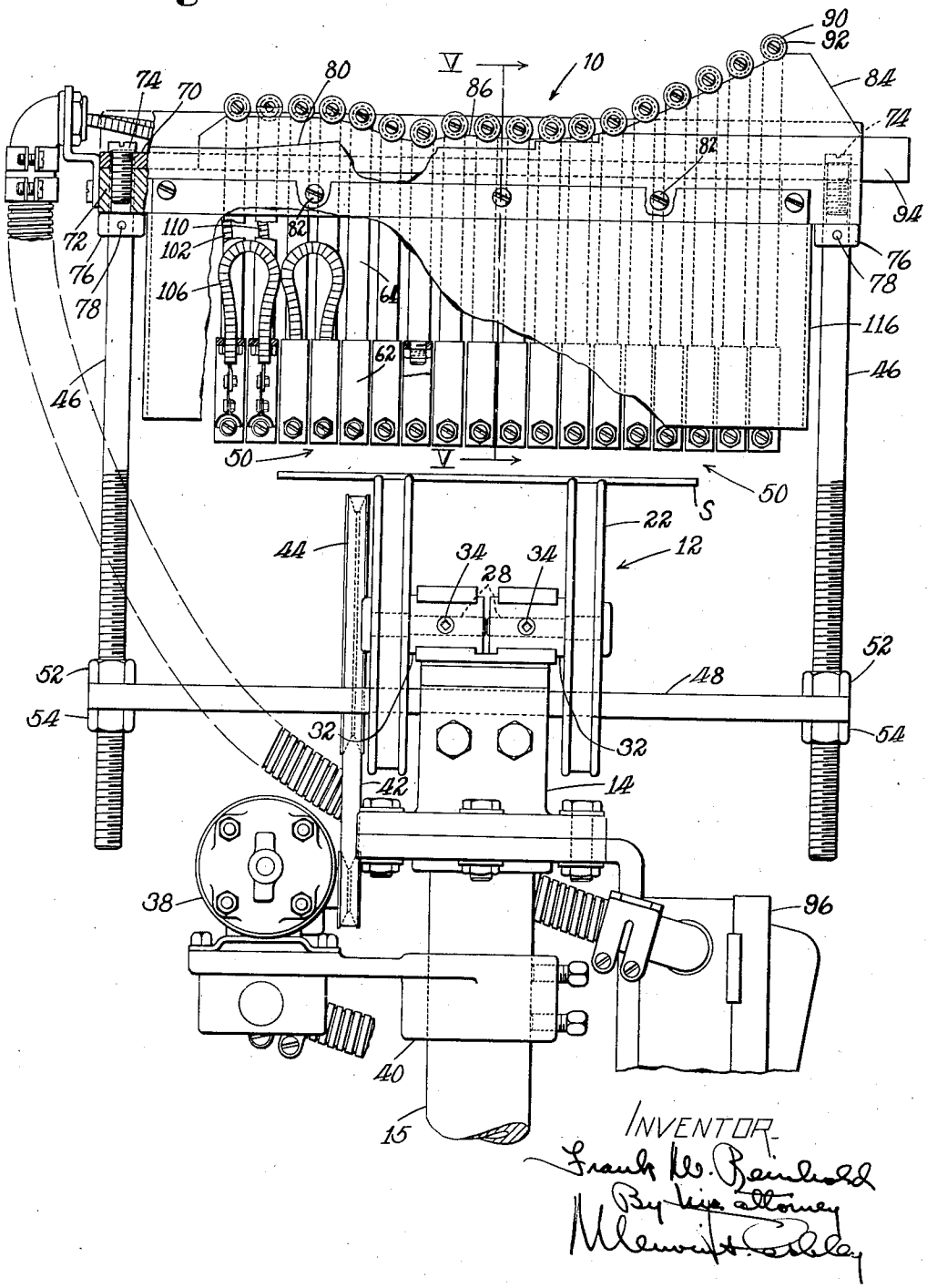
July 21, 1942. F. W. REINHOLD 2,290,356

MACHINE FOR TREATING SOLES WITH HEAT

Filed March 5, 1941 3 Sheets-Sheet 1

Fig. 1.



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MACHINE FOR TREATING SOLES WITH HEAT

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Fig. 2.

