

L. A. CASGRAIN.
INDENTING AND STITCH SEPARATING MACHINE.
APPLICATION FILED MAY 4, 1908.

1,047,382.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 1.

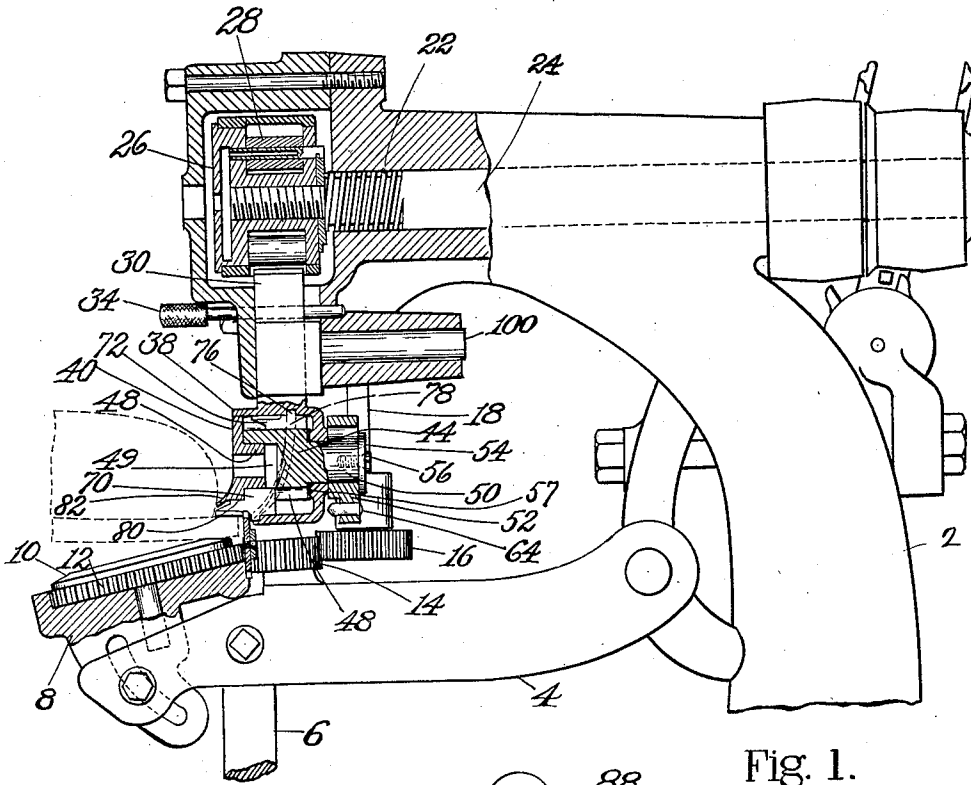


Fig. 1.

