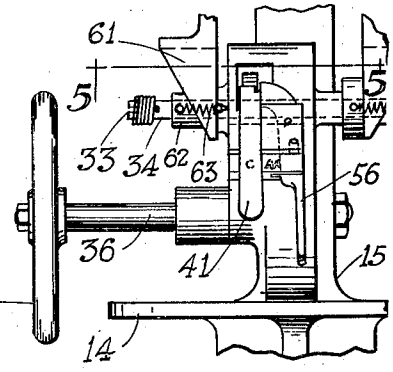


Fig. 4

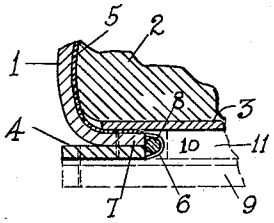


Fig. 6

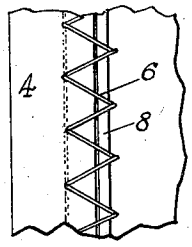


Fig. 7

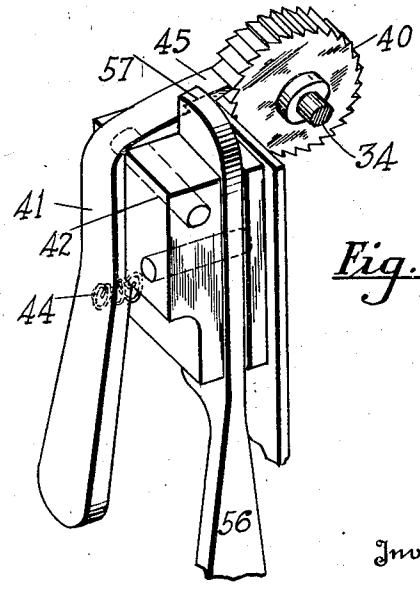


Fig. 8

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Patented Nov. 24, 1931 1,833,229

UNITED STATES PATENT OFFICE

FRANK SAHR, OF COLUMBUS, OHIO

MACHINE FOR LASTING SHOES

Application filed January 29, 1930. Serial No. 424,359.

This invention relates to machines for lasting shoes, and has particular reference to lasting machines of the type wherein a shoe upper is fitted to the last by the employment of wire connectors, wherein a wire is connected with the welted edge of an upper and by the provision of the machine the wire is drawn taut so that the upper is secured and stretched around the last to assume a desired shape or contour.

It is a primary object of the present invention to provide a simple and improved machine for facilitating the operation of tautly drawing the wire and fastening the same in such a tautly drawn condition to shape and retain the upper on the last, to the end that the operation may be effected quickly and economically and to produce a shoe of improved and well finished appearance.

With these and other objects in view which will appear as the description proceeds, the invention consists in the novel features of construction, combinations of elements and arrangements of parts hereinafter to be fully described and pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a side elevation of a lasting machine constructed in accordance with the present invention,

Figure 2 is a top plan view thereof,

Figure 3 is a vertical transverse sectional view on the plane indicated by the line 3—3 of Figure 1,

Figure 4 is an edge elevation of the wire tightening arbor and its associated locking and rotating mechanism,

Figure 5 is a horizontal sectional view taken on the lines 5—5 of Figures 1 and 4.

Figure 6 is a detailed view in vertical section taken through a shoe lasted in accordance with the present invention,

Figure 7 is a detailed bottom plan view of the shoe,

Figure 8 is a detail perspective view showing the interlocking levers governing the rotation of the wire tightening arbor,

Figure 9 is a detail perspective view of the shank of the wire twister, and

Figure 10 is similar to Figure 2 and shows the twisting tool in an operative position.

In the lasting of certain styles of shoes an upper 1 is placed over a last 2, as shown in Figures 1, 2 and 6. An insole is designated by the numeral 3 and a welt 4 is secured to the edge of the upper and the lining 5 by means of the cross stitching 6. The stitching 6 also serves to connect securely with the inner edge 7 of the upper a lasting wire 8 which, when tautly drawn and twisted, as shown in Figure 2, draws the upper around the last to produce a shoe of desired shape, and this operation is accomplished without the employement of tacks and other devices which tend to mutilate the last and to render its period of usefulness short. Moreover, this lasting operation with the use use of the wire 8 in connection with the welting machine hereinafter described in detail, is capable of being quickly and economically effected and a shoe of improved appearance produced. The outsole 9 may then be connected in the usual manner with the welt 4 and the space or pocket 10 formed between the outsole, the insole and bound by the wire 8 may be filled with a suitable filler 11. It will be noticed that the wire 8 is positioned in the pocket 10 where it does not interfere with the construction of the shoe nor will it provide any discomfort for the wearer. Moreover, by passing the stitching 6 through both the welt and the upper 7 a double thickness of material is provided which prevents tearing thereof at the time the wire is being drawn taut to shape the upper around the last.

