

L. B. WHIPPLE.
WOOD HEEL TURNING MACHINE.
APPLICATION FILED AUG. 4, 1919.

1,412,910.

Patented Apr. 18, 1922.

5 SHEETS—SHEET 1.

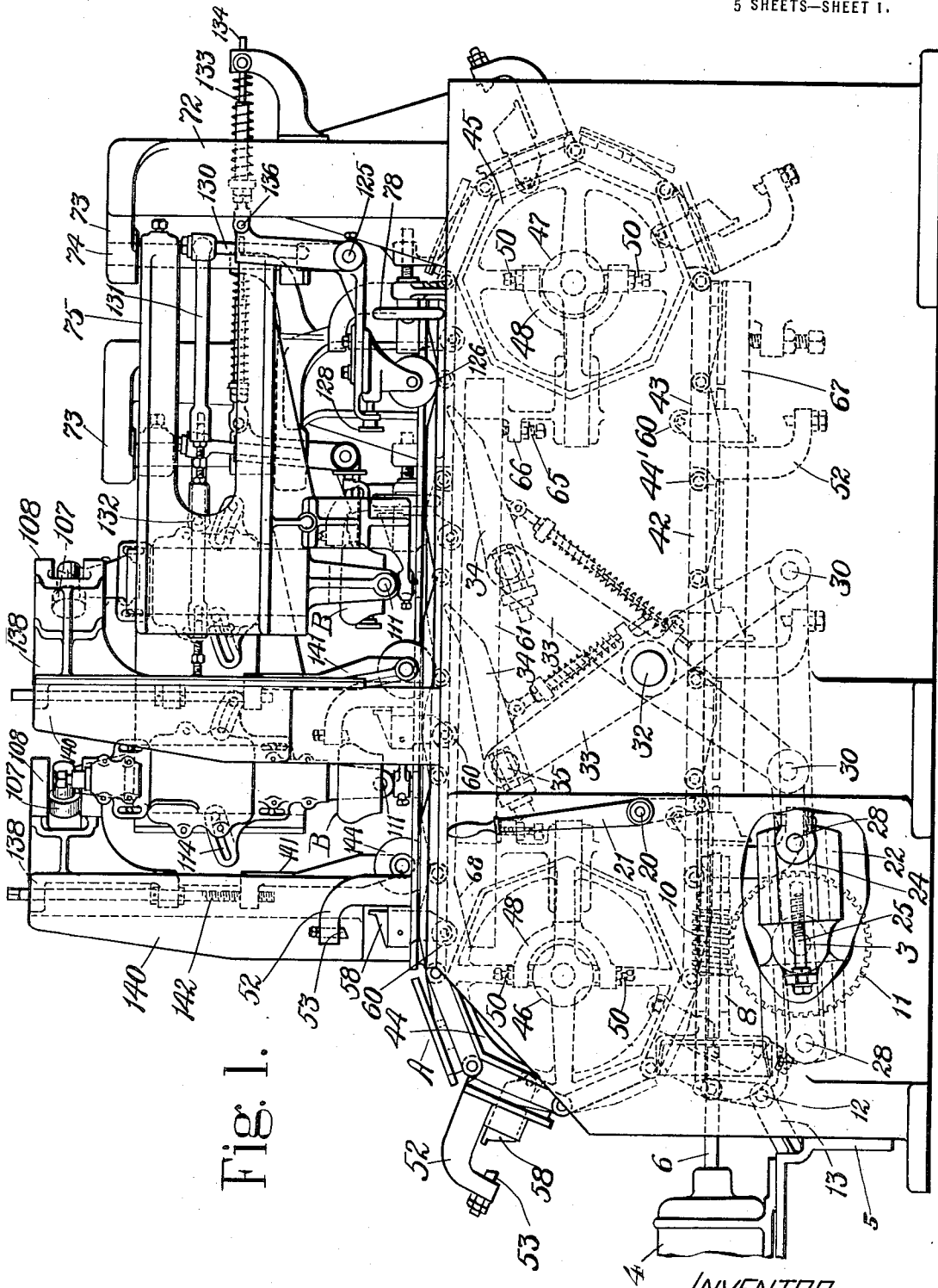


Fig. 1.

INVENTOR.
Leland B. Whipple
By his attorney,
Nelson M. Howard

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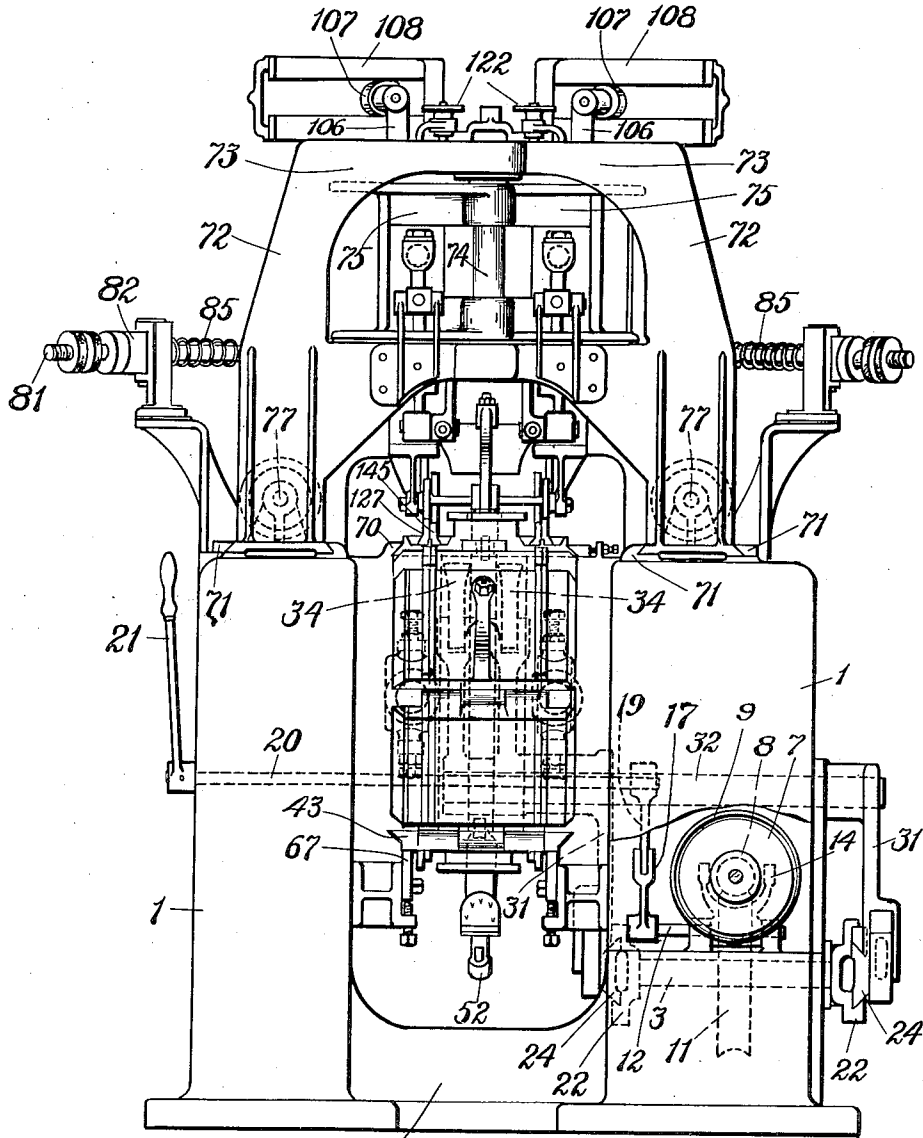


Fig. 2.