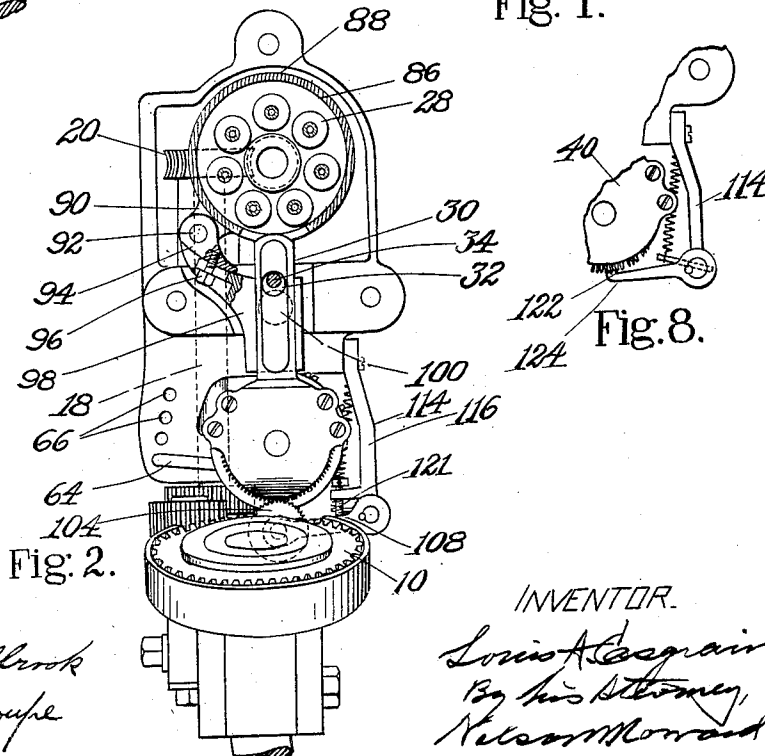


Fig. 2.

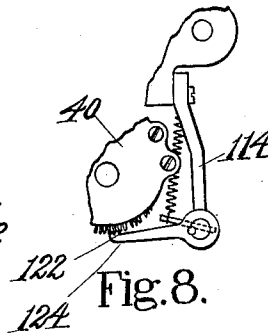


Fig. 8.

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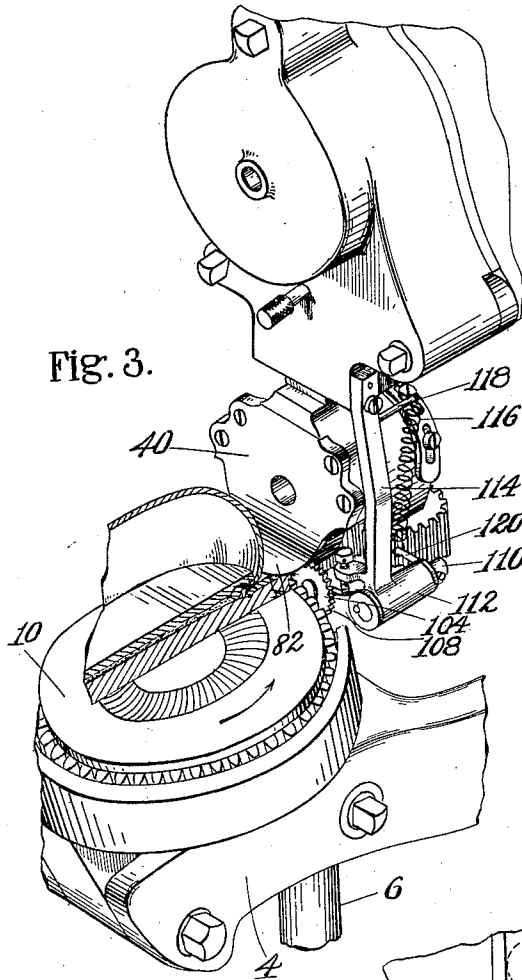


Fig. 3.

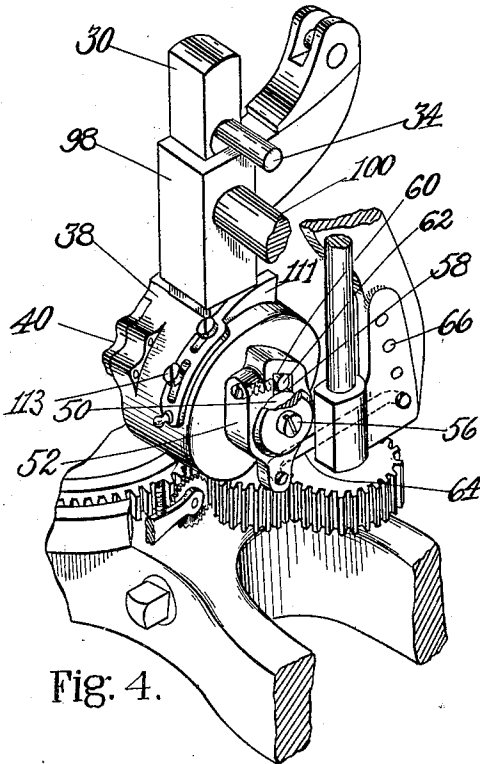


Fig. 4.

