

J. N. BUSELL.
MACHINE FOR CONCAVING HEELS OF BOOTS AND SHOES.
APPLICATION FILED AUG. 8, 1906.

1,030,567.

Patented June 25, 1912.

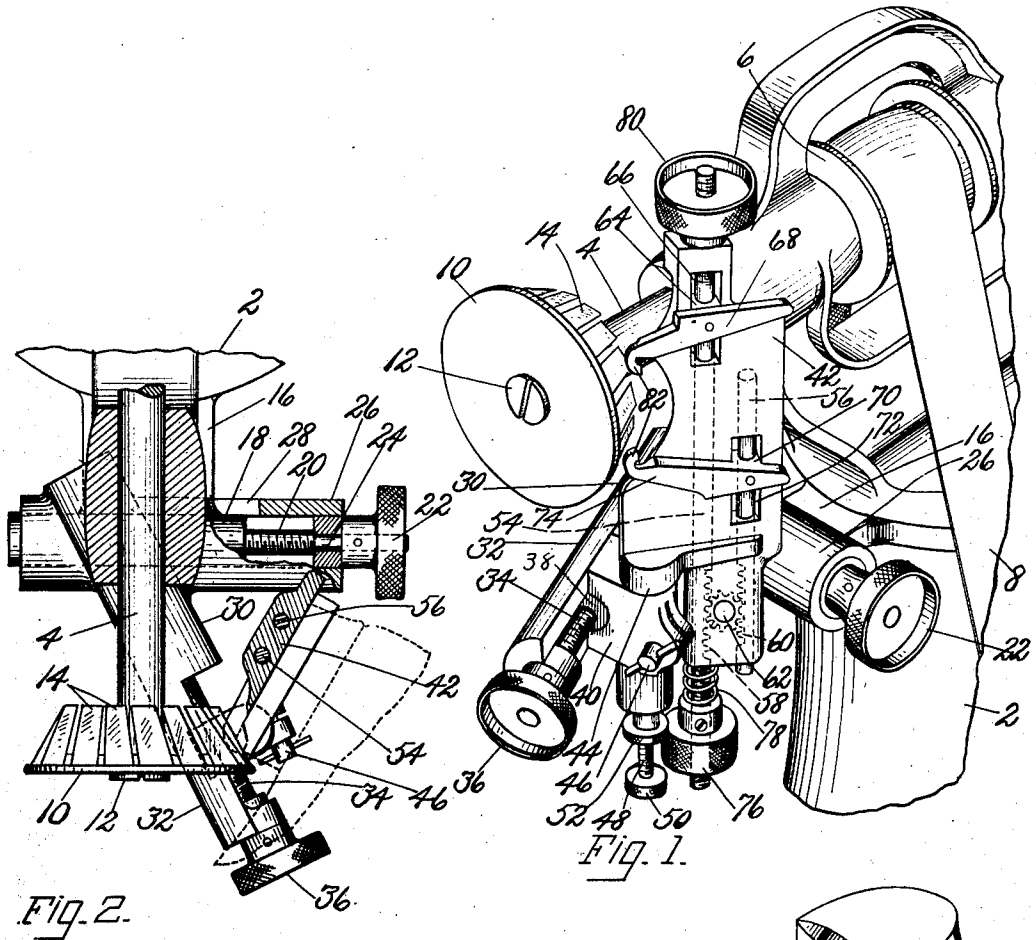


Fig. 2.

Fig. 1.

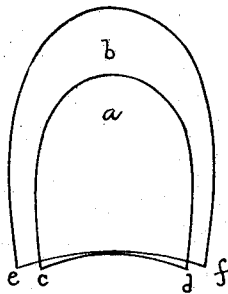


Fig. 4.

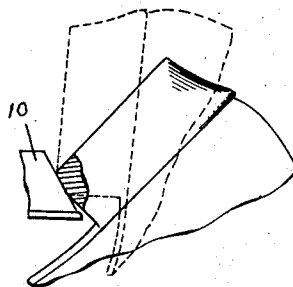


Fig. 5.