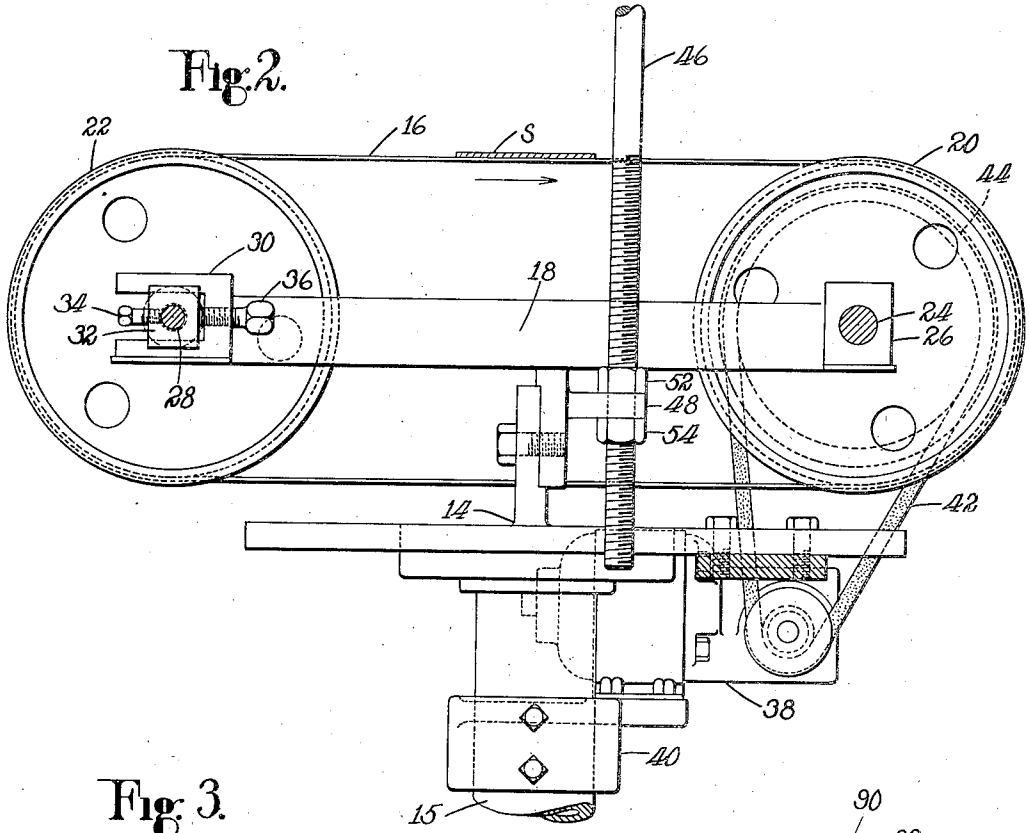
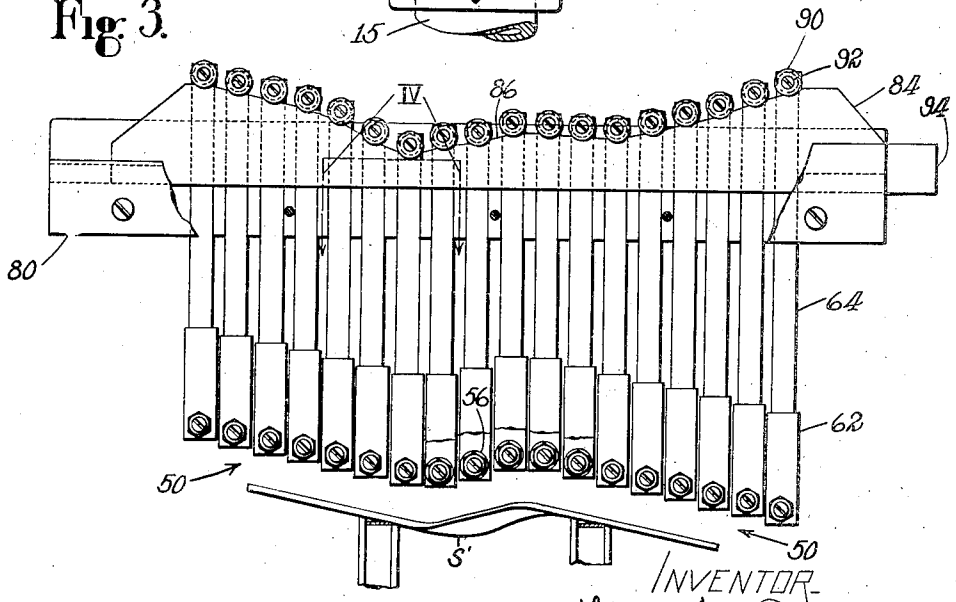


Fig. 3.