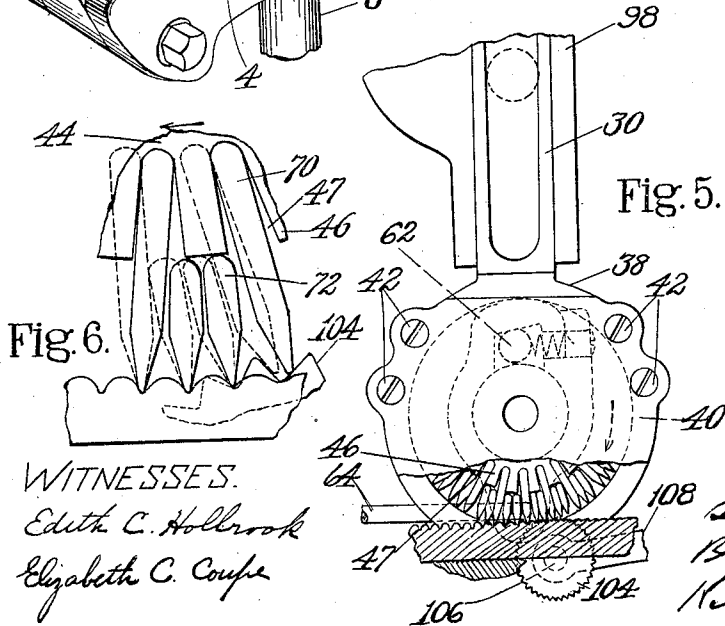


Fig. 5.

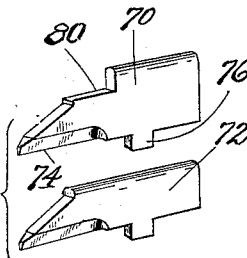


Fig. 6.

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UNITED STATES PATENT OFFICE.

LOUIS A. CASGRAIN, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

INDENTING AND STITCH-SEPARATING MACHINE.

1,047,382.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed May 4, 1908. Serial No. 430,851.

To all whom it may concern:

Be it known that I, LOUIS A. CASGRAIN, a citizen of the United States, residing at Beverly, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Indenting and Stitch-Separating Machines, 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 machines intended primarily for indenting the upper side of that portion of the welt or sole of a boot or shoe which projects beyond the upper and extends around the forepart. In the usual McKay shoe such indentations are formed in the outer or tap sole while in a Goodyear or McKay welt shoe they are formed in the welt. However, the welt may be considered as a part of the outer sole of a Goodyear or McKay welt shoe for the purpose of the present application, and therefore, to avoid unnecessary repetition, where the operation of indenting a sole is hereinafter referred to, it is to be understood as including also the indenting of a welt. For those McKay shoes which have no stitches in the projecting portion of the sole and for those Goodyear shoes in which the stitches are sunk in a channel in the upper side of the welt, the machine of the present invention may be used to form impression or imitation stitches, but the machine is capable also of "separating" stitches. It may be employed also in connection with a "wheeling" machine, which forms or partially forms impression stitches, either to complete the shaping of the indentations, formed by such a machine, or to burnish the walls of such indentations.

Inasmuch as the operation of indenting, above described, is commonly performed after the shoe is lasted and usually near the end of the series of operations involved in the manufacture of the shoe, it is particularly necessary to avoid injuring the upper by allowing the indenting tool or tools to contact therewith. There is considerable danger of so injuring the upper where it projects to a considerable extent over the portion of the sole to be indented. It is desirable, however, to have the indentations extend as nearly as possible to the upper.

While it is contemplated that a single tool might be employed, it is deemed preferable to provide a plurality of tools arranged in a rotary carrier approximately in a circle. With such a construction the proportions of the parts may be such that several of the tools shall be in engagement with the sole at the same time.