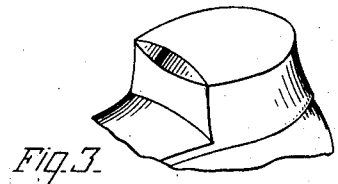


Fig. 3.

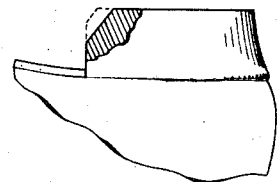


Fig. 6.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR CONCAVING HEELS OF BOOTS AND SHOES.

1,080,567.

Specification of Letters Patent.

Patented June 25, 1912.

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To all whom it may concern:

Be it known that I, JOHN N. BUSELL, a citizen of the United States, residing at Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Con-
caving Heels of Boots and Shoes, of which the following description, in connection with the accompanying drawings, is a spec-
ification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines for operating upon heels.

More particularly it relates to machines for producing a concave cut in the breast portion of heels.

It is a common practice in the manufacture of boots and shoes to provide a concave surface in the breast edge of a top lift for ornamental purposes after its attachment to a shoe. A machine embodying the present invention may be used for the purpose of forming such a concave surface.

As will be obvious from the following description the machine may be used, if desired, to operate upon heels before they are attached to shoes. It will be also understood that the invention is not limited to the production of a concavity in the outer lift of a heel, but may also be employed in other ways; for example, in forming a concavity in other parts of a heel, as in the edge of the heel in which the breast surface and the heel seat surface meet.

Some of the objects of the invention are to provide a machine by the use of which the concave or curved recess may be formed with exactness and to provide a machine by which the contour of the recess may be varied in several ways to be hereinafter more particularly described.

The machine herein illustrated comprises a rotary cutter in the form of a frustum of a cone having cutting blades which are thus disposed at an angle to the axis of rotation. A work-rest is supported in coöperative relation to said cutter, and gages are provided to guide the heel along the work-rest into position to be acted upon by the cutter to

produce the desired concave. The rotary cutter and the work-rest and gages are supported in such manner that by moving them relatively, the character of the concave may be readily varied.

In the preferred form of the invention, the work-rest and gages are rotatably mounted so that the angular position of the concave with respect to the breast of the heel may be varied. In intermediate position as regards rotation, the concave will appear equally in the bottom of the top-lift and breast portion. By turning the work-rest and gages in one direction the concave will be placed more in the bottom portion and less in the breast portion, while movement in the other direction will produce variation in reverse manner. The work-rest and gages are mounted in such manner that they may be moved toward and from the shaft of the cutter to vary the depth of the cut, and they are also mounted in such manner that they may be moved parallel to the cutting edge of the cutter which is adjacent to the work-rest to vary the length of cut. The machine is also provided with means to center the work with respect to the cutter.

In the preferred embodiment the gages converge toward each other as they extend toward the cutter, and are provided with stops on their ends adjacent to the cutter to limit the movement of the work. The gages are movable toward and from each other, and are connected together in such manner that they are moved away from each other in unison in opposition to a restraining force when the heel is moved between them toward the cutter. The restraining force increases as the gages gradually move apart, and therefore the clamping effect on the work is greatest at the time when the cutter is acting to complete the concave which is the place where the material to be removed is greatest. The gages are so arranged that each of them as it moves to successive positions is maintained parallel to its former positions, and means is provided for varying the amount of separation of the gages when no work is be-

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tween them. In this manner, the gages may be set so that heels of different width will come into contact with the inclined gages at the same place.

5 Referring to the drawings,—Figure 1 is a view in perspective of the machine with a portion of the machine frame broken away; Fig. 2 is a plan view, partially in section; Fig. 3 is a perspective of a heel after it has
10 been operated upon by the machine; Figs. 4, 5, and 6 are detail views to illustrate variations in the effect produced on heels by different adjustments of the machine.