INVENTOR.
Leland B. Whipple
By his Attorney,
Melvin M. Howard

L. B. WHIPPLE.
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5 SHEETS—SHEET 3.

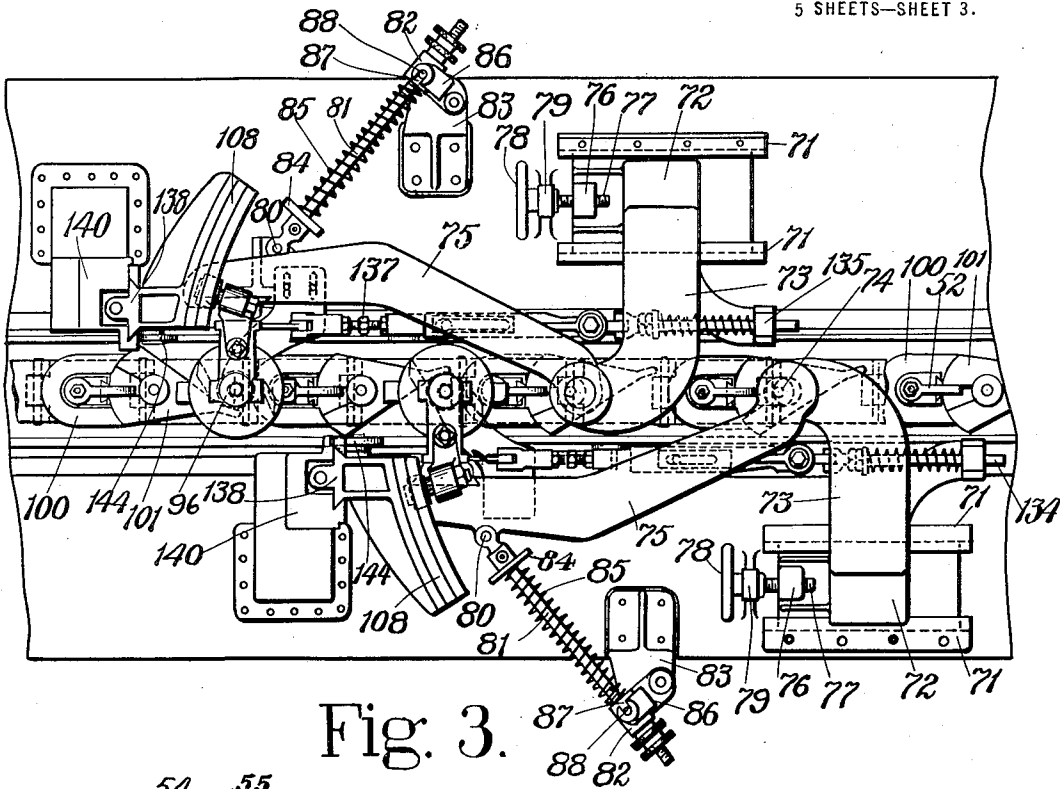


Fig. 3.

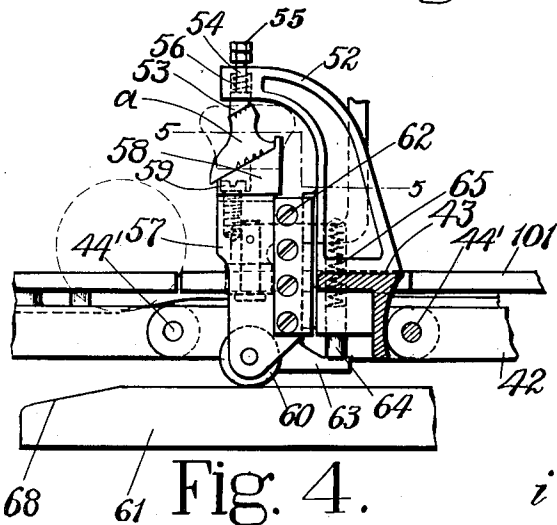


Fig. 4.

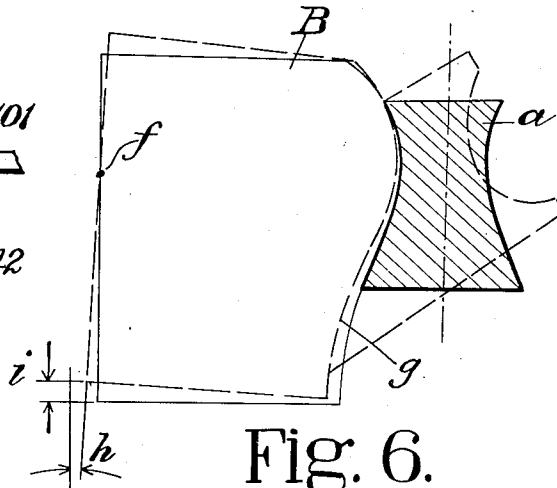


Fig. 6.

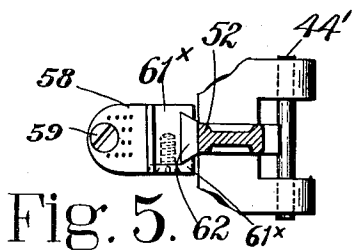


Fig. 5.

INVENTOR.

Leland B. Whipple
By his Attorney,
Nelson W. Howard

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Fig.9.

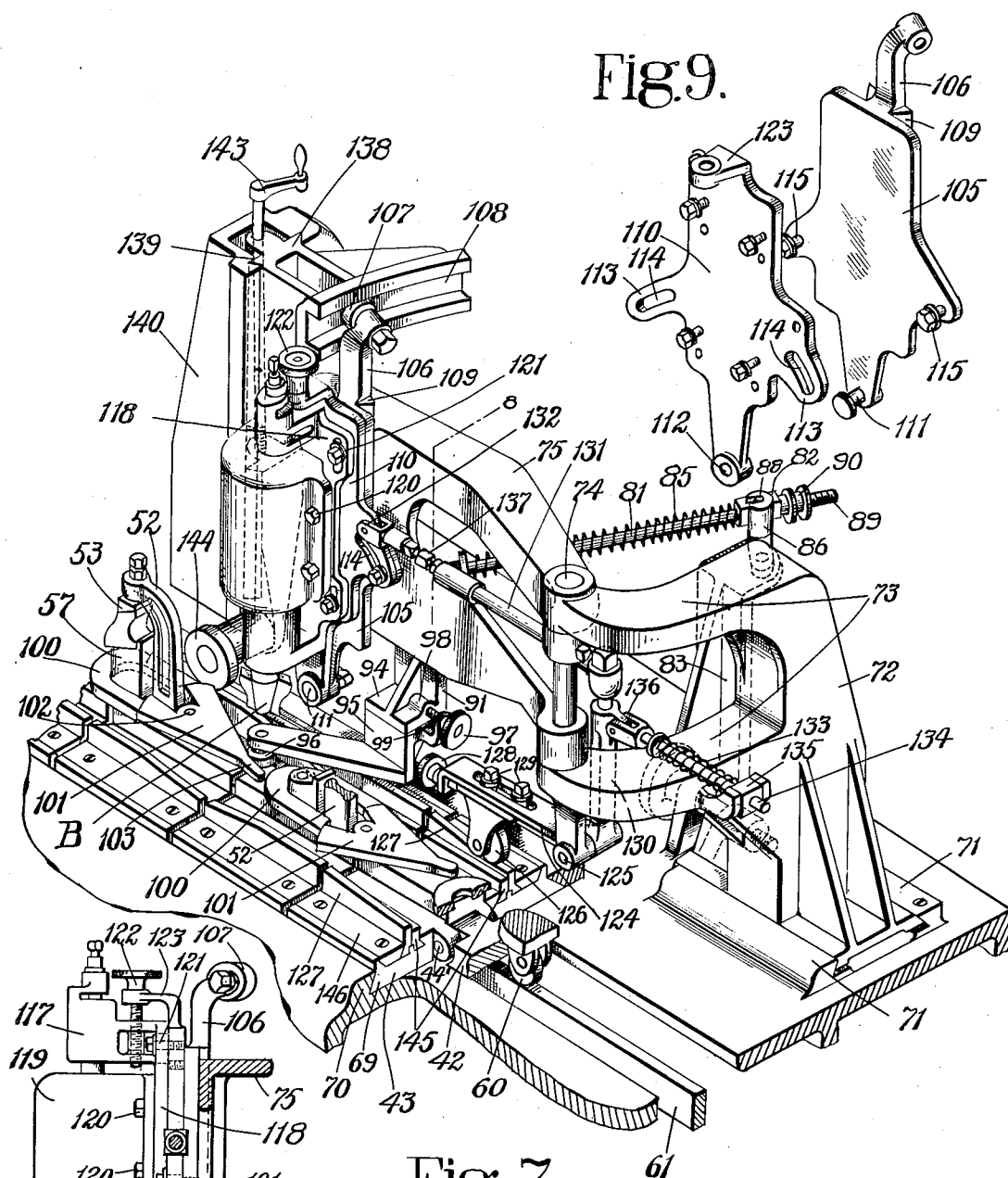


Fig. 7.

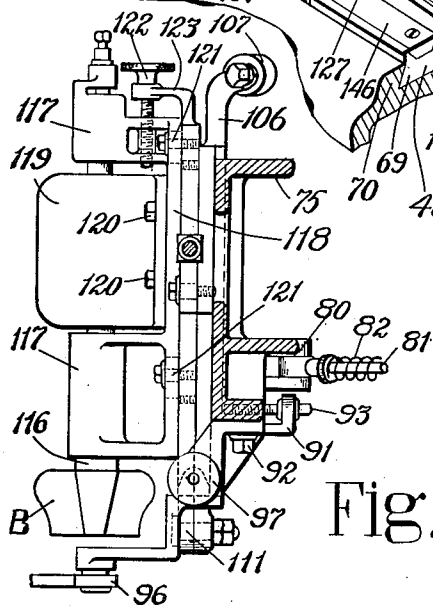


Fig. 8.

INVENTOR.

Second B. Whipple
By his Attorney,
Nelson W. Howard

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5 SHEETS—SHEET 5.

