To all whom it may concern:

Be it known that I, Arthur F. Pym, a resident of Lynn, in the county of Essex, in the State of Massachusetts, have invented certain improvements in Shoe-Shaping Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to shoe-making, and is illustrated as embodied in an apparatus for causing lasted shoes to conform to the contours of the lasts enclosed therein.

In the manufacture of shoes, certain operations, such as stitching, leave a more or less wrinkled surface on the leather, which must in some way be smoothed out to impart a finished appearance to the shoes. For example, after the turning and relasting of turned shoes, the shoe materials adjacent to the sole-attaching seam are often found to be wrinkled and irregular in appearance. It is also customary to rub them manually with a bone.

One object of this invention is the provision of an apparatus for smoothing such wrinkled surfaces of lasted shoes, as illustrated herein, the apparatus comprises means for smoothing the upper materials adjacent to the sole-attaching seam of turned shoes in the form of rubbing or smoothing members spring-pressed together so that when a relasted turned shoe is pushed between them, the upper-materials are progressively smoothed against the last.

A further object of this invention is the provision of an apparatus capable of heating the upper-materials as they are smoothed against the last, to "set" them in a smoothed condition. As illustrated, this object is attained by heating the rubbing or smoothing members.

When the sides of the shoe-upper are smoothed against a last by an apparatus of this character, the advantage of the operation may be more or less offset by an accompanying distortion of the shoe bottom unless provision is made to prevent such distortion. This possibility is especially to be avoided in working on single soled shoes such as turned shoes. A further feature of the invention, accordingly, is the provision of novel supporting means in engagement with the shoe bottom to prevent any such distortion. In the illustrated embodiment of the invention such means consists of a roll, which co-operates with side-engaging rubbing or smoothing members to prevent distortion of the sole, and springs which maintain the roll in engagement with the sole. By suitable adjustment of the strength of the springs, the roll may also be caused to exercise a greater or less leveling action on the sole.

Further features of the invention are to be found in the provision of means to effect relative adjustment of the various springs which maintain the smoothing and distortion-preventing devices in yielding engagement with a shoe, and in various combinations and specific constructions which will be apparent from the following description of the illustrative embodiment of the invention shown in the accompanying drawings, in which—

Fig. 1 is a perspective view of the apparatus in operation, certain parts being broken away the better to show interior construction; and

Fig. 2 is an enlarged detail perspective showing the co-operation of the supporting roll and one of the upper smoothing rolls in rubbing down the sole attaching seam of a turned shoe.

The apparatus in the form illustrated is supported on a base 10 from which rises a supporting arm 12. Supported on either side of the arm 12 are sleeves 14 and supported at the upper end are sleeves 16. The bottom engaging supporting roll 20 is carried on a suitable shaft 22 journaled in the outer ends of arms 24 rigidly connected by cross-braces 26. The inner ends of the arms 24 are in the form of bearings 28 turning in suitable recesses in the sleeves 14 and secured to a rotatable spindle 30, by setscrews 34.

As shown at the left side of Fig. 1 each end of the spindle 30 carrying the bearings 28 is attached to a helical spring 32. The outer end of each of the sleeves 14 is split and may be contracted by adjusting a clamping screw 35. Mounted to turn in the end of each of
the split sleeves 14 is a headed tension adjusting device 36, attached to the outer end of each spring 32. By loosening the clamping screws 35 and turning the tension adjusting devices 36 the tension of the helical springs 32 may be increased or diminished as desired.

The side smoothing or rubbing devices are carried on the outer ends of arms 50 integral with or permanently attached to sleeves 52. These sleeves are secured to rods 64 journelled in the sleeves 16 carried by the supporting arm 12 and in sockets in the base 10, the arms 50 are constantly urged together by helical springs 56. The tension of the springs 56 may be adjusted as described for the springs 32 by means of clamping screws 58 and adjusting devices 60.

Rollers 62 are mounted for free rotation on the ends of the arms 50 and comprise upper cylindrical portions 64 to engage the sides of the shoe upper and flanges 66 adapted for insertion in the crease between the shoe upper and the sole. The form of rollers 62 shown in this illustrative embodiment of the invention is particularly adapted for smoothing the sole-attaching seams of turned shoes.

The rollers 62 are held in position by flanges or supports on the bottom of the hollow cylindrical bearings 68 which are screwed threaded into the ends of the arms 50 as shown in the broken-away portion of the left hand roll 62. Inside each of the bearings 68, and resting on an internal flange or support, is a suitable heating device 70 shown as an electrical heating unit to which current may be supplied through lead wires 72. In idle position the flanges 66 of the rolls 62 are maintained in engagement with one another by the tension of helical springs 56.