It is recognized as desirable in machines of this character to form each indentation by a plurality of actions of the indenting tool. It is also desirable to cause the indenting tool while under pressure and in engagement with the work to be moved relatively to the work either in the direction of feed or transversely thereto, longitudinally of an indentation, for the purpose of burnishing the indentation or for shaping its sides. The machine here described and illustrated as embodying the present invention in its preferred form is provided with means for obtaining these several movements.

While, in so far as certain features of the invention are concerned, the pressure exerted upon the work by the tool might be produced through springs or any other means for exerting a substantially uniform pressure, yet preferably, the tool is subjected to a rapid succession of blows or to a succession of percussional impulses of high frequency for the reason that an indentation formed in this way will be sharper and more uniform in shape, will be smoother and more highly burnished and will require less pressure for its production than if formed in some other known manner.

Accordingly, one feature of the present invention comprises the provision of an indenting tool movable in the direction of its length transversely of the sole of a shoe and means for delivering to said tool a rapid succession of blows in a direction approximately perpendicular to the sole.

Another feature of the invention comprises the provision in a machine, in which the indenting tool is movable not only toward and from the projecting margin of the sole but also movable in and out transversely of the sole, of a guard located adjacent to the acting end of the indenting tool to protect the upper, said guard having its lower portion projecting outwardly so that it may extend under an overhanging upper. Preferably, the guard engages the indenting

tool near its acting end and through the guard pressure is exerted upon the tool for indenting the work.

Obviously, in the use of a machine embodying these novel features of construction, the tool during the indenting operation may extend close to the upper without danger of injuring it. Moreover, the machine illustrated is provided with means for vibrating the tool or tools rapidly in the direction of the feed. Where the means above referred to for moving the tool in and out is provided, this vibration in the direction of feed is also accompanied by a slight vibration of the tool along the indentations.

It is the custom to form indentations between the stitches upon the upper side of the welt of a Goodyear shoe so as to make the stitches stand out more prominently and to give an ornamental appearance to this portion of the shoe. This operation is commonly known as stitch separating. In order that a machine may do satisfactory work as a stitch separator, provision must be made for the irregularities which always occur in the length of stitch, not only upon different shoes but also upon the same shoe.

The features of the invention already explained are applicable not only to a machine for acting upon a substantially plane surface to form indentations therein or for burnishing or finishing the shaping of uniformly spaced indentations already wholly or partially formed but also to a machine for acting upon indentations not uniformly spaced and particularly for separating stitches.

The machine illustrated in the accompanying drawings is especially adapted for separating stitches and, when the machine is to do this kind of work, it is preferably provided with a plurality of tools adapted to act upon successive stitches and, in order to provide for variations in length of stitch, the tools are supported so as to be capable of movement toward and from each other, thus facilitating the locating or finding of each stitch by one of the tools.

Where the machine is used only for forming indentations on a plane surface such capacity of the tools for independent movement is unnecessary but on the other hand, it is desirable when the machine is used for separating stitches not only to provide for an independent movement of the indenting tools but also to give to them the vibratory movement in the direction of feed above mentioned since this movement assists considerably in the finding or locating of the stitches. Preferably the tools are mounted loosely in a tool carrier constructed and arranged to be rotated by the work, as it is fed, to bring the tools in succession automatically into successive stitch intervals.

In order to provide for a wide variation

in the length of stitch, it may be advantageous to employ an auxiliary device for locating each tool approximately in correct position just before it enters a stitch interval. Accordingly, in the particular machine hereinafter described, such an auxiliary device is provided in the form of a toothed wheel or equivalent device which will hold a tool just entering a stitch interval at a distance, variable within certain limits, from the preceding and the following tools.

In addition to the features above specifically referred to, the invention comprises also certain other combinations, arrangements of parts and details of construction hereinafter described and claimed.