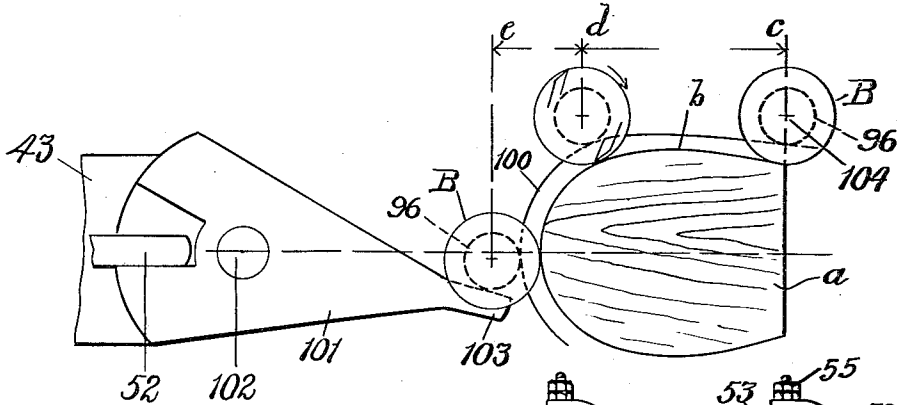


Fig. 11.

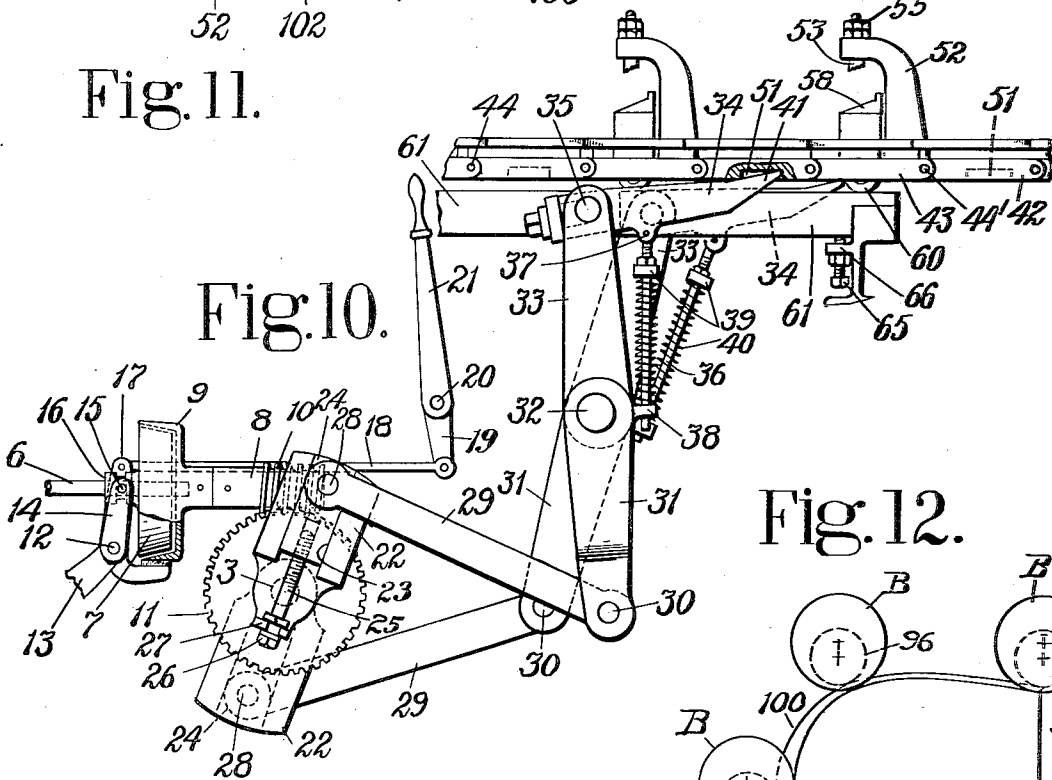


Fig. 10.

Fig. 12.

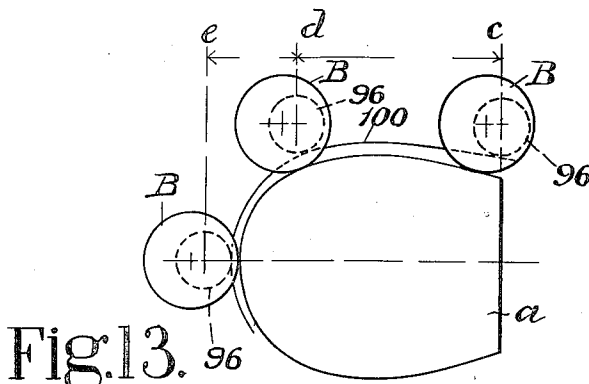
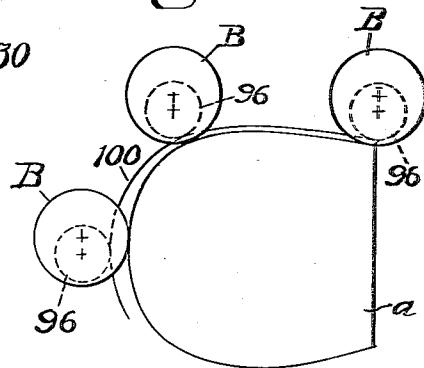


Fig. 13.

INVENTOR
Leland B. Whipple
By his Attorney
Nelson W. Howard

UNITED STATES PATENT OFFICE.

LELAND B. WHIPPLE, OF ROCHESTER, NEW YORK, ASSIGNOR TO FITZ-EMPIRE DOUBLE PIVOT LAST COMPANY, OF AUBURN, MAINE, A CORPORATION OF MAINE.

WOOD-HEEL-TURNING MACHINE.

1,412,910.

Specification of Letters Patent. Patented Apr. 18, 1922.

Application filed August 4, 1919. Serial No. 315,081.

To all whom it may concern:

Be it known that I, LELAND B. WHIPPLE, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Wood-Heel-Turning 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 for making heels for boots and shoes, and more particularly to machines for making wooden heels.

One of the difficulties inherent in making wooden heels from previously prepared heel blanks arises from the fact that the grain of the wood, which usually runs lengthwise or from the breast to the rear of the blank, does not permit cutting about the blank continuously from one breast corner to the other. Any attempt to cut against the grain of the wood is attended by unsatisfactory results due to the gouging or tearing effect of the cutter upon the wood fibres, consequently two operations are necessary, one in the direction of the grain of the wood on one side of the blank, and the other in the direction of the grain of the wood on the opposite side of the blank. Owing to the surface contour of the finished heels which extends along the sides and about the rear of the heels, it is expedient to cut the blanks from the breast corners on each side in the direction of the grain of the wood, to the medial line of the heel at the rear by means of cutters molded or formed to produce the desired surface. An important feature of the present invention, therefore, consists of a novel organization of heel blank carrier on which the heels blanks are mounted and rotary molded cutters mounted to act upon the heel blanks at opposite sides of the feeding path as they are presented by the carrier.

The cut or finished sides and rear surfaces of wooden heels may, in some instances, be conveniently formed by a simple traversing movement of molded cutters shaped to produce the desired contour, but heel styles vary. Some require a greater fullness or bulge towards and at the rear

of the heel leading to the heel seat, while others necessitate greater or less fullness toward the tread surface at the rear of the heels, while a difference in contour at the breast and at the rear is frequently demanded.

Another important feature of the invention, therefore, consists in mounting the molded cutters for tilting movement at each side of the feeding path of the heel blank carrier and automatically effecting a change in the angular position of the cutters as they act progressively along a blank. In some cases the tilting movement of the cutters may be sufficient, but a further feature of the invention consists in additionally supporting the cutters for movement heightwise of the heel blanks as they are tilted relatively thereto. Different parts of the cutters are thus brought into action at different parts of the heel, and a variation in shape is thus produced.

In carrying this feature of the invention into practical effect the tilting movement of the cutters in the present instance of the invention is produced about an axis passing transversely of the cutters, and means are provided for changing at will the relation of the cutters and tilting axes longitudinally of the cutters, thus adapting the cutter action to a variety of different heel styles.

Since the molding cutters are mounted to act upon the blank from opposite sides of the feeding path of the blanks, means are provided to move the cutters laterally about the rear of the blank. Unless the cuts made by the respective cutters accurately meet at the rear of the heel, a ridge or uncut portion would be left which must be subsequently removed. The cutters at opposite sides of the feeding path of the blanks are therefore mounted to act successively, and in this connection an important feature of the invention consists of means for directing the lateral inward movement of the cutters and permitting each to move successively to the centre line at the rear of the heel or slightly beyond this point as the heel blank being treated is moved in the direction of feed by the carrier.

When the cutters move laterally inward to finish the rear of a heel blank, they must be returned to outer or initial position to

commence the cut upon a succeeding heel blank at the breast corners of the blank, and an important feature of the invention in this respect consists of means for limiting the inward lateral movement of the cutters and acting as the blanks are fed to operating position, to move the cutters outward or to initial position.

While the cutters are operating upon the side portions they act in the direction of the grain of the wood and good results may be secured by traversing the blanks and cutters relatively at high speed, but as the cutters move inward about the rear of the heel should the same speed of relative traverse be maintained, the cutters would travel over a greater length of surface in a unit of time, than while working along the side of the heel. This would tend to produce unsatisfactory results, especially in view of the fact that as the cutters move inward at the rear of the heel they cut, to some extent, crosswise of the grain.

Another important feature of the invention, therefore, consists in relatively traversing the cutters and blanks at conveniently variable speed as the cutters move around the blanks to secure the most efficient cutting action.