The machine frame 2 supports a shaft 4
15 having a pulley 6 rotated by a belt 8 connected with any suitable source of power. A rotary cutter 10 is secured to the shaft by a screw 12 which permits said cutter to be
20 readily removed for sharpening or replacement by another cutter. The cutter is in the form of a frustum of a cone having the large diameter farthest from the machine, and the perimeter is made up of a series of cutting blades 14.

25 Secured to the machine frame by a neck portion 16 is a cylindrical portion 18 into which is threaded a screw-threaded rod 20 having a milled head 22 by means of which said rod may be screwed into or out of the
30 portion 18. The rod has a reduced portion 24 fitting the end of a sleeve 26 mounted slidably on the portion 18. Rotation of the milled head 22 produces longitudinal movement of said sleeve which has a slot 28 to
35 accommodate the neck 16.

Angularly connected to the sleeve 26 is a second sleeve 30 the end opposite the juncture having a portion cut away so as to leave a semi-cylindrical portion 32. Rotatably mounted in said sleeve but restrained from longitudinal movement therein is a screw-threaded rod 34 having a milled head 36. This rod is threaded through a screw-threaded portion 38 of a carrier 40 which
45 may be moved longitudinally of the sleeve by rotation of the milled head. A work-rest 42 has an offset portion 44 from which a stem extends into a vertical opening in the carrier, said carrier being provided with
50 a clamp 46 to hold the work-rest in adjusted position as regards rotation about the stem. In order to center the work with respect to the cutter, a screw-threaded rod 48 extends through the bottom of the carrier into engagement with the stem of the work-rest.
55 Said rod is provided with a milled head 50 and a lock-nut 52.

Two rods 54 and 56 are slidably held in the work-rest, and these rods are notched
60 to form racks 58 and 60 which engage a pinion 62 placed between them. To the rod 54 is secured a block 64 which is slidably held in a slot 66 in the work-rest and to this block is secured an upper gage 68. A simi-

lar block 70 is secured to the rod 56 and this
65 block is slidably held in a slot 72 in the work-rest. A lower gage 74 is secured to this block. The lower end of the rod 54 is screw-threaded and a thumb-nut 76 threaded thereon, a spring 78 being located be-
70 tween said nut and an extension on the lower end of the work-rest. The upper end of the rod 54 is also threaded and a thumb-nut 80 provided. It will be seen that the tendency of the spring is to draw the gages
75 together and that the thumb-nut 80 constitutes an adjustable stop to limit the extent to which the gages approach each other. It will be seen that by this manner of mounting the gages, each of them as it moves to
80 successive positions is maintained parallel to its former positions. The work-rest has a cut-away portion on the edge adjacent to the rotary cutter so that the latter will not strike the former. The gages are given an
85 inclination so that they converge in a direction extending toward the cutter, and the ends adjacent to the cutter are provided with stops 82 which limit the movement of the heel toward the cutter.
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It is desirable that the concave extend across the top-lift from one side to the other as shown in Fig. 3. For heels of different size such as indicated in Fig. 4 by *a* and *b*, it is evident that the length of cut will vary
95 as indicated by the lines *c-d* and *e-f*. By turning the milled head 36, the operator moves the work-rest in a direction parallel to the cutting edge of the cutter that is adjacent to the work-rest, since the sleeve 30
100 is parallel to this cutting edge. It will be evident that the length of cut will be increased as the work-rest is moved toward a position opposite the cutter where the circumference is greater. The same result
105 may be accomplished by removing the cutter 10 and replacing it by another one of a different size.

In Fig. 5, the heel is shown in full lines in a position to form the concave principally
110 in the breast portion of the top-lift, while in dotted line position, it is formed principally in the tread portion. Between these positions, the heel may be supported so that the concave will be formed equally in the breast
115 and tread portions. This result is accomplished by loosening the clamp 46 and rotating the work-rest into the desired position.