The present invention deals particularly with the provision of an improved machine fashioned for the specific purpose of drawing the wire 8 to a taut condition and by a twist lock to retain the same in such condition. To this end the machine consists of a stationary base 12 suitably fastened to a floor or other foundation 13. The upper portion of the base terminates in a horizontal table 14 from which arises a stationary pedestal 15. The upper end of the pedestal terminates in a laterally and horizontally directed arm 16

which has its outer end downwardly turned to produce a stationary last rest 17.

Carried by the table 14 is a vertical guide 18 in which is slidably mounted a bar 19. The upper end of this bar is threaded for the reception of a head 20 which is centrally bored for the reception of a yieldable jack post 21, the said post being received, as is customary, within an opening provided in the last 2. The jack post is resiliently supported in connection with the head 20 by a coil spring 22. The bar 19 is adjustable vertically by having its lower end connected with a link 23, and this link is, in turn, pivotally connected at its lower end with a foot pedal 24 pivoted on the base 12 as at 25. By pressing downwardly on the operating end of the pedal 24 the bar 19 is elevated so that the last 2 will be forced upwardly into engagement with the rest 17. This position is retained by providing the bar 19 with ratchet teeth 26 with which engages a pawl 27 which is pivoted as at 28 in connection with the guide 18 and is pressed by a spring 29 normally into contact with the teeth 26. The lower end of the pawl 27 is connected with a sliding hand operated rod 30 which projects towards the operator's side of the machine and is slidably mounted in connection with the base 12. By pulling on the rod 30 the pawl may be swung to a position clear of the teeth 26 so that the jack post may be raised or lowered with relation to the stationary rest 17. When the pawl 27 is released a spring 31 connected with the pedal 24 operates to positively move the jack post in a downward direction. However, this movement is usually regulated by foot pressure by the operator to the pedal 24.

To draw the wire 8 to a taut condition so that the upper will be stretched about the outer surfaces of the last, the said wire is crossed, after passing around the inner periphery of the sole, as indicated at 32, and terminates in diverging extension, the ends of which are positioned within slots 33 provided in a tightening arbor 34.

This arbor is rotatably mounted in stationary bearings 35 projecting from the pedestal 15, and its rotation is effected by means of a counter shaft 36 which is supported in connection with bearings mounted on the table 14. One end of the shaft 36 is equipped with a hand wheel 37 and the other end thereof carries a gear 38, which meshes with a similar gear 39 fixed to the arbor 34. It will be seen that by rotating the hand wheel 37 corresponding rotary motion may be imparted to the arbor, and this motion is utilized for the purpose of placing the wire 8 under tension so as to stretch the upper around an associated last.

To lock the arbor in a fixed position of rotation, the arbor is provided, adjacent to the gear 39 with a ratchet wheel 40 with which engages a spring pressed pawl 41. This pawl is pivotally mounted as at 42 on a bracket 43 carried in conjunction with the table 14, a spring 44 carried by the bracket engages with the operating end 45 of the pawl 41 in order to normally maintain the detent end of said pawl in engagement with the teeth of the ratchet 40, whereby the arbor is automatically locked in any of its rotated positions and likewise the wire 8 is retained in its taut condition.

In the specific form of the machine illustrated, the arbor 34 is spaced from the last 2 and therefore I provide adjustable roller guides 46 between said last and the ends of the arbor, which function to direct the wire during the time it is being tightened by the arbor, and to control the operating positions thereof. The rollers 46 are carried by vertically adjustable brackets 47 which are mounted in conjunction with bearings 48 carried by the pedestal 15.

After the wire 8 has been drawn to a desired taut condition and placed under a proper degree of tension necessary for drawing the upper around the last, I then retain that portion of the wire in engagement with the upper permanently in its taut or stretched condition by twisting the wire as indicated at 49 where the crossed strands of the wire meet, as indicated at 32, in the stretching operation. The twisting of the wire as at 49 permanently retains the wire in its tightened condition whereby the upper is stretched around the last 2 so that upon the subsequent removal of the last from the shoe the desired form of the shoe will be retained.