A still further important feature of the invention consists in automatically tilting the cutters, and moving them in a vertical and horizontal direction as they operate upon a blank. These movements of the cutters are preferably secured by pattern means which, in the present instance, are movable with the heel blank carrier.

Economy of operation and increased output depend to a large extent upon the facility with which the heel blanks may be secured to the carrier and the finished heels discharged therefrom. The carrier in its broad sense may be variously contrived but a good practical form of carrier consists of a series of links flexibly connected together and carrying clamps for securing blanks thereto. A further feature of the present invention, therefore, consists of a carrier having blank holding clamps and means for automatically clamping a presented blank, moving it past the molding cutters, and automatically discharging the finished heel.

Various other features of the invention and novel combinations of parts will be hereinafter described in addition to those above referred to and in connection with the accompanying drawings which illustrate one good practical form of the invention, it being understood that in its true scope the invention may embrace various forms and modifications.

In the drawings:

Fig. 1 is a side elevation of a machine containing the present invention, some of

the parts being broken away to show elements beyond;

Fig. 2 is an end elevation;

Fig. 3 is a plan view, some of the parts at the ends of the machine being broken away;

Fig. 4 is an enlarged detail showing one of the heel blank clamps mounted on the carrier, some of the parts being broken away;

Fig. 5 is a section on line 5—5, Fig. 4;

Fig. 6 is an enlarged diagrammatic view showing in outline one of the cutters and a heel blank in the relative positions they may occupy as the cutter operates along the heel to the centre line at the back thereof;

Fig. 7 is a perspective view with some of the parts broken away showing one of the cutters and its associated features;

Fig. 8 is a section on the line 8, Fig. 7;

Fig. 9 is a view of parts relating to the cutter mounting and adjustments, the parts being shown in separated relation;

Fig. 10 is a detached detail showing one form of means for feeding the carrier at different speeds;

Fig. 11 is a diagrammatic view showing the cutter positions and relations with the heel as it operates along the heel to the rear thereof;

Figs. 12 and 13 are similar views showing some of the variations formed in the heel surface by relative adjustment of the cutter and its lateral controlling means.

The main frame of the machine may be of suitable construction for supporting the operating parts, and as shown, comprises the side members 1 suitably connected by the ties 2. Mounted in the machine frame is the shaft 3 which may be driven from any suitable source of power. In the present instance of the invention the shaft 3 is driven from a motor to which it may be connected or disconnected at will by means of a clutch. The motor 4 is supported upon a bracket 5 connected to the machine frame and the motor shaft 6 carries one member 7 of a clutch preferably splined to the motor shaft 6 for rotative movement therewith but permissive movement longitudinally thereon. Mounted in the machine frame in axial alignment with the motor shaft 6 is the shaft 8 carrying the other member 9 of the clutch and provided with a worm 10 which engages the worm wheel 11 mounted on the shaft 3, substantially as shown in Fig. 7.

Pivotaly mounted at 12, Fig. 10, upon a bracket 13 projecting from the machine frame, is the yoke 14, Figs. 2 and 10, carrying pins or rolls 15 which engage a circumferential groove in the hub portion 16 of the clutch member 7, the construction being such that upon rocking movement of the

yoke 14, the clutch member 7 may be moved into or out of operative engagement with the companion clutch member 9. The clutch device herein described is of the cone friction type which has some advantages over the more positive forms of clutches, but it is to be understood that any suitable clutch connection may be employed between the motor shaft 6 and the intermediate shaft 8.

Secured to the pivot shaft 12 which carries the yoke 14 is an arm 17, Figs. 2 and 10, to which is connected the rod 18. The other end of the rod 18 is jointed to an arm 19 secured to the shaft 20, Figs. 2 and 10, which preferably extends transversely of the machine frame and is provided at a convenient point with an operating handle 21, the construction being such that upon movement of the handle 21 by the machine attendant, the clutch members 7 and 9 may be engaged or disengaged at will.

The shaft 3 has secured thereto the two similar crank arms 22, Figs. 1 and 7, and as these crank arms are of similar construction, description of one will suffice for both. The crank arm 22 has a hub portion which serves to connect the crank arm with the shaft 3. Extending longitudinally of the crank arm is a guide-way 23 in which is mounted the slide 24, Fig. 10. The slide 24 is adjusted lengthwise the guide-way 23 by suitable means, such, for instance, as the adjusting screw 25, which, in the present instance, is shown as threaded into the slide 24 and has a collared head portion at 26 which engages at opposite sides of the slotted lug 27 projecting from the crank arm 22, the construction being such that upon manipulation of the adjusting screw 25, the slide 24 may be moved towards or from the axis of rotation of the shaft 3.

The crank arms 22, as indicated in Fig. 7, are preferably arranged 180° apart, that is, the slides 24 are supported diametrically at opposite sides of the shaft 3 for a purpose that will more fully appear.

Pivotaly connected to each of the slides 24 at 28 is a link 29, the opposite end of each of which is connected at 30, to arms 31, respectively, mounted to rock upon the supporting shaft 32. Each of the arms 31 has an opposite member 33 carrying a feed pawl 34 pivotally connected to its arm at the upper portion 35 and normally under the control of yielding means for causing the respective pawls to engage with the heel blank carrier, to be hereinafter described, and permit disengagement of the pawls therefrom. In the present instance, each of the pawls 34 is provided with a rod 36 pivotally connected to the pawl at 37 and extending loosely through a lug 38 carried by the pawl actuating member. Between the lug 38 and a collar 39 carried by the rod 36, is the spring 40, the construction being such

that the pawls 34 will normally have their engaging ends 41 yieldingly projected to engage and move or feed the heel blank carrier which, in Fig. 1, is designated as a whole at A.

The present invention contemplates that the wooden heel blanks to be treated shall be rigidly connected to a carrier or supporting means and that the molded cutters and the blanks shall be given a relative traverse movement past each other to enable the molded cutters to act from opposite sides of the path of relative traverse movement and upon opposite sides of the blanks.

In the present instance of the invention the carrier for the heel blanks comprises a series of links 42 and 43 pivotally connected at their end portions at 44' into a flexible endless chain construction. The carrier A thus formed of the flexibly connected members 42 and 43, passes about suitable rotary supporting members 44 and 45 mounted for rotative movement upon the machine frame substantially as indicated in Fig. 1. The rotary supporting members 44 and 45 have flat peripheral portions, as indicated in Fig. 1, for properly conforming to the links 42, 43, as the supporting members 44 and 45 rotate. The supporting members 44 and 45 may be appropriately carried in suitable bearings 46, 47, in the machine frame and in order that the carrier A passing about the supporting members 44 and 45 may be properly adjusted to conform the upper run of the carrier A to its proposed path of movement, the bearings 46, 47 may be adjustably mounted in the yokes 48, Fig. 1, and adjusting screws 50 may be provided for adjusting the bearings 46 and 47.

The pawls 34, heretofore described, constitute one convenient form of feeding means for the heel blank carrier A, and are adapted to engage with lugs or in recesses 51, best shown in Fig. 10, as the pawls successively move in their operating stroke. The recesses 51 are formed in the under surface of the link members of the carrier, and the feed pawls, under the action of the springs 40, are enabled to engage and disengage the recesses 51 to feed the carrier on the operating stroke of the pawls. Inasmuch as the feed pawls 34 are actuated from the crank arms 22 arranged 180° apart, as hereinbefore described, it follows that each of the feed pawls will give to the carrier A a relatively slow start and finish to its feeding movement, and a relatively high rate of travel between the start and finish. In other words, the carrier A is moved at varying speeds, the purpose of which will more fully hereinafter appear.

The heel blank carrier A has mounted thereon a series of clamps for securing the wooden heel blanks in fixed position relative to the carrier as it moves or feeds the

wooden heel blanks past the cutting stations. In the present instance of the invention alternate links of the carrier A, as, for instance, the links 43, have rising therefrom an arm 52, Figs. 4 and 7 and 10, the overhanging upper end portion of which is provided with a spring actuated clamping member 53 which may be provided with a suitable roughened or toothed engaging surface to securely hold one end of the blank. As indicated in Fig. 4, the clamping member 53 is mounted on a pin 54 having the adjustable head portion 55 preferably formed by adjustable nuts, and mounted in the recess of the overhang of the arm 52 and surrounding the pin 54, is a spring 56, the normal tendency of which is to depress or project the clamping member 53.

Mounted for sliding movement relative to the link 43 of the carrier is the lower clamping member 57 to the upper end portion of which is secured a clamping block 58 conveniently secured to the clamping member 57 by suitable means, such as the screw 59. The clamping member 57 extends through the link 43 and at its lower end portion has rotatively mounted thereon the roller 60 adapted to engage a trackway 61 mounted on the machine frame below the carrier. The clamping member 57 has guiding connection with the link 43 by means of the winged portions 61* on the clamping member 57 which embrace a guide 62 on the arm 52. The clamping member 57 is provided with a projection 63, Fig. 4, against which bears a plunger 64 normally under the influence of a spring 65 tending to project the plunger and, perforce, cause the clamping member 57 to be moved downwardly, in Fig. 4.