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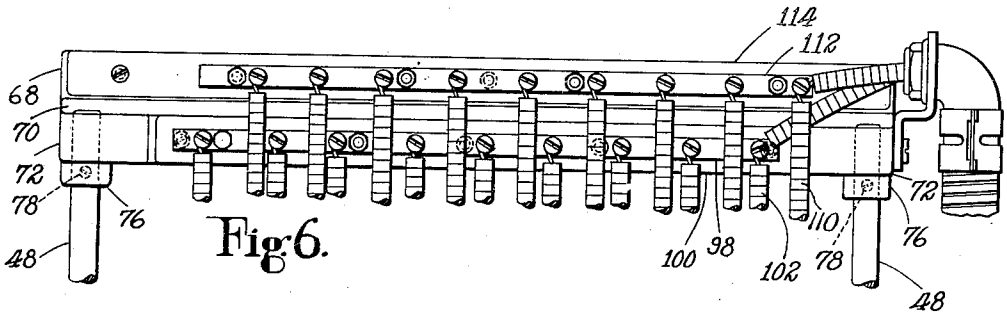


Fig 6.

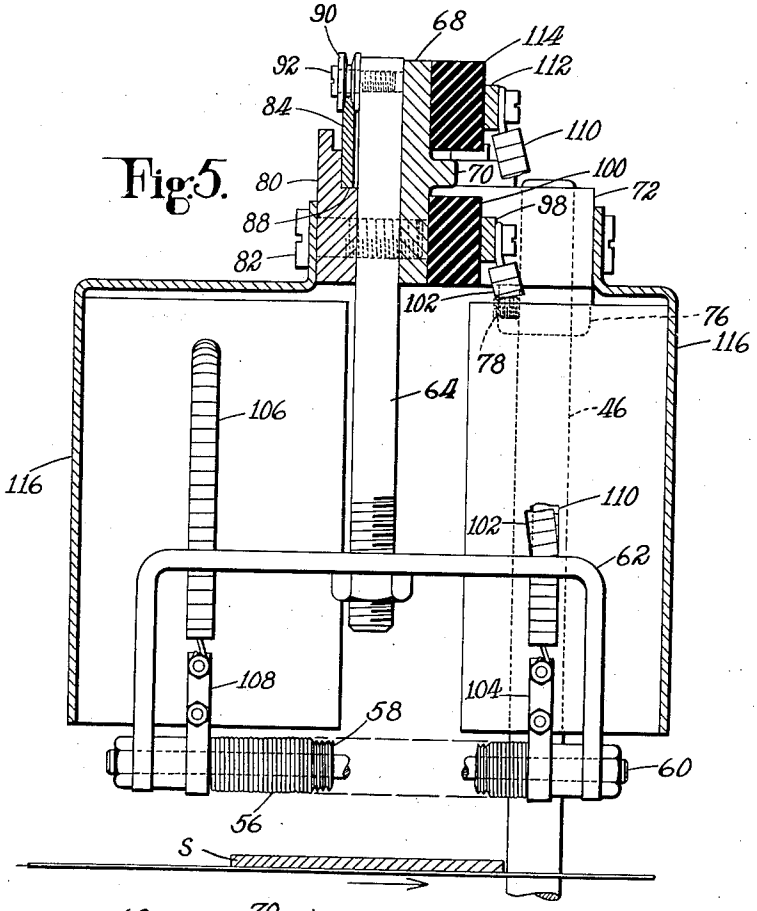


Fig 5.

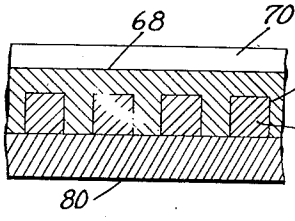


Fig 4.