When the device is being used on turned shoes, a second last L carrying a relasted turned shoe S is presented with the end of the shoe in a position to be pushed between the heated, rolls 62, the sole in engagement with the supporting roll 25 and the flanges 66 riding in the crease between the sole and the upper of the shoe. The shoe is pushed manually forward between the rolls 62, and the materials adjacent to the sole attaching seam are progressively smoothed or rubbed into conformity with the contour of the last L by these rolls. As the wrinkled upper materials are rolled down in this manner, the heated rolls move from the toe rearwardly, and tend to stretch the toe of the upper lightly, and maintain it under tension against the toe of the last. The shoe materials are shrunk or "set" in this last-conforming position by the heat supplied by the units 70. The supporting roll 25 cooperates with lower flat end faces of the rolls 62 to prevent any distortion of the shoe bottom or sole due to the changes in the shape of the shoe upper and at the same time the roll 20 has a greater or less leveling effect depending on the tension of springs 32.

While one form of the invention has been described in detail it will be appreciated that considerable variation in the form and arrangement of parts is feasible and it is not intended that this detailed description shall in any way limit the scope of the invention.

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

1. In a shoe-shaping apparatus, members to engage the bottom of the sole and both sides of the upper of a relasted turned shoe, progressively to smooth the shoe materials into conformity with the enclosed last, and means to supply heat to set the materials as they are smoothed.

2. In a shoe-shaping apparatus, means operating simultaneously at opposite sides of a relasted turned shoe to iron and heat the materials adjacent to the rand crease thereof to conform them to the enclosed last progressively from the end of the shoe, electric means to supply the heat for the conforming operation, and means continuously in engagement with the bottom of the sole to urge it into conformity with the last.

3. In a shoe-shaping apparatus, shoe-engaging members to conform both sides of a shoe-upper to an enclosed last, mounted for relative progressive movement of the shoe and the said members in engagement therewith, a part simultaneously to engage the bottom of the sole, and means to heat the shoe-engaging members.

4. In a shoe-shaping machine, members progressively to act on the sides of the end portion of a lasted shoe to conform the shoe materials to the contour of the enclosed last, means to heat said members, and a roll spring-pressed against the bottom of a shoe being acted upon thereby, to prevent distortion of the shoe-bottom during the upper-shaping operation, and to urge the shoe-bottom into conformity with the contour of the last.

5. In a shoe-shaping machine, rolls spring-pressed together to engage the sides of a lasted shoe moving relatively to said rolls and between them, means to heat the rolls as they iron the shoe materials against the contour of the enclosed last, and a roll spring-pressed against the bottom of a shoe being acted upon by the shoe-engaging rolls, to prevent distortion of the shoe-bottom and shape it against the last.

6. In a shoe-shaping apparatus, a yieldingly-mounted part to engage and support the entire width of the bottom of a lasted shoe, a member to engage the upper, and arranged for relative movement of the shoe.
and the upper-engaging member, to smooth the upper into conformity with the last, and means progressively to supply heat to set the shoe-materials in last-conforming position as they are smoothed against the last.

7. In a shoe-shaping apparatus, an idle roll to engage the sole of a lasted shoe across its entire width, to urge it against the enclosed last, an ironing member progressively to smooth the upper against the last, and means to heat said member to set the upper materials in conformity with the contour of the last.

8. In a shoe-shaping apparatus, a supporting roll progressively to engage the entire bottom face of the sole of a re-lasted turned shoe, a recessed ironing roll progressively to engage the upper of the shoe while the latter is engaged by the supporting roll and an electric unit in the recess to heat the ironing roll.

9. In a shoe-shaping apparatus, in combination, a support, members mounted on the support for engaging the opposite sides of the upper of a re-lasted turned shoe in and adjacent to the rand crease to smooth the materials of the shoe while simultaneously maintaining them flattened about the toe of the last, and means for simultaneously engaging the outer face of the sole to conform the sole to the last.

10. In a shoe-shaping apparatus, members operating simultaneously at opposite sides of arelasted turned shoe fed between them in upright position to iron and heat the materials adjacent to the rand crease thereof to conform them to the enclosed last progressively from the end of the shoe, said members being constructed and arranged to enter the rand crease and to engage the projecting upper face of the sole to prevent distortion thereof as a result of said ironing action and a roller for engaging the bottom of the sole to assist in supporting the shoe.

11. In a shoe-shaping apparatus, members to engage both sides of the upper and a member to engage the bottom of a lasted shoe progressively to iron the shoe materials against the enclosed last, springs to maintain each of said upper engaging members in yielding engagement with the shoe materials; a spring to maintain the bottom engaging member in yielding engagement with the shoe bottom, means to vary the tension of the last named means for varying the tension of the spring for said bottom engaging member.

12. In a shoe-shaping apparatus, shoe-engaging means progressively to conform to an enclosed last both sides of the upper of a shoe adjacent the rand crease, and a part acting simultaneously to engage the outer face of the sole.

13. In a shoe-shaping apparatus, shoe-engaging means to conform the sides of the upper of a lasted shoe to the contour of the enclosed last, and a roll spring-pressed into yielding engagement with the entire width of the bottom of the shoe being acted upon thereby, to prevent distortion of the shoe-bottom and urge it into conformity with the enclosed last.

14. In a shoe-shaping apparatus, shoe-engaging means to conform the sides of the upper of a lasted shoe to the contour of the enclosed last, a roll to engage the entire width of the bottom of the shoe being acted upon thereby, to prevent distortion of the shoe bottom and urge it into conformity with the enclosed last, a spring to urge said roll yieldingly into engagement with the shoe bottom, and means to vary the tension of the sprin.