The trackway 61, as indicated in Fig. 1 of the drawings, is supported upon the machine frame below the path of the carrier in position to be engaged by the rolls 60 as the carrier is given its feeding movement, and in order that the trackway 61 may be properly positioned for effecting the clamping action desired between the clamping members 53 and 57, hereinbefore described, the trackway is adjustably supported at each end upon the machine frame, as indicated in Fig. 1. The adjustment of the trackway 61 may be variously effected, but in the present instance of the invention, an adjusting screw 65, Fig. 1, passes through a lug 66 carried by the machine frame and engages the trackway 61. Such adjusting device may be provided at desired intervals along the trackway, or at either end, as circumstances may dictate, the construction being such that the trackway may be properly adjusted to secure the desired clamping action of the heel blanks between the upper and lower clamping members.

It is sometimes desirable to support the

lower run of the carrier, as it passes in its idle position between the rotary supports 44 and 45, as indicated in Fig. 1. To this end a supporting bar or track 67 is adjustably secured to the machine frame below the track 61 and in position to be engaged by the side portions of the carrier A, as indicated in Fig. 2, as the carrier moves in its idle position between the rotating supporting members 44 and 45. The adjustability of the supports 67 may be secured by means similar to those described for the trackway 61, as indicated in Figs. 1 and 2.

In the present instance of the invention alternate links of the carriers A may be provided with clamps for rigidly securing wooden heel blanks thereto, but, of course, this feature of the invention may be variously modified and more or less of the links be provided with clamps. In any event, however, it is desirable that the clamps may be automatically actuated to clamp the wooden heel blanks as they are presented to the machine, and to automatically unclamp or discharge the finished heels. To this end, the trackway 61, hereinbefore described, is provided with an inclined end portion 68, Figs. 1 and 4, along which the rolls 60 carried by the clamping member 57 act as the carrier moves the clamps towards the cutting stations. As hereinbefore stated, the spring actuated plunger 64 normally tends to separate the clamps 53, 57, and, consequently, a heel blank may be presented between the clamps 53 and 57 prior to the engagement of the roll 60 of a clamp with the incline 68 of the trackway 61, and, as the roll thereafter moves upward along the incline 68, the blank *a*, Fig. 4, will be automatically clamped and rigidly held in position for the action of the cutters. After the heel has been finished by the operations to be hereinafter described, the heel clamps successively pass from the end of the trackway 61, thereby permitting the spring actuated plunger 64 to separate the clamping members 53, 57, and automatically discharge the finished heels.

When the blanks are placed between the clamp members 53, 57, they are held in an inclined position relative to the vertical, as indicated in Fig. 4, and in this position are rigidly supported by the carrier as the blanks are moved past the cutting station. Hereinafter the term "heightwise" will be employed to designate the dimension of the heel blank vertically between the clamping members 53, 57, it being understood, of course, that the true heightwise dimension of a heel is the distance between the tread and heel seat surfaces on a line perpendicular to each. The above term, however, will be employed in the broader sense, as hereinbefore noted, and constitutes a convenient designation of position or dimension with

respect to which the cutters are movable as will hereinafter more fully appear.

The heel blanks, when taken by the clamps, are subject to considerable clamping pressure which might, in some instances, tend to lift the carrier or link to which the clamp is connected. The present invention, therefore, contemplates that the carrier A may be prevented from responding to this action of the clamp by confining the carrier to its predetermined path of movement. In the present instance the links of the carrier are provided with outer dove-tailed portions 69, Fig. 7, which underlie overhanging portions 70 which may be formed as gibs or guideways on the machine frame. The construction described affords a convenient means for maintaining the carrier in its predetermined path of travel as the clamp members automatically act to secure a clamp to the carrier and hold it as it is moved past the cutting stations, but obviously this feature may be variously contrived.

The number of molded cutters employed may be varied to suit varying conditions, but in the present instance of the invention two rotary molded cutters are shown, each of similar construction and mounted for acting, one at each side of the path of movement of the blanks or carrier, to successively treat opposite side and rear portions of the blanks. Since the character, construction, mounting, and mode of operation of each of the cutters is the same, a description of one will be sufficient.

The machine frame has its top portion provided with guideways 71, Figs. 3 and 7, in which is adjustably mounted the upright 72 carrying laterally extending arms 73 in which is pivotally mounted at 74 the swinging arm 75, on which one of the molded cutters is mounted, as will hereinafter more fully appear.

In order that the upright 72 may be adjusted to position the cutter for proper relation with the blank to be cut as it is fed by the carrier, the base portion of the upright 72 is provided with a lug 76 which is engaged by a threaded adjusting bolt 77 and provided with an operating handle 78. The adjusting bolt has a collared portion at each side of a fixed lug 79 and is, therefore, held from longitudinal movement in the lug but may rotate with respect thereto, with the result that the upright 72 may be adjusted in the guideways 71.

The cutter B is connected to the swinging arm 75 in a manner to be hereinafter described, but for the present it is sufficient to note that the cutter B moves with the arm 75 as the latter turns about its pivotal mounting 74 and that the cutter is thus movable laterally with respect to the wooden heel blanks presented by the carrier as indicated in Figs. 3 and 7. Pivotaly connected to the

arm 75 at 80, Figs. 3 and 8, is a rod 81 which passes loosely through a collar or sleeve 82 supported by the bracket 83 rising from the top of the machine frame. Interposed between a collar 84 on the rod 81 and the sleeve 82 is a spring 85 normally acting to swing the arm 75 laterally inward toward the path of movement of the heel blanks mounted on the carrier. To afford proper swinging movement of the rod 81 as the arm 75 swings about its pivot 74, the sleeve 82 is connected to the bracket 83 by means of an arm 86, Figs. 3 and 7, having a slot 87 which is engaged by pins 88 extending from the sleeve 82, the construction being such as to permit the sleeve 82 to rock as required by the changing position of the rod 81. The end 89 of the rod 81 may be provided with screw threads and suitable adjusting sleeves 90 may be threaded thereto to limit the movement of the rod 81 through the sleeve responsive to the spring 85.

As the wooden heel blanks traverse relatively to the cutter B, the present invention contemplates that the cutter shall act along the side of the blank commencing at the breast corner towards the rear of the heel blank, and then move inwardly to or slightly beyond the median rear line of the heel. As the next blank in a series approaches the cutter, it is necessary that the latter should be restored to its outer or initial position in order to again commence its above described operation along the heel blank. A bracket 91, Figs. 7 and 8, is secured to the arm 75 by a bolt or other fastening means 92, Fig. 8, and is adjustable laterally of the arm 75 by means of the adjusting screw 93, the construction being such that by loosening the securing means 92, the bracket 91, Fig. 8, may be laterally adjusted and then clamped in adjusted position. The bracket 91 projects laterally at 94 and to such lateral projection of the bracket there is adjustably secured an arm 95, carrying a stud or roller 96 which, in connection with means to be described, serves to determine the lateral position of the cutter B. The arm 95 may be secured adjustably to the bracket 91 by suitable means such as the adjusting screw 97, Fig. 7, threaded to a lug 98 on the projection 94 of the bracket and mounted to turn in, but restrained from longitudinal movement with respect to, a lug 99 carried by the bracket 95, the construction being such that by manipulation of the adjusting screw 97 the position of the roller 96 may be changed relative to the cutter B.

A templet 100 is mounted on the carrier adjacent each of the heel blank clamps as indicated in Fig. 7, and along the templet the roll 96 travels as the carrier moves the templet and adjacent heel blank in its path of travel past the cutter. The trailing portion of the templet 100 is curved, as indicated

in Fig. 7, to permit the roller 96 to move laterally inward of the blank under the impulse of the spring 85 as the blank moves relatively to the cutter, the effect being to cause the cutter to act along the side of the blank from the breast corner towards the rear and then to move inwardly to or beyond the median line at the back of the blank.

To move the cutter outwardly again after completing its operation upon a blank, means are provided to act upon the roller 96 to move the arm 75 and the connected cutter into its outward or initial position. In the present instance of the invention such means comprise members 101, which, for identification, may be herein referred to as "switches," one being located adjacent each of the clamps on the carrier. Since these switches are of the same construction throughout and act in the same manner in the performance of their functions, a description of one will be sufficient. The switch 101, Fig. 7, is pivotally mounted at 102 upon the carrier and has a bifurcated trailing end portion embracing the arm 52 of the clamp to thereby limit swinging movement about its pivot. The switch 101 has a leading end portion 103 which extends forwardly adjacent the rounded end portion of the next preceding templet, the construction being such that as the roller 96 travels along the templet to its trailing end portion and moves inwardly to carry the cutter about the rear of the blank, it engages the end portion 103 of the succeeding switch which thereby acts as a stop to limit the lateral inward movement of the cutter, and thereafter the inclined edge portion of the switch, acting upon the roller 96 as the carrier traverses the blank relative to the cutter, causes the roller 96 to be moved laterally outward and, perforce, to similarly move the cutter into its initial outward position to commence its next cut upon the following blank at the breast corner thereof as the templet again takes charge of the lateral movement of the cutter.