The formation of the twist 49 is effected by the provision of a twisting device 50. In the particular form of the invention illustrated this device consists of a tool shank 51 which is positioned within enlarged guide openings 52 formed in the pedestal 15 and in the rest 17, the openings 52 being of such size as to permit of some manipulation on the part of the tool shank 51. The outer end of the tool shank is equipped with a handle 53 permitting the implement to be readily manipulated. The inner end of the shank 51 is provided with a head 54 formed with dove tail slots 56. These slots are so formed that they may be engaged with the diverging strands of wire immediately to the rear of their crossed point of juncture 32. While the wire is maintained in a stretched or taut condition through the operation of the arbor 34, the twisting implement is inserted into the openings 52 and engaged with the crossed strands of the wire, against the resistance of a spring 51*a*. Then by partially rotating the shank 51 around its longitudinal axis through approximately 180° of movement a slight initial twist is imparted to the wire at the point 32 to hold the wire against slipping and loss of its tautness where it en-

gages with the upper 1. Following this initial twist of the wire the pawl 41 which normally locks the ratchet wheel 40 in the arbor is rocked manually to release the arbor, and this operation serves to relieve the tension of the wire strands which are positioned between the partially twisted crossed point 32 to the ends of the arbor. The pawl 41 is held in this arbor releasing position by a detent 56 which, when the pawl 41 occupies an arbor-releasing position, engages with a recess 57 formed in one of the side walls of the pawl 41, thus positively holding the pawl 41 from locking engagement with the arbor.

Due to the slack which this latter operation introduces into the diverging strands of the wire 8 leading to the arbor, it is now possible to manually rotate the twisting device 50 to provide the series of twists 49 in the wire 8 which retains that portion of the wire surrounding the edges of the upper 1 in its desired taut condition with the upper stretched around the last 2. The wire may then be severed immediately to the rear of the twisted portion 49 in order to free the upper binding portions of the wire from the diverging portions or strands which are connected with the arbor.

To remove these useless strands of wire from the arbor use is made of a pivoted lever 58, which is carried by the upper end of the pedestal 28 and is normally retained in an elevated position by the employment of a coil spring 59. To the lever 58 there is pivotally connected a pair of jaws 60 which have their lower ends formed with cam surfaces 61, which surfaces are normally in engagement with collars 62 slidably mounted on the ends of the arbor shaft and which are maintained in contact with the cam surfaces 61 by the employment of springs 63. By rocking the lever 58 downwardly the jaws 60 move the collars 62 longitudinally and outwardly of the arbor shaft, against the resistance of the spring 63, until the collars force the wire strands from engagement with the ends of the arbor. The operator may then release the jack bar 19 by operating the rod 30 to permit the last and the upper associated therewith to be withdrawn from the machine, which completes the operating cycle of the machine. The detent 56 is moved then from engagement with the pawl 42 to allow the latter to return to its normal position of engagement with the ratchet wheel 40. The operations described are capable of being very quickly effected by the machine attendant and a shoe of desired appearance produced.

What is claimed is:

1. In a lasting machine, a frame, means for detachably securing a last to said frame wherein the last is provided with an upper having an attaching wire secured thereto, an arbor rotatably mounted in connection with said frame and to which the ends of the wire are attached, manually operated means for rotating said arbor to place said wire under tension throughout the entire length thereof, means for locking the arbor in a position retaining the wire under tension, a manually operated twisting device carried by said frame and engageable with the wire between its point of connection with the upper and with said arbor for twisting said wire, and means admitting of the release of said arbor to permit of the completion of the wire twisting operation by releasing the tension on said wire between the point of twisting and said arbor.

2. In a lasting machine, a frame, means for detachably securing a last to said frame wherein the last is provided with an upper having an attaching wire secured thereto, an arbor rotatably mounted in connection with said frame and to which the ends of the wire are attached, manually operated means for rotating said arbor to place said wire under tension throughout the entire length thereof, means for locking the arbor in a position retaining the wire under tension, a manually operated twisting device carried by said frame and engageable with the wire between its point of connection with the upper and with said arbor for twisting said wire, means admitting of the release of said arbor to permit of the completion of the wire twisting operation by releasing the tension on said wire between the point of twisting and said arbor, and means for removing from said arbor the ends of the wire attached thereto following said twisting operation.