15. In a shoe-shaping apparatus, idly mounted rolls spring-pressed together, to engage the vertical sides of the upper of a lasted shoe moving therebetween and relatively thereto, said rolls having peripheral flanges arranged to enter the rand crease progressively to conform the shoe-materials to the contour of the enclosed last, and a part simultaneously engaging the bottom of the sole to assist in supporting the weight of the shoe.

16. In a shoe-shaping apparatus, members to engage both sides of the upper and a member to engage the bottom of a lasted shoe progressively to iron the shoe materials against the enclosed last, springs to maintain each of said upper engaging members in yielding engagement with the shoe materials, a spring to maintain the bottom engaging member in yielding engagement with the shoe bottom, and means for varying the tension of said springs.

17. In a shoe-shaping apparatus, rolls spring-pressed together to engage the sides of a lasted shoe moving relatively to the rolls and between them, to conform the shoe materials to the contour of the enclosed last, and a roll spring-pressed against the bottom of a shoe being acted upon thereby, to prevent distortion of the shoe-bottom and urge it into conformity with the last.

18. In a shoe-shaping apparatus, a support, a pair of arms pivotally mounted upon the support for horizontal swinging movements toward and from one another, bearings depending from the free extremities of said arms, and rollers mounted on said bearings having flanged lower ends shaped to enter the rand crease of a lasted turned shoe fed between the rollers in an upright position for acting progressively upon opposite vertical sides of the shoe upper to conform the upper materials to the last.

19. In a shoe-shaping apparatus, a support, a pair of arms pivotally mounted upon
the support for horizontal swinging movements toward and from one another, springs arranged to urge the arms toward one another, bearings depending from the free extremities of said arms, and rollers mounted on said bearings having flanged lower ends shaped to enter the rand crease of a relasted turn shoe fed between the rollers in an upright position for acting progressively upon opposite vertical sides of the shoe upper to conform the upper materials to the last.

20. In a shoe-shaping apparatus, a support, a pair of arms pivotally mounted upon the support for horizontal swinging movements toward and from one another, hollow bearings depending from the free extremities of said arms, rollers mounted on said bearings having flanged lower extremities shaped to enter the rand crease at opposite sides of a relasted turn shoe fed between the rollers in upright position for acting progressively upon the shoe upper to conform it to the last, and heating units fitted within the hollow bearings for heating said rollers.

21. In a shoe-shaping apparatus, a supporting member, a hollow vertical cylindrical bearing on said member, having supports inside and outside on its lower end, extending in a direction substantially perpendicular to the cylindrical portion, a shoe-shaping roll rotatable on said bearing and resting on the outer support, and a heating unit within said bearing and resting on the inner support.

22. In a shoe-shaping apparatus, in combination, a support for the sole of a relasted turned shoe throughout the entire width of the sole, and a member constructed and arranged to engage the upper adjacent to the rand crease to smooth the materials of the shoe and simultaneously to cooperate with said support to prevent distortion of the sole resulting from said smoothing action.

23. In a shoe-shaping apparatus, in combination, a support for the sole of a relasted turned shoe, and members operating simultaneously at both sides of the upper of a shoe fed between them in upright position progressively to iron and heat the upper material adjacent to the rand crease to conform it to the enclosed last progressively from the end of the shoe, said members being constructed and arranged to cooperate with said support to hold the margin at both sides of the sole in the plane of intermediate position of the sole.

24. In a shoe-shaping apparatus, a smooth supporting roll to engage the bottom of a relasted shoe to prevent distortion, arms carrying said roll, a fixed bearing about which said arms are mounted to rock to urge the roll against a shoe bottom, springs to rock said arms for maintaining the roll in engagement with the shoe bottom, and means to vary the tension of the springs.

25. In a shoe-shaping apparatus, a smooth supporting roll to engage the bottom of the sole of a relasted turned shoe progressively to force the sole against the enclosed last, and means simultaneously to heat the upper materials of the shoe to shrink them into conformity with the last, said last-named means co-operating with said roll to prevent distortion of the sole.

26. In a shoe-shaping apparatus, a cylindrical roll movable relatively to the sole of a relasted turned shoe and in engagement with the sole across the entire width of the sole and means progressively to heat the upper of the shoe during the relative movement of the roll and shoe, said roll and said heating means operating to shape the materials of the shoe to the contour of the enclosed last and also cooperating with said roll in preventing distortion of the marginal portions of the sole.

27. A shoe-shaping device comprising, in combination, means movable in a fixed plane to shape the upper materials of a shoe adjacent to the rand crease, and a member mounted for movement in a direction substantially at right angles to said plane and constantly urged toward said plane yieldingly to engage the sole of a shoe operated on thereby.

28. A machine of the class described comprising, in combination, members movable in a fixed plane for engaging the opposite sides of the upper of a shoe, a support extending across the bottom of the shoe, and yielding means allowing movement of said support relatively to said members in the direction of the height of the shoe.

In testimony whereof I have signed my name to this specification.

ARTHUR F. PYM.