Referring to the accompanying drawings, Figure 1 is a view partly in side elevation and partly in section of the working parts and head of a machine embodying the invention in its preferred form, a portion of a shoe, the sole of which is to be indented, being indicated in dotted lines; Fig. 2 is a view in front elevation with some of the parts shown in section; Fig. 3 is a perspective view in which is shown in section a portion of a shoe being acted upon; Fig. 4 is a perspective view from the rear of the tool carrier and certain other parts adjacent thereto; Fig. 5 is a view in front elevation of the tool carrier, chiefly, with a part of its cover broken away; Fig. 6 is a detail view upon a large scale showing some of the indenting tools and their relation to work to be indented, one position of the tools being shown by full and one by dotted lines; Fig. 7 is a detail view of the indenting tools, and Fig. 8 is a view in front elevation showing a modified form of the device for assisting in positioning the tools.

In the accompanying drawings, the present invention is shown as embodied in a machine having many of the characteristic features of applicant's prior Patent No. 768,560, dated August 23, 1904. Thus the frames for supporting the working parts, the devices for delivering blows to the tool carrier, and the means for actuating the work support are or may be substantially like the corresponding parts shown in that patent. The work support itself, however, and the means for rotating it to feed the work, as shown, are substantially like the corresponding parts described in Canadian Patent No. 131,174, dated February 21, 1911, and German Patent No. 200,392, dated November 27, 1906. The specific form of these parts is not material to the present invention but they will be described briefly in order to make clear the operation of the entire machine.

The machine illustrated comprises a main frame 2 to which is pivoted an arm 4 con-

trolled in position vertically through a connecting rod 6 by mechanism substantially like that fully disclosed in the patent mentioned. At the forward end of this arm 4 is mounted an angularly adjustable block 8 in which is rotatably mounted the work support or table 10 provided at its periphery with a gear 12. The work support is rotated through gears 12, 14, 16, vertical shaft 18, worm wheel 20, and worm 22 upon main shaft 24 in substantially the same manner as in the application above referred to. Upon the front end of shaft 24 is carried a rotary hammer 26 provided with a series of blow-delivering rolls 28 arranged to act upon the upper end of the tool carrier 30 which is mounted so as to be capable of moving substantially vertically. The carrier is provided with an opening 32 to receive a supporting pin 34. As in the patent mentioned, when the tool carrier is permitted to descend to its lowest position, corresponding to that shown in Fig. 2, it is supported by pin 34 with its upper end out of the path of rotation of the rolls 28, but, when work is inserted in the machine, the tool carrier is raised so that the rolls will deliver to the carrier a rapid succession of blows during the rotation of shaft 24 at high speed. The lower end of the tool carrier 30 is formed with a boss or barrel 38 to the front face of which is secured a cover 40 by screws 42. Concentrically arranged within the barrel is a spider 44, the circumferential surface of which is provided with a series of ribs 46 alternating with grooves 47. The rear side of the cover is provided with a boss 48 which enters a cylindrical recess 49 in the forward end of the spider, serving as a journal and support therefor. Extending from the rear side of this spider is a stud 50 journaled in the rear end of the barrel 38. Surrounding stud 50 is a block 52 the rear side of which is substantially flush with the rear end of stud 50. A washer 54 and screw 56 serve to hold parts 38, 44 and 52 together with sufficient play to permit relative rotary movement, a spring washer 57 or other equivalent device being interposed between the rear side of the spider and the adjacent surface of barrel 38 to hold the spider frictionally against accidental rotation. The block 52 is provided with a recess 58 (Fig. 4) open toward stud 50 and having an inclined surface 60 forming with the circumference of stud 50 a tapering space within which is located a spring pressed roll 62, constituting a well known form of roll clutch. The lower end of block 52 is connected to the stationary frame of the machine by a rod 64 the outer intumed end of which may be placed in any one of a series of holes 66 in the frame, for a purpose to be described.