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Patented July 21, 1942 2,290,356

UNITED STATES PATENT OFFICE

2,290,356

MACHINE FOR TREATING SOLES WITH HEAT

Frank W. Reinhold, Beverly, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application March 5, 1941, Serial No. 381,879

9 Claims. (Cl. 219—19)

This invention relates to a machine for treating soles with heat, and is herein illustrated as directed to a machine for heat-activating thermoplastic cement coatings on soles prior to the attachment of the latter to shoes.

It is well understood that in the manufacture of shoes, the soles of which are to be attached by means of cement, a coating of thermoplastic cement may be applied to the sole before the attaching operation and allowed to dry thereon and that such a coating may later be activated just prior to the attaching operation by a suitable application of heat. Several devices have been suggested for performing such activation of cement-coated soles and have been found satisfactory for operating on flat soles. However, when these devices are used in the treatment of conformed soles, such as those commonly used in the manufacture of cement-process shoes, much difficulty has arisen because some parts of the sole are heated more than others. Such uneven heating causes incomplete activation of portions of the cement coating and results in an unsatisfactory bond between the sole and the shoe. In view of this difficulty, there was provided by the invention set forth in United States Letters Patent No. 2,186,941, granted January 16, 1940, upon the application of J. Teppema et al., a tool having a rigid heating surface shaped to conform with the longitudinal contour of the sole to be treated, thus providing for the uniform heating of a particular conformed sole.

Objects of the present invention, therefore, are to provide an improved machine for treating soles with heat which may be utilized for the treatment of soles having any desired contour to effect a uniform activation of the cement thereon and to provide means for furnishing a substantially continuous supply of activated soles to a sole-attaching machine.

In accordance with these objects, the illustrated machine has a heating device the surface of which is adjustable in shape to correspond to the contour of a sole to be treated, said heating surface comprising a series of heating units mounted on slides constructed and arranged so that the contour of the surface may be adjusted by means of a template. As illustrated also, means are provided in the form of a conveyor unit for carrying a succession of soles to be treated past said heating surface in a direction transverse of the soles.

The above and other features of the invention will be further explained in the following detailed description and defined in the claims.

In the drawings:

Fig. 1 is a front elevation of a machine, embodying one form of my invention, in which various portions are broken away to show the details of the heating surface and the mechanism for adjusting the shape thereof;

Fig. 2 is a side elevation of the conveyor unit of the machine shown in Fig. 1;

Fig. 3 is a detailed view, with parts broken away, of the adjustable heating device;

Fig. 4 is a horizontal section taken along the line IV—IV of Fig. 3 to show the guides for the slides carrying the individual heating units;

Fig. 5 is a vertical section on the line V—V of Fig. 1, showing details of the heating device; and

Fig. 6 is a detailed view of the rear of the frame member which supports the units, showing the bus bars and electrical connections for supplying current to the heating units.

As illustrated in Fig. 1, this machine comprises a heating device 10 and a conveyor 12 both mounted upon a base 14 supported on a column 15, the conveyor being constructed and arranged to carry the soles to be treated past the heating device in the direction of the arrows in Figs. 2 and 5.

The conveyor mechanism comprises a pair of thin, flexible, steel belts 16 carried upon pulleys arranged at opposite ends of a member 18 secured in a horizontal position at the top of the base 14. One pair 20 of the aforementioned pulleys is driven while the other pair 22 idles, the driven pulleys 20 being secured at the ends of a shaft 24 which is journaled in a bearing block 26 mounted upon one end of the member 18 while the idler pulleys 22 are rotatably mounted separately on a pair of shafts 28 at the other end of the member 18. To provide for tensioning the conveyor belts 16, the idler pulleys 22 are mounted for adjustment lengthwise of the member 18. As herein illustrated, the adjustable mounting for the idler pulleys comprises a pair of U-shaped blocks 30 forming a part of the conveyor member 18 and a pair of shaft-supporting blocks 32 having grooves formed in their opposite faces to adapt them to be slidably received between the arms of the U-shaped blocks 30. The shafts 28 are held in place in the shaft-supporting blocks 32 by set screws 34. Adjusting screws 36 extending through the U-shaped members 30 are arranged to bear against the shaft-supporting blocks 32. It will be understood that by appropriate adjustment of the screws 36, the conveyor belts 16 may be given any desired tension or may be allowed to slacken so that they

may be removed from the pulleys for repair or replacement. For operating the conveyor, a geared reduction motor 38 mounted on a bracket 40 on the column 15 is connected by a belt 42 to a driving pulley 44 secured to the shaft 24 which carries the driven conveyor pulleys 20.