As indicated in Fig. 11, it is desirable that the lateral movement of the cutter about the rear of the blank shall be sufficient to reach or pass slightly beyond the rear median line of the heel blank in order to insure the complete finish of the rear portion of the heel as the successive cutters act along and about the heel.

Heretofore reference has been made to the variation in the speed of travel of the carrier during the action of the cutters upon the heel blank, and suitable means to this end has also been described. This variation in speed, and the action of the cutter upon the heel as it travels along the side and about the rear thereof, is graphically represented in Fig. 11 wherein the relative traverse of the cutter and heel, as the cutter acts along

the side *b* of the heel, is relatively rapid between the points *c*, *d*, and relatively slow between the points *d* and *e* as the cutter moves about the rear of the heel crosswise of the grain. In other words, in a unit of time the cutter will move along the side *b* of the heel a distance *c*, *d*, whereas, while cutting around the rear portion of the heel crosswise of the grain, the cutter will move in the same unit of time the distance *e*, *d*, thereby insuring proper surface finish to both the side and rear portions of the heel.

In Fig. 11 the axis 104 about which the roller 96 and the cutter B rotate, are indicated as in alignment and such relation of the axes of the roller 96 and the cutter is desirable in some forms of heels. By the adjustment of the roller 96 to carry the axis thereof into different relations with the axis of the cutter, the same machine is adapted to treat heels of different sizes and forms. This is graphically illustrated in Figs. 12 and 13. In Fig. 12 the axis of the roller 96 is indicated as having been adjusted laterally inward relative to the axis of the cutter B, the effect being to enable the same cutter to produce heels wider at the breast and more flat at the rear portion as the roller 96 travels along the templet 100.

In Fig. 13 the axis of the roller 96 is indicated as having been adjusted forward of the axis of the cutter B so that as the roller 96 travels along the templet 100 in the manner hereinbefore described, the breast width of the heel may remain the same as when the axis of the roller 96 and the cutter B are in alignment, but as the cutter moves about the rear portion of the heel a greater fullness or rear extension of the heel is produced.

The present invention contemplates that the cutter B shall not only have the characteristic lateral movement hereinbefore described, but that it may be tilted and moved vertically as it passes along and about the heel, and one convenient form of means to these ends will now be described.

Mounted for sliding movement in the arm 75 is the cutter pivot carrying frame 105 provided with an upwardly extending arm 106 carrying a roller 107 adapted to move in a trackway 108 as the arm 75 is laterally moved. The sliding connection between the frame 105 and the arm 75 may be variously contrived, but as herein shown the frame 105 has the beveled flanges 109 which are received into corresponding guideways in the arm 75, the construction being such that the frame 105 will be properly guided as it moves relatively up or down in the arm 75.

A swinging frame 110 is pivotally connected to the frame 105, and one convenient form of pivotal connection consists of a pin 111 on the frame 105 which engages an opening 112 at the lower part of the swing-

ing frame 110, Fig. 9. The swinging frame 110 has the lateral projections 113 provided with slots 114 formed in the arc of a circle with the pivot as a center, and bolts 115 serve to guide the swinging frame 110 as it moves about its pivotal axis.

The cutter B is mounted on a shaft 116, Fig. 8, held in suitable bearings 117 carried by a frame 118. The shaft 116 of the cutter passes through a motor 119 which may be secured to the frame 118 by suitable means, such as the bolts 120. The motor 119 may be of the usual electric type serving to impart to the cutter shaft and cutter, rotary motion. The frame 118 is adjustably mounted on the swinging frame 110 by means of securing bolts 121, and may be adjusted vertically with respect thereto by means of an adjusting device which, in the present instance of the invention, comprises an adjusting screw 122, Fig. 8, mounted for rotary movement in an arm 123 and threaded into projections from the upper bearing 117 of the frame 118, the construction being such that by loosening the bolts 121, and manipulation of the adjusting screw 122, the cutter carrying frame 118 may be adjusted to move the cutter upward or downward relative to its pivotal axis. From the construction described, it will be apparent that the axis about which the cutter B tilts, passes transversely of the cutter and that the cutter may be vertically adjusted by hand to place the axis in different vertical relation thereto.

The means for automatically tilting the cutter about its axis as it operates upon a heel blank, may be variously contrived, but in the present instance of the invention comprises an arm 124, Fig. 7, pivotally mounted at 125 to a lug depending from one of the arms 73, Fig. 7. Adjustably connected to the arm 124 is a roller 126 which rides on cams 127 mounted on the heel blank carrier. The adjustable connection of the roller 126 with the arm 124 may be secured by suitable means, such as the adjusting screw 128 and the clamp screws 129, Fig. 7.

The arm 124 has secured thereto the upwardly extending arm 130, Fig. 7, connected at its upper end portion to a link 131 jointed to the swinging frame 110 at 132, the construction being such that as the roller 126 is moved by the passing cams or patterns 127 on the carrier, the swinging frame 110, and, perforce, the cutter and motor carried thereby, will be moved about the pivotal axis 111. The roller 126 may be maintained in operative relation with its cams or patterns 127 by suitable means which, in the present instance of the invention, consists of a spring 133, Fig. 7, encircling a rod 134 which passes through a swivel block 135 mounted on one of the arms 73, the other end of the rod 134 being pivotally connected to the arm 130 at

136, the construction being such that the spring 133 normally tends to depress the roller 126 into contact with its cooperating cams or patterns 127. The link 131 may be made adjustable in length by means of a reversible crew turn-buckle 137.

The trackway 108 in which the roller 107 travels, is mounted upon a slide 138, Figs. 1 and 7, guided by suitable dove-tailed bearings 139 formed in the uprights 140 rising from the machine frame.

The slide 138 is connected to a lower slide 141 by an adjusting screw 142 which may be appropriately turned by hand for relatively adjusting the slides 138 and 141 by means of a handle or crank arm 143.

The slide 141, which, as described, is vertically movable in the frame 140, is provided at its lower end with a roller 144, Figs. 1 and 7, which rides upon cams or patterns 145 mounted on the carrier A, the construction being such that as the carrier is moved to feed the blanks to the cutters, the roller 144 will ride upon the cams or patterns 145 and raise or lower the cutter through the connections described to vary its position heightwise of the blank being treated.

Inasmuch as the carrier A is formed of link members flexibly connected together, and carries the cams or pattern devices for controlling the tilting and vertical movement of the cutter, the cam or pattern devices 127, 145, are formed in sections corresponding to the link members which carry them and are preferably connected thereto detachably by means of cap plates 146, Fig. 7, the construction being such that the cams or patterns may be readily removed and replaced by others to change the tilting and vertical movements of the cutters as prescribed by the character of heels being made.

From the construction described it will be apparent that the axis about which the cutter tilts passes transversely of the cutter, and relative adjustment of the cutter and tilting axis by hand may locate the axis of tilt at different points relative to the length of the cutter or between the top and bottom of the cutter as occasion demands. In Fig. 6, the effect of tilting and moving the cutter heightwise of the blanks to be treated, is graphically represented. Fig. 6 shows two superposed views taken at right angles. The full line figure is taken with the line of sight parallel to the direction of feed; the dotted line figure is taken with the line of sight perpendicular to the direction of feed. In the dotted figure the point *f* is the projection of the axis of tilt through the angle *h, i*. (This is the axis 111); and in the full line figure the point *f* is a point of that axis which would extend across the paper parallel to the word "Inventor," if it were drawn in. Assuming that the axis about which the cutter tilts is at *f*, Fig. 6, 130

between the top and bottom of the cutter B, the cutter B will commence its cutting action upon the heel blank *a* at the breast corner as indicated by full lines in Fig. 6; and as the
 5 cutter progressively acts along the heel towards the rear median line thereof, it will be automatically tilted and moved heightwise of the blank under the dictate of the
 10 cams or patterns 145, 127, hereinbefore described, and will assume the dotted line position, Fig. 6, wherein the tilting movement of the cutter is represented by the
 15 arrows at *h* and the heightwise or lifting movement of the cutter is indicated by the arrows *i*, Fig. 6, the effect being, in the present assumed instance, to produce a fullness at the rear portion of the heel leading to the heel seat, as indicated by dotted lines at *g*, Fig. 6.

20 By shifting the axis of tilt relative to the cutter, the variation in heel shapes produced by the action of the cutters on the heel blank, may be indefinitely varied. Likewise, either by change of cams or pat-
 25 terns, or by adjustment of the roller 126, for effecting the tilting action of the cutter, its degree and time of tilting action may be indefinitely varied and the machine herein described as a good practical form of the
 30 present invention, be adapted for the formation of wooden heels of greatly varying styles and shapes.

It will be noticed that the cutter head is shown as of considerably greater vertical
 35 depth than the heel. This enables different portions of the cutter to be used at different parts of the heel periphery and permits the cutter, therefore, by virtue of the vertical shift, to combine different
 40 curves required in the peripheral surface at the breast and at the rear of the heel.

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

45 1. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding wooden heel blanks, rotary molded cutters mounted to act upon a blank from breast to rear at op-
 50 posite sides of the feeding path as the blank is fed by the carrier, and means for changing the angular relation of the cutters to the heightwise dimension of a heel blank during the operation of the cutters.