3. In a lasting machine, a frame, a last support carried by said frame for the reception of a last provided with an upper having a wire attached thereto, an arbor rotatably mounted in conjunction with said frame and to which the crossed strands of said wire are connected, manually operated means for rotating said arbor whereby to place said wire under tension sufficient to draw the associated upper tautly around said last, manually operated means carried by said frame for partially twisting the wire at the point of intersection of its crossed strands while the entire length of the wire is maintained under tension, and means for releasing said arbor following said initial twisting operation to remove the tension on the wire strands between the point of twist and said arbor whereby to permit of the completion of the twisting operation.

4. In a lasting machine, a frame, supports carried by said frame for the reception of a shoe last provided with an upper having a wire attached to the edges thereof, an arbor rotatably carried by said frame and to which the crossed diverging strands of said wire extended beyond the upper are connected, manually operated means for effecting the

rotation of said arbor to place the entire length of said wire under tension to draw the upper firmly around its last, means for locking the arbor in its position applying tension to the attaching wire, and means carried by said frame for twisting said wire at the point of intersection of its crossed strands to retain that portion of the length of said wire in engagement with the upper permanently under tension.

5. In a lasting machine, a frame structure, a support carried by said frame structure adapted for the reception of a last which carries an upper with a wire stitched to the sole engaging edges of the upper, means carried by the frame structure for placing the entire length of the attaching wire under tension of sufficient magnitude to retain the upper in a stretched condition around said last, means for twisting said wire while under tension to maintain that portion of the wire connected with the upper permanently under tension to permit of the severing of the wire strands disposed beyond said twisted portion, and means for discharging said severed strands from the tension applying means.

6. In a machine for lasting shoes with an upper having a wire attached thereto, a frame structure including a pedestal having a down turned last rest, a vertically adjustable jack carried by said frame structure behind said rest and adapted for the reception of a last, means for moving said jack vertically to clamp the last between the rest and said jack, a manually operated arbor rotatably mounted in connection with said frame structure, means for securing the ends of the crossed strands of the attaching wire to said arbor to permit the entire length of said wire to be placed under a tension of sufficient force to firmly stretch the upper around said last, means carried by said frame structure for twisting said wire at the intersection of its crossed strands to permanently retain that portion of the wire in engagement with the upper under tension, and means for releasing said arbor following the initial twisting of said wire to relieve the tension on said strands behind the last to permit of the completion of the twisting operation.

7. In a machine for lasting shoes with an upper having a wire attached thereto, a frame structure including a pedestal having a down turned last rest, a vertically adjustable jack carried by said frame structure behind said rest and adapted for the reception of a last, means for moving said jack vertically to clamp the last between the rest and said jack, a manually operated arbor rotatably mounted in connection with said frame structure, means for securing the ends of the crossed strands of the attaching wire to said arbor to permit the entire length of said wire to be placed under a tension of sufficient force to firmly stretch the upper around said last, means carried by said frame structure for twisting said wire at the intersection of its crossed strands to permanently retain that portion of the wire in engagement with the upper under tension, means for releasing said arbor following the initial twisting of said wire to relieve the tension on said strands behind the last to permit of the completion of the twisting operation, and means for positively removing the wire strands from said arbor following the severing of said strands of the twisted portion of the attaching wire.

8. In a lasting machine, a frame structure, a last support formed with said frame structure and adapted for the reception of a shoe last provided with an upper and having an attaching wire secured to the sole engaging edges thereof, an arbor journaled transversely in said frame structure for rotation and formed with slotted ends, said attaching wire being crossed adjacent to said last and having the diverging strands which project beyond the last connected with the slots in said arbor, adjustable guides carried by said frame structure between said arbor and said last for the guidance of said strands, manually operated means for effecting the rotation of said arbor to apply tension to said wire attaching member, pawl and ratchet mechanism co-operative with said arbor to maintain the latter in a position applying tension to said wire, means carried by said frame structure for twisting said wire at the point of crossing of its arbor engaging strands, and means for positively maintaining the pawl and ratchet mechanism in an arbor-releasing position during the twisting of the wire attaching member.

In testimony whereof I affix my signature.

FRANK SAHR.