The heating device 16 is supported above the conveyor 12 by vertical rods 46 carried by a cross member 48 of the base 14 in such a position that the heating surface indicated at 50 in Figs. 1 and 3 is spread out transversely of the direction of travel of the conveyor belts 16 to an extent sufficient to cover the longest sole to be treated. Thus, a sole S placed on the conveyor belts 16, as shown in Fig. 1, is carried past the heating surface 50 in a direction widthwise of the sole. The rods 46 are threaded at their lower ends to receive clamp nuts 52 and 54 thereby providing means for adjusting the heating device as a unit heightwise toward or away from the conveyor.

The heating surface 50 is made up of a series of heating units 56 each comprising resistance wire wound upon a porcelain tube 58. These tubes are supported on cross rods 60 bridging yokes 62 which are mounted at the lower ends of slides 64 squared at their upper portions. These slides are received in parallel guideways 66 formed in one vertical face of a transverse frame member 68 supported on the rods 46. To this end, the member 68 has a rib 70 extending rearwardly from its other vertical face and the frame member is carried on blocks 72 and attached thereto by screws 74 (Fig. 1) passing through the rib. The blocks 72 slide on the rods 46 and have collars 76 attached to the rods by set screws 78 to determine the heightwise position of the blocks. Crossing the guideways 66 is a cover plate 80 held on the member 68 by screws 82. It will be understood that by varying the positions of the individual slides 64 in the guideways 66, the contour of the heating surface may be adjusted to correspond with the longitudinal contour of a sole to be treated. If a sole has been conformed, it may have a contour such as a sole S' in Fig. 3.

Adjustment of the positions of the heating units to form a curved heating surface having the longitudinal contour of any particular conformed sole is effected by a template 84 having a working surface 86 (Fig. 1) received in a slideway 88 cut in the cover plate 80 (Fig. 5). This template is constructed and arranged to engage cam rolls 90 rotatable on studs 92 at the upper ends of the slides 64 and has a handle 94. Thus, when the template is introduced into the slideway, it engages the cam rolls 90 and moves the individual heating units 56 toward or away from the conveyor to such positions that the heating surface takes the desired contour such as that shown in Fig. 3 and thereafter holds the heating units in their adjusted positions, none of the heating units being in contact with the work.

In the illustrated machine, 110-volt heating units are supplied from a 220-volt source, the units being connected in groups of two each, the units in each of said groups being connected in series and the groups being connected in parallel. Current enters the circuit through the switch 96 and is carried to a bus 98 secured upon an insulating strip 100 on the frame member 68. A lead 102 of flexible wire having porcelain bead insulation carries the current to a connection 104 at one end of a heating unit 56. A jumper lead 106 secured to a connection 108 at the other end of the heating unit carries the current to the adjacent heating unit and a lead 110 at the other end of this adjacent heating unit carries the current to the return bus 112 which is also secured on an insulating strip 114 on the frame member 68 and is connected to the other side of the switch 96. This wiring arrangement is repeated for the other groups of heating units 56. It will be obvious to those skilled in the art that any other suitable circuit connections may be used for supplying current to the aforementioned heating units.

Inasmuch as a large amount of heat is generated by the heating units 56, it has been found desirable to provide covers 116 to protect the operator.

In the operation of this machine, the operator chooses a template 84 the working surface 86 of which has a shape bearing a definite relation to the contour of the sole S' to be treated and by means of the handle 94 introduces said template into the slideway 88 thereby to adjust the contour of the heating surface to correspond to that of the sole, as has been described above. He then places the pre-cemented sole on the conveyor belts 16, as shown in Fig. 1, and sets the conveyor motor 38 in operation. The sole is carried widthwise past the heating surface 50 and is delivered to the operator at the other end of the conveyor 12 with the cement uniformly activated. As herein illustrated, the speed of the conveyor drive is so adjusted that freshly activated soles will be delivered to the operator at definite intervals as required for the subsequent sole attaching operation. It will be understood that this machine may be used to activate pre-cemented soles of any longitudinal contour through the use of a suitably shaped template. In the illustrated machine, the lengths of the slides 64 have been so determined that a straight template will position the heating units to form a heating surface corresponding in shape to the longitudinal contour of a fully conformed sole. Thus, little motion of the slides 64 will be required to adjust the contour of the heating surface to correspond to that of most conformed soles and the maximum movement will be required only to adjust the heating surface for work on a flat sole. The purpose of this arrangement of parts is to reduce the motion of the heating units necessary in the ordinary use of the machine and thus to reduce the possibility of the various electrical leads becoming tangled and damaged.