55 2. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding heel blanks, rotary molded cutters mounted to act one at each side of the feeding path, and
 60 means for tilting the cutters in the direction of feed as they act progressively along the heel blank from breast to rear.

3. In a machine for making wooden heels for boots and shoes, the combination of a
 65 carrier for supporting and feeding heel

blanks, rotary molded cutters mounted to act one at each side of the feeding path, and means for tilting the cutters and moving them in a direction heightwise of a heel
 70 blank as they act progressively along the blank from breast to rear.

4. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding heel
 75 blanks, rotary molded cutters mounted to act one at each side of the feeding path, and means for automatically moving the cutters in a direction towards the longitudinal median plane of the heel blank and heightwise
 80 of the blank as the cutters progressively act along the blank.

5. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding heel
 85 blanks, rotary molded cutters mounted to act one at each side of the feeding path, and means for bodily moving the cutters in a plurality of directions as they progressively act from breast to rear along the blank.

6. In a machine for making wooden heels
 90 for boots and shoes, the combination of a carrier, means for securing wooden heel blanks on the carrier, means for moving the carrier in a predetermined path, rotary molded cutters arranged to act successively upon
 95 opposite sides of a blank as it is moved by the carrier, and means for automatically changing the positions of the rotary cutters in a plurality of directions at each side of the predetermined path as they act suc-
 100 cessively upon opposite sides of a blank.

7. In a machine for making wooden heels for boots and shoes, the combination of a carrier for heel blanks, rotary molded cut-
 105 ters mounted to act at each side of the path of movement of blanks as they are presented by the carrier, and means for moving the cutter axes in three ways as they act progressively along the blank, one laterally of the blank, another heightwise of the blank, and
 110 a third angularly relative to the blank.

8. In a machine of the class described, the combination of a carrier, means for securing heel blanks in fixed position on the carrier, rotary molded cutters arranged to act upon
 115 opposite sides of the heel blanks while held in fixed positions relative to the carrier, and means for tilting the cutters toward parallelism with the back of the heel as they act
 120 along the blank.

9. In a machine for making wooden heels for boots and shoes, the combination of a heel carrier having provisions for securing heel blanks in fixed position thereon, rotary
 125 cutters arranged at each side of the path of movement of the heel blanks as they are fed along by the carrier and to act on opposite sides of the heels, and means for automatically changing the position of the cutters in directions towards and from and heightwise
 130

of the heels, and angularly during the progressive action of the cutters along the heel.

10. In a machine for making wooden heels for boots and shoes, the combination of a carrier for presenting heel blanks to be treated, clamps for securing the blanks in fixed position on the carrier, rotary cutters arranged to act one at each side of the path of movement of blanks presented by the carrier, and means for changing the horizontal, vertical, and angular positions of the cutters as they act along a heel blank.

11. In a machine for making wooden heels for boots and shoes, the combination of a carrier for presenting heel blanks for treatment, rotary cutters mounted to act upon opposite sides of the heel blanks as they are moved past the cutters by the carrier, and means for automatically changing the horizontal, vertical and angular positions of the cutters as they act along a blank from breast to rear thereof.

12. In a machine of the class described, the combination of a carrier, means for moving the carrier in a predetermined path to continuously present heel blanks for treatment, cutters mounted to act upon opposite sides of heel blanks as the latter move with the carrier in the predetermined path past the cutters, and means for automatically moving the cutters into different vertical, horizontal and angular positions relative to a heel blank as they act along the blank.

13. In a machine of the class described, the combination of a carrier, means for securing wooden heel blanks rigidly on the carrier, means for feeding the carrier to present the heel blanks for treatment, a cutter arranged at each side of the path of movement of the heel blanks as they are fed by the carrier and acting on opposite sides of the blanks, and pattern means acting automatically during the operation of the cutters upon a blank to move the cutters into different angular and heightwise positions relatively to the blank.

14. In a machine of the class described, the combination of a carrier, means for securing wooden heel blanks rigidly on the carrier, means for feeding the carrier to present the heel blanks for treatment, a cutter arranged at each side of the path of movement of the heel blanks as they are fed by the carrier and acting on opposite sides of the blanks, and pattern means acting automatically during the operation of the cutters upon a blank to move the cutters sidewise relative to the blank, heightwise of the blank, and angularly relative to the blank.

15. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding blanks, cutters arranged at opposite sides of the feeding path to act upon opposite sides of

a blank as it is fed by the carrier, pattern means movable with the carrier to control the lateral position of the cutters as they act upon the blank, and pattern means movable with the carrier to control the position of the cutters heightwise of the blank.

16. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding blanks, cutters arranged at opposite sides of the feeding path to act upon opposite sides of a blank as it is fed by the carrier, and pattern means movable with the carrier to control the sidewise and angular position of the cutters relative to the blank.

17. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding blanks, cutters arranged at opposite sides of the feeding path to act upon opposite sides of a blank as it is fed by the carrier, and pattern means movable coincidently with the carrier for moving the cutters heightwise as they act along a blank.

18. In a machine for making wooden heels for boots and shoes, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, and pattern means acting to control the lateral, height, and angular position of the cutters as they operate upon the blank.

19. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, a pivotal support for each cutter, and means for swinging the cutters about their pivotal supports as they act along a blank, there being provision for adjustment between the cutters and the swinging means to effect proper timing between the cutter and the work.

20. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, and means for tilting each cutter about an axis passing transversely through the cutter as it operates upon a blank.

21. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, means for tilting each cutter about an axis passing transversely through the cutter as it operates upon the blank, and means for changing the position of the axis relative to the blank.

22. In a machine of the class described, the combination of means for supporting and

presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, and means acting automatically to tilt the cutters about an axis passing transversely of the respective cutter axes as they operate upon a blank.

23. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, means acting automatically to tilt the cutters about an axis passing transversely of the respective cutter axes as they operate upon a blank, and means for automatically changing the positions of the respective axes relative to the blank during the operation of the cutters.

24. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, means for tilting the cutters about an axis passing transversely through the respective cutters as they operate upon a blank, and means for relatively adjusting the axis and respective cutters to place the axis in different positions between the ends of the cutters.

25. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, means for automatically tilting the cutters, and means for automatically moving the cutters in a direction heightwise of the blank as they act along the blank.

26. In a machine of the class described, the combination of means for supporting and presenting heel blanks for treatment, two molded cutters arranged to act upon opposite sides of a blank from breast to rear, means for automatically tilting each cutter about an axis extending transversely of the respective cutter axes, means for relatively adjusting each cutter and its tilting axis in a direction lengthwise of the cutter, and means for automatically moving the cutters heightwise of the blank as the cutters operate upon a blank.

27. In a machine for making wooden heels for boots and shoes, the combination of a carrier, means for clamping heel blanks on the carrier, rotary molded cutters arranged to act upon heel blanks at opposite sides of the carrier movement, means for tilting each cutter about an axis passing transversely thereof as they operate upon a blank, and means for automatically changing the position of the cutters and tilting axes relative to the height of the blank as the cutters act along the blank.

28. In a machine for making wooden heels

for boots and shoes, the combination of means for supporting wooden heel blanks, rotary molded cutters, means for relatively moving the supporting means and cutters to cause the cutters to act successively upon the blanks at opposite sides of the path of relative movement, and means for causing the cutters to successively move to the median longitudinal vertical plane at the rear of the blank as the cutters and blank are relatively moved past each other.

29. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding wooden heel blanks, rotary molded cutters arranged to act successively upon a blank from breast to rear at opposite sides of the feeding path as the blank is fed by the carrier, and means for causing the cutters to successively move to the longitudinal median plane vertically of the blank as the blank is fed past the cutters.

30. In a machine for making wooden heels for boots and shoes, the combination of a carrier for supporting and feeding wooden heel blanks, rotary molded cutters arranged to act successively upon a blank from breast to rear and about the rear at opposite sides of the feeding path as the blank is fed by the carrier, and means for varying the speed of the carrier to cause the cutters to travel over the heel blank more slowly as the cutters pass about the rear of the blank transversely of the grain of the wood.

31. In a machine for making wooden heels for boots and shoes, the combination of means for supporting wooden heel blanks for treatment, rotary molded cutters mounted to act one along each side of the blanks, and means for relatively moving the cutters and heel blanks to traverse the cutters along the heel blanks from breast to rear and about the rear and for causing the traverse to be relatively fast along the side of the blank while cutting with the grain and relatively slow as the cutters move about the rear of the heel blanks crosswise of the grain.

32. In a machine for making wooden heels for boots and shoes, the combination of means for supporting wooden heel blanks for treatment, rotary molded cutters mounted to act one along each side of the blanks, means for moving the cutters laterally towards the centre of the heel blank at the rear thereof, and means for relatively traversing the cutters and blanks at a predetermined speed along the side of the blanks while cutting with the grain and at a decreased speed as the cutters act about the rear of the heel cross-wise of the grain.