The indenting tools 70, 72 have their lower edges 74 of any suitable shape to form the

desired indentation in the work. As shown in Figs. 6 and 7, the tools 70 are wider than the tools 72 in the direction of their height and are seated at their inner edges in the inner ends of grooves 47 while the narrow tools 72 rest against the outer ends of ribs 46. If the machine is to be used only for imitating stitches or for acting upon a plane surface, the tools 70, 72 may be made integral with the spider 44 or they may be rigidly secured thereto. Moreover, since the indentations in such case should ordinarily be equally spaced, these tools even although they are given the in and out movement hereinbefore mentioned should preferably be arranged, as by fitting closely in the grooves 47, so as to have no movement with relation to each other in the line of feed. The machine as illustrated, however, is capable of separating stitches, the lengths of which vary within certain limits. Therefore, each of the tools 70, 72 is mounted in such a manner that it is capable of independent movement with reference to all of the other tools. As clearly indicated in Fig. 6, the grooves 47 are tapered so that their walls do not engage the sides of tools 70 but permit a limited movement of the tools in the line of feed. The tools 72 are likewise capable of independent movement. The shape and number of the tools and particularly the amount of play provided between the tools and ribs 46 will be determined according to the desired range of variation in the length of stitch. Each tool is provided with a lug or tail 76 fitting a guiding groove 78 formed in the inner circumference of the barrel 38. As shown in Fig. 1, this groove is of such shape that as the spider 44 is rotated either by the roll clutch 62 or by the rotation of work support 10 acting through the work and the tools upon the spider, as will be further explained, the tools will be moved in and out as they travel progressively along the groove. The lower portion of the groove inclines forwardly at a comparatively sharp pitch so that as the tools approach the work they are projected forwardly in order that the indentations to be formed upon the sole of the shoe may extend close to the upper. As each tool leaves the sole it will be drawn inwardly quickly so that it cannot strike the upper which may overhang the indented portion of the sole.

Each tool is provided near its forward end with a surface 80 which is engaged by a corresponding circumferential surface of the cover 40, as shown in Fig. 1, so that the blows imparted to the tool carrier are transmitted to the tools in engagement with the work both through the cover 40 and through the spider 44. As an additional protection for the upper, the lower side of the cover is preferably extended, as at 82, over the ends of the tools to serve as a guard. The ham-

mer head 26 is provided with a circumferential surface 86 slightly eccentric to the axis of shaft 24. Fitting this surface is an eccentric strap 88 provided with a lug 90 to which is pivoted at 92 a connecting member 94 adjustably secured by a screw 96 to a guide block 98 through which the tool carrier 30 is caused to reciprocate as already mentioned. The guide 98 is provided with a rearwardly extending stud 100 pivoted in the main frame and hence the rotation of the hammer head 26 acting through the eccentric strap 88 and the connections just described, effects a vibration of the tool carrier 30 about its axis thus causing the tools to vibrate in the line of the feed of the work. The extent of vibration may be varied, if desired, by adjustment of screw 96 along the slot in guide block 98, thus varying the distance from pivot stud 100 at which the definite motion imparted by the eccentric 86 is imparted to the guide block.

It may be desired to provide additional means for locating each tool approximately in proper position as it is about to enter a stitch interval. Two forms of locating device for this purpose are illustrated. As shown particularly in Figs. 5 and 6 a toothed wheel 104 with its teeth having a pitch equal approximately to the average length of stitch is mounted to rotate freely upon a stud 106 projecting from an arm 108 secured to the forward end of a short shaft 110 supported and capable of turning in a boss 112 at the lower end of an arm 114 rigidly secured to the frame of the machine. A light spring 116, connected at one end to a pin 118 projecting from arm 114 and at the other to a pin 120 secured to shaft 110, tends to maintain wheel 104 yieldingly in highest position which will be determined by an adjustable stop 121 or by the contact of the wheel with the edges 74 of tools 70, 72. Preferably this wheel will be so located that its stud 106 will be in a line passing through the axis of spider 44 and between the ends 74 of that tool which is about to enter a stitch interval and the preceding tool, the arrangement being such that just before a tool enters the interval it will enter one of the spaces of the toothed wheel, the adjacent teeth of which will project between the said tool and those lying next it and thus each tool will be positioned at approximately the length of a stitch from the preceding tool as it enters an interval. As shown in Fig. 8, instead of the wheel 104, teeth 122 may be provided at the end of an arm 124 corresponding to arm 108. Such a locating device will not always be required but it has been found useful in some classes of work to insure against any skipping of stitch intervals by the tool and it may be employed to obtain uniformity in the spac-