In Fig. 6, the concave is shown as having
120 different depths as indicated by the full line and the dotted line. By turning the milled head 22, the operator may move the work-rest toward or from the cutter to produce this result, the length of cut being main-
125 tained as desired by turning the milled head 36. It will be observed that by adjustment of the rod 48 the gages and work rest may

be adjusted in the direction of the width of the heel. This permits the work to be so adjusted with reference to the cutter that the concavity formed by the cutter may have the particular position desired with reference to the sides of the heel. It will be understood that this adjustment may be desirable where a change occurs in the contour of the top lift being operated upon. For example if top lifts are rights and lefts and are consequently of an unsymmetrical contour this adjustment is useful to insure that the concavity will have the same relation to the breast corners of the top lift in the two kinds of lifts.

The operation of the machine has been indicated in the detailed description above. The operator holds the boot or shoe with the tread portion of the heel against the work-rest, first placing the heel between the gages at the right where they are far enough apart to admit the same. He then moves the boot or shoe toward the left so that the heel causes the gages to separate gradually and equally in opposition to the restraining force exerted by the spring 78. The forward portion of the top-lift is thus brought into contact with the rotary cutter 10 which forms the concave as shown in Fig. 3.

While the machine has been described in detail in the above description, it is to be understood that various changes may be made in arrangement and in details without departing from the spirit 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. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and to permit movement of the heel breast foremost over said face toward the cutter, gages arranged to engage opposite sides of the heel and to guide the heel in a predetermined path toward the cutter, and means for holding the gages yieldingly in contact with the heel constructed to cause the movement of said gages to be equal and in opposite directions.

2. A machine for concaving the breast portions of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and to permit movement of the heel breast foremost over said face toward the cutter, gages converging toward the cutter arranged to engage opposite sides of the heel and to guide the heel in a predetermined path toward the cutter, and means for holding the gages yieldingly in contact with the heel constructed to maintain a predetermined angle between said gages.

3. A machine for concaving the breast

portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and to permit movement of the heel breast foremost over said face toward the cutter, gages arranged to engage opposite sides of the heel and to guide the heel in a predetermined path toward the cutter and constructed to be moved away from each other by the movement of the heel between them, and means for holding the gages yieldingly in contact with the heel constructed to cause the movement of said gages to be equal and in opposite directions.

4. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and to permit movement of said heel breast foremost over said face toward the cutter, gages arranged to engage opposite sides of the heel and to guide the heel in a predetermined path toward the cutter and constructed to be moved away from each other by the movement of the heel between them, and means for holding the gages yieldingly in contact with the heel arranged to impart an increasing pressure to said gages in the movement of the heel toward the cutter.

5. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and formed to permit movement of the heel breast foremost over said face toward the cutter, gages arranged to engage opposite sides of the heel and to guide the heel in a predetermined path over the work rest toward the cutter, means for holding the gages yieldingly in contact with the heel constructed to cause movement of said gages toward and from each other to be equal and in opposite directions, and means for varying the amount of separation of said gages before the insertion of the work between them.

6. In a machine of the class described, the combination with means for supporting a heel, of a rotary cutter arranged to produce at the breast edge of the heel a concave of a given length, and means for varying the angle of said concave while maintaining its length constant.

7. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter formed with a straight cutting edge, a work rest arranged to receive a heel against its face and mounted in an oblique relation to the edge of the cutter, gages for positioning a heel upon said work rest with its breast face in the path of the cutter, and means for varying the angular relation between the work rest and the cutter to secure a predetermined angle of bevel upon the edge of the heel.

8. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive a heel against its face and mounted in an oblique relation to the edge of the cutter, gages for positioning the heel upon said work rest with its breast face in the path of the cutter and constructed to limit movement of the heel toward the cutter, means for holding said gages yieldingly in engagement with the heel and means for adjusting said gages simultaneously toward and from the cutter in a direction transverse to the axis of the cutter to vary the depth of cut made by said cutter.

9. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter, a work rest arranged to receive against its face the heel to be acted upon and to permit movement of the heel over said face toward the cutter, gages arranged to engage opposite sides of the heel and to guide the heel in a predetermined path toward the cutter and constructed to be moved away from each other by the movement of the heel between them, means for holding the gages yieldingly in contact with the heel, and means for effecting relative adjustment of the cutter and the gages in the direction of the width of the heel.

10. In a machine for scalloping or concaving the breast edge of toplifts, the combination of a rotary cutter, a work slide carrying a heel plate, a work slide support, a bracket carrying said work slide support, and means for adjusting the bracket and work slide support toward and from the axis of the cutter.

11. In a machine for concaving top-lifts, the combination with a rotary cutter, of a work-rest, gages arranged to be moved away from each other by the movement of the work toward said cutter, rods carried by said work-rest and to which said gages are secured, a pinion between said rods in engagement with rack-portions thereon, a nut threaded on one end of one rod, a spring between said nut and the work-rest, and a nut threaded on the other end of said rod to adjust the relative position of said gages.

12. A machine for concaving the breast portion of a heel, having in combination, a frusto-conical rotary cutter, a work rest arranged to receive against its face the heel to be acted upon and mounted in an oblique relation to the edge of the cutter, gages for positioning the heel upon the work rest with its breast face in the path of the cutter, means for adjusting the work rest and the gages in a direction parallel to the cutting edge of the cutter to permit the concaving of the heel to be effected by portions of the cutter of different diameters, and means for varying the angular relation between the

work rest and the cutter to secure a predetermined angle of bevel upon the edge of the heel.

13. A machine for concaving the breast portion of a heel, having in combination, a frusto-conical rotary cutter, a guideway arranged in parallel relation to the cutting edge of the cutter, a work rest mounted for adjustment upon said guideway and arranged to receive against its face the heel to be acted upon and gages mounted upon said work rest for positioning the heel with its breast face in the path of the cutter.

14. A machine for concaving the breast edge of a heel having, in combination, a rotary cutter, a work rest formed to receive a heel against its face and to permit movement of the heel breast foremost over said face toward the cutter, gages arranged to engage opposite sides of the heel to guide the heel in a predetermined path over said rest and constructed to limit movement of the heel toward the cutter, means for adjusting said gages and rest in a direction parallel to the adjacent edge of the cutter, and means to adjust said gages and rest in a direction at an angle to said first-named direction.

15. A machine for concaving the breast portion of a heel, having in combination, a rotary cutter formed with a straight cutting edge, a work rest formed to receive a heel against its face and mounted in oblique relation to the edge of the cutter, gages for positioning a heel upon said work rest with its breast face in the path of the cutter and constructed to limit movement of the heel toward the cutter, and means for adjusting said work rest and gages toward or away from the edge of the cutter without changing the angle between said work rest and the edge of the cutter whereby the depth of cut made by said cutter may be varied without altering the angle of bevel.

16. A machine for concaving the breast portion of a heel, having in combination, a frusto-conical rotary cutter, a work rest arranged to receive against its face the heel to be acted upon and mounted in an oblique relation to the edge of the cutter, gages for positioning the heel upon the work rest with its breast face in the path of the cutter, and means for adjusting the work rest and the gages in a direction parallel to the cutting edge of the cutter without varying the angle between the work rest and the edge of the cutter whereby the concaving of the heel may be effected by portions of the cutter of different diameters without varying the angle of bevel produced by the cutter.

17. A machine for concaving the breast portion of a heel, having in combination, a cutter arranged to be continuously actuated, a work rest constructed to receive a heel

against its face and arranged to permit movement of the heel breast foremost into the path of the cutter, gages arranged to engage opposite sides of the heel to position the sides of the heel upon the work rest and to guide the heel in a predetermined path toward the cutter, and means for adjusting the gages simultaneously in a direction lateral of the heel whereby the position of the

cut produced by the cutter may be shifted 10 in the direction of the width of the heel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN N. BUSELL.

Witnesses:

MAMIE E. HUNT,

MARY J. CLARK.