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

1. In a machine for treating soles with heat, a work support and a heating device having a substantially continuous heating surface of adjustable contour, said heating device comprising a frame member having parallel guideways, a plurality of heating units positioned adjacent to one another and slidably received in said individual guideways for adjustment toward and away from said work support, and means common to a plurality of said units for adjusting said units in said guideways to alter the contour of said heating surface.

2. In a machine for treating soles with heat, a heating device having a heating surface of adjustable contour, said heating surface comprising a plurality of heating units positioned adjacent to one another and supported by a frame member, said heating units being individually adjustable with respect to the frame member in substantially parallel directions, unitary means for substantially simultaneously

adjusting said heating units to change the contour of said heating surface, and means for carrying a sole past said heating device in a direction substantially perpendicular to that in which the aforementioned adjustment of said heating units is made.

3. In a machine for treating soles with heat, an elongated heating device having a heating surface the longitudinal contour of which is adjustable to correspond to that of a sole being treated, said heating surface comprising a plurality of units positioned adjacent to one another and individually adjustable in a direction heightwise of said device, means for substantially simultaneously adjusting the positions of all said heating units and means operating to carry a sole past said heating surface in a direction widthwise of the latter.

4. In a machine for treating an article with heat, a support for an article of irregular shape, a heating device comprising a plurality of heating units positioned adjacent to one another and individually guided for movement toward and away from said support, coacting means to hold said heating units out of contact with said article and substantially simultaneously to arrange them in positions such that the surface of the article is uniformly treated, and independent means for adjusting the heating device as a unit toward and away from said support.

5. In a machine for treating soles with heat, a work support, a frame, a plurality of parallel guideways arranged adjacent to each other in said frame, a plurality of slides received in said guideways for heightwise movement toward and away from the said work support, heating units secured to said slides and arranged adjacent to one another to form a heating surface having a predetermined contour, and unitary means for holding said slides individually at different positions in said guideways.

6. In a machine for treating soles with heat, a work support, a frame, a plurality of individual heating units arranged parallel to and closely adjacent to each other to form a substantially continuous heating surface, members slidably received in said frame for supporting said heating units above said work support, cam rolls mounted on the said slidable members, and unitary means acting on said cam rolls for moving said individual heating units relatively to each other in directions toward and away from the work support.

7. In a machine for treating soles with heat, a frame, a plurality of heating units arranged parallel to and closely adjacent to each other to form a substantially continuous heating surface, members slidably received in said frame for supporting said heating units, a template having a shape which bears a definite relation to the longitudinal contour of the sole to be treated, cam rolls mounted on parallel axes at the upper ends of said slidable members and constructed and arranged to engage said template for moving the heating unit heightwise of said frame, and means for carrying the sole past said heating surface in a direction normal to said template.

8. In a machine for treating soles with heat, a work support, a frame, a plurality of heating units arranged parallel to and closely adjacent to each other to form a substantially continuous heating surface, members slidably received in said frame for supporting said heating units above said work support, a slideway in said frame constructed and arranged to receive any one of a series of templates each of which has a shape bearing a definite relation to the longitudinal contour of a particular sole to be treated, and means mounted on said slidable members and constructed and arranged to engage said template for moving the heating units heightwise of said frame.

9. In a machine for treating soles with heat, a frame, a work support, a plurality of heating units arranged parallel to and closely adjacent to each other to form a substantially continuous heating surface, said heating units being slidably received in said frame, a template constructed and arranged to engage said heating units thereby to cause the contour of said heating surface to correspond to that of the sole to be treated, and means for carrying the sole past the heating surface.

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