ing of the indentations in case such independently movable tools are used for making imitation stitches.

As shown in Fig. 4, an adjustable wedge 111 is interposed between the lower end of guide 98 and barrel 38, being secured to the barrel by screws 113. The adjustment of this wedge controls the extent to which the tool carrier may be raised and thereby determines the effect of the blows of the hammer by regulating the reciprocating movement of the tool carrier and tools.

The operation of the machine can be readily understood from the foregoing description but it will be briefly summarized as follows: The main shaft 24 may be continuously rotated, if desired. The shoe, the sole of which is to be indented, having been placed upon the work table 10, the latter is raised to bring the upper end of the tool carrier 30 into the path of the rolls 28 at which time the parts will have the positions indicated in Fig. 1. The rotation of table 10 in the direction of the arrow, Fig. 3, will cause a progressive feeding of the shoe, which will be guided, so far as is necessary, by the workman. The spider 44, carrying the tools 70, 72, will be actuated by the roll clutch 62 to rotate the tools, which are in engagement with the work, in the direction of the feed of the work at the time that the tool carrier is oscillated by eccentric 86 in the direction opposite to that in which the work is fed, but the rate of movement imparted to the ends of the tools in the direction of feed by the clutch is preferably slightly less than, and certainly not in excess of, the speed at which the work is fed by the rotation of the work table, for it is intended that the movement of the spider effected through the work will be greater at all times than that produced by the clutch. This clutch therefore is merely an auxiliary feeding device which in some cases may be omitted, since it is intended that the rate of rotation of the spider 44 and of the tools carried thereby shall be determined by the speed at which the work is fed. It will be noted that, to this end, the tools and spider are always free to rotate independent of the clutch in a right-handed direction as indicated by the arrows in Figs. 5 and 6.

The manner in which the tools will successively locate the stitch intervals will be explained by reference particularly to Fig. 6 in which the tool 70 at the right is represented as having just entered a stitch interval but has not yet reached the deepest part of the interval. It will be noted that, as the locating wheel 104 is rotated by the forward movement of the tools the play between the sides of a tool, and the sides of the teeth of the wheel 104, between which it is at the moment located, will increase according to

its distance from the line joining the axes of spider 44 and stud 106 so that the tools will not only be capable of moving independently in the spider, as above explained, but
 5 neither will the engagement of the teeth of wheel 104 with the preceding tools prevent the tool just entering a stitch interval from moving relatively to such other tools. Hence as the entering tool, shown at the right in
 10 Fig. 6, descends by reason of the continued rotation of the spider 44, its edge 74 will slide off the crown of the stitch into the deepest part of the space between the stitches. The amount of play between the
 15 tools and the teeth of wheel 104 may be regulated by adjusted stop 121. In this manner each tool will be located at the deepest part of the stitch interval as it approaches the vertical plane through the center of the
 20 spider 44. The back and forward movement of the tools in the line of feed, which is effected by the eccentric 86, facilitates the finding of the stitch interval by the tool, as above explained. As the tools approach the
 25 vertical plane through the center of the spider they will receive the full force of the blows imparted to the tool carrier 30 by the hammer 26. These blows are of such high frequency that each tool will receive a large
 30 number of percussional impulses while in engagement with an indentation. It is to be noted also that there is a rubbing action of the tool upon the stitch intervals both on account of the oscillation in the line of feed
 35 and also on account of the slight in and out movement caused by groove 78 while a tool is in engagement with a stitch interval. The oscillation of the tools in the line of feed and the change in their inclination while
 40 they are in engagement with the intervals results in a shaping or rounding of the crowns of the stitches.

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

1. In a machine of the class described, an indenting tool movable in the direction of its length transversely of the sole of a shoe and means for delivering a rapid succession
 50 of blows to said tool in a direction approximately perpendicular to the sole to cause the tool to indent the sole.

2. In a machine of the class described, a rotary carrier, a plurality of indenting tools
 55 rotatable with said carrier but also movable independently of each other in and out transversely of the sole of a shoe and means for delivering a rapid succession of blows to said tools in a direction approximately
 60 perpendicular to the shoe.

3. In a machine of the class described, a tool movable toward and from the projecting margin of the sole of a shoe for forming indentations therein and also movable in and
 65 out transversely of the sole, in combination

with a guard adjacent the acting end of the tool to protect the upper and having its lower portion projecting outwardly so that it may extend under an overhanging upper.

4. In a machine of the class described, a
 70 tool having a pointed end and movable to indent the projecting margin of the sole of a shoe and also movable in and out transversely of the sole in combination with a guard constructed and arranged to main-
 75 tain the upper of the shoe out of engagement with the tool, the guard having its lower portion projecting outwardly so that it may extend under an overhanging upper.

5. In a machine of the class described, a
 80 tool movable to indent the projecting margin of the sole of a shoe, and means engaging the tool near its forward end through which pressure is exerted upon the tool for indenting the sole.

6. In a machine of the class described, a rotary carrier, a tool projecting from the face of the carrier and an abutment engaging the tool near its projecting end through
 90 which pressure is exerted upon the tool for indenting the work.

7. In a machine of the class described, a tool carrier, a plurality of indenting tools loosely supported in the carrier and capable
 95 of movement toward and from each other, said carrier being constructed and arranged to be rotated by the work as it is fed to bring the tools in succession automatically into successive stitch intervals.

8. In a machine of the class described, a
 100 plurality of indenting tools and means for moving them to and fro in the line of feed approximately parallel to the surface of the work, said tools being capable of relative movement whereby they will automatically
 105 locate and enter the stitch intervals as the work is progressively presented to them.

9. In a machine of the class described, a rotary tool carrier, a plurality of indenting tools loosely supported in the carrier and
 110 means for delivering a rapid succession of blows to said tools to cause them to indent the work.

10. In a machine of the class described, a plurality of indenting tools, means for delivering a rapid succession of blows to said
 115 tools to cause them to indent the work, and means for vibrating said tools while in engagement with the work approximately in the plane of the work.

11. In a machine of the class described, a plurality of indenting tools constructed and arranged to vibrate approximately in the plane of the work both in the line of feed
 125 and transversely thereto.

12. In a machine of the class described, a plurality of indenting tools movable relatively to each other for locating stitch intervals, and means constructed and arranged to
 130 act upon each tool to place it approximately

in correct position as it is about to enter an interval.

13. In a machine of the class described, a rotary carrier, means for indenting the work
5 mounted in the carrier, work-feeding means continuously acting through the work to rotate said carrier, and an auxiliary intermittently-acting feeding and locking device for said carrier.

10 14. In a machine of the class described, a rotary slotted spider, a casing around the spider, a plurality of indenting tools between the spider and the casing, said tools being loosely connected with the spider but
15 movable with it, and means for exerting

pressure upon the tools for indenting the work.

15. A stitch separating device, comprising a slotted spider, a plurality of tools projecting beyond the periphery of the spider, some 20 of which are loosely carried in the slots of the spider, and means for maintaining the tools in proper relation to the spider.

In testimony whereof I have signed my name to this specification in the presence of 25 two subscribing witnesses.

LOUIS A. CASGRAIN.

Witnesses:

FREDERICK L. EDMANDS,
ANNA C. BRIER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