33. In a machine for making wooden heels for boots and shoes, the combination of means for supporting wooden heel blanks for treatment, rotary molded cutters mounted to act along opposite sides of heel blanks

as the blanks and cutters are relatively traversed, templet controlled means for causing the cutters to move laterally about the rear of the heel blanks as the blank and cutters are relatively traversed, and means for limiting the lateral movement of the cutters and acting as the cutters and blanks are relatively traversed to restore the cutters to the position for commencing the next cut at the breast corner of a heel blank.

34. In a machine of the class described, the combination of a carrier for supporting and presenting wooden heel blanks for treatment, molded cutters mounted to act along opposite sides of the blank on the carrier, means for moving the cutters laterally about the rear end of the blank, a templet for controlling the path of lateral movement of the cutters, and a second templet for moving the cutters laterally outward in position to start operation on another blank at the breast corners.

35. In a machine of the class described, the combination of a carrier for supporting and presenting wooden heel blanks for treatment, molded cutters mounted to act along opposite sides of the blank on the carrier, means for moving the cutters laterally about the rear end of the blank, a templet for controlling the path of lateral movement of the cutters, and switch means acting as the carrier and cutters are relatively moved to restore the cutters laterally to outward position.

36. In a machine for making wooden heels for boots and shoes, the combination of a carrier comprising a series of flexibly connected link members provided with means for holding heel blanks, means for feeding the carrier to present the heel blanks for treatment, molded cutters supported to act on opposite sides of the blanks as they are fed along by the carrier past the cutters, and means for changing the lateral and vertical position of the cutters as they operate along the heel blanks.

37. In a machine for making wooden heels for boots and shoes, the combination of a carrier comprising a series of flexibly connected link members provided with means for holding heel blanks, means for feeding the carrier to present the heel blanks for treatment, molded cutters supported to act on opposite sides of the blanks as they are fed along by the carrier past the cutters, means for moving the cutters laterally about the rear of the blanks as they are fed along by the carrier, a templet movable with the carrier and controlling the lateral movement of the cutters, and means for restoring the cutters to outward position that they may commence operation on a succeeding blank at the breast corners.

38. In a machine for making wooden heels for boots and shoes, the combination of a

heel blank carrier, two rotary molded cutters to act one on each side of a heel blank, means for moving the carrier to feed heel blanks to the action of the molded cutters, means for moving the cutter laterally inward relative to the blank being treated to cause the cutters to move about the rear of the blank, a templet movable with the carrier for controlling the inward movement of the cutters, and a switch mounted on the carrier and acting as the carrier is moved to restore the cutters to initial position.

39. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier, two rotary molded cutters to act one on each side of a heel blank, means for moving the carrier to feed a heel blank to the action of the molded cutters, means for moving the cutter laterally inward relative to the blank being treated to cause the cutters to move about the rear of the blank, a templet movable with the carrier for controlling the inward movement of the cutters, and a switch member pivotally supported on the carrier and acting as the carrier is moved to restore the cutters to initial position.

40. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier, two rotary molded cutters to act one on each side of a heel blank, means for moving the carrier to feed a heel blank to the action of the molded cutters, means for moving the cutter laterally inward relative to the blank being treated to cause the cutters to move about the rear of the blank, a templet movable with the carrier for controlling the inward movement of the cutters, and a pivoted switch member having a portion to limit the inward movement of the cutters about the rear of the blank and acting as the carrier is moved to restore the cutters to initial position.

41. In a machine for making wooden heels for boots and shoes, the combination of a flexible heel blank carrier, means for moving the flexible heel blank carrier to feed blanks, a pair of molded cutters one of which is arranged to act along a heel blank from one side of its feeding path and the other of which is arranged to act along a heel blank from the opposite side of its feeding path, means for moving the cutters laterally inward about the rear of the heel blank being treated, a templet for controlling the inward movement of the cutter, and a switch member having a part to limit the inward movement of the cutters as they pass about the rear of a heel blank and acting as the carrier is fed to restore the cutters to initial outward position.

42. In a machine for making wooden heels for boots and shoes, the combination of a flexible heel blank carrier, means for moving the flexible heel blank carrier to feed

- blanks, a pair of molded cutters one of which is arranged to act along a heel blank from one side of its feeding path and the other of which is arranged to act along a heel blank from the opposite side of its feeding path, means for moving the cutters laterally inward about the rear of the heel blank being treated, a templet for controlling the inward movement of the cutter, and a pivoted switch mounted on the carrier and acting to limit the inward movement of the cutters and to restore the cutters to their outward position that they may commence operation on another blank at the breast corners.
43. In a machine for making wooden heels for boots and shoes, the combination of a carrier provided with supports for securing wooden heel blanks for treatment, rotary molded cutters mounted to act at opposite sides of heel blanks supported by the carrier, and means acting automatically to clamp a heel blank presented to said supports as the carrier is moved and for automatically unclamping the finished heel blanks.
44. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier formed of a series of links, a series of blank holding means mounted on the links, means for feeding the carrier to present heel blanks held thereon for treatment, cutters mounted to act upon a blank one at each side of the feeding path, and means comprising a cam for automatically clamping a blank presented to the carrier for treatment and automatically unclamping the finished blank as the carrier is fed.
45. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier provided with clamps for securing blanks thereto, rotary cutters arranged to act upon opposite sides of blanks as they are fed by the carrier, and means acting automatically for operating the clamps as the carrier is fed to secure a blank to the carrier and automatically release a finished blank.
46. In a machine for making wooden heels for boots and shoes, the combination of a carrier formed of a series of pivotally connected links, means for securing blanks to the links of the carrier for treatment, means for moving the carrier to feed the blanks in a rectilinear path, cutters arranged to act one at each side of the feeding path of the blanks, and means for automatically discharging the finished blanks.
47. In a machine for making wooden heels for boots and shoes, the combination of a carrier formed of a series of pivotally connected links, a clamp for securing blanks to the links of the carrier for treatment, means for moving the carrier to feed the blanks in a rectilinear path, molded cutters arranged to act one at each side of the feeding path of the blanks, and means for moving the cutters vertically, horizontally, and angularly as the blanks are traversed past the cutters.
48. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier formed of a series of connected links, clamps for holding heel blanks mounted on some of said links, means for feeding the blank carrier, rotary molded cutters arranged to act one from each side of the feeding path of the blanks, and cam operated means for tilting the cutters and changing their lateral and vertical position as they act upon blanks fed past them by the carrier.
49. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier formed of a series of connected links, clamps for holding heel blanks mounted on some of said links, means for feeding the blank carrier, rotary molded cutters arranged to act one from each side of the feeding path of the blanks, means for moving the cutters laterally inward about the end of a blank as it is fed along by the carrier, templets mounted on the links of the carrier to control the inward movement of the cutters, and switches for limiting the extent of inward movement of the cutters and for restoring the cutters to their outward position.
50. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier formed of a series of connected links, heel blank clamps mounted on the links of the carrier, molded cutters one arranged to act at each side of a blank held in a clamp of the carrier, means for feeding the carrier to traverse the clamped blank in a rectilinear path between the molding cutters, and independent cams and connections for automatically changing the position of each cutter in a plurality of respects as the blank is fed past them.
51. In a machine of the class described, the combination of means for holding and feeding blanks, rotary cutters arranged to act successively upon the blanks at opposite sides of the path of feed movement, means tending to move each cutter laterally inward as it passes the rear of the blanks, and means for controlling the lateral inward movement of the cutters and permitting them to successively pass the centre of the heel blank at the rear thereof.
52. In a machine for making wooden heels for boots and shoes, the combination of a heel blank carrier for supporting heel blanks and feeding them for treatment, and rotary cutters mounted to act successively upon the heel blanks from opposite sides of the path of feeding movement around to their rear as they are moved by said carrier, whereby

the operative positions of the cutters may overlap without physical interference.

53. In a machine of the class described, the combination of an endless carrier for heel
5 blanks, cutters mounted to act upon blanks at opposite sides of the feeding path as they are fed along by the carrier, cams carried by the carrier, and means operated by said
10 cams for tilting the cutters, and moving them in a vertical and lateral direction as they act upon the blanks.

54. In a machine of the class described, the combination of a carrier formed of links
15 jointed together, means for clamping heel blanks to and for movement with the carrier, rotary molding cutters arranged to act on opposite sides of the blanks as they move along with the carrier, and a cam and connection for shifting the angular and vertical
20 position of the cutters as they operate on a blank.

55. In a machine for making wooden heels, the combination of means for presenting heel
25 blanks for treatment, cutters mounted to act one at each side of the heel blank and laterally movable inwardly towards the median line of the heel at the rear thereof, a motor for each cutter mounted for lateral movement with the cutter, and means for auto-
30 matically swinging the cutter and motor about an axis as the cutter acts along the heel.

56. In a machine for making wooden heels, the combination of a carrier for supporting
35 and presenting heel blanks for treatment, rotary molded cutters arranged to act along the sides of the heel blanks at opposite sides of the relative traversing movement of the blanks and cutters, a motor for each cutter,
40 and means for automatically tilting the cutters and motors as the cutters act along the heel.

57. In a machine for making wooden heels, the combination of a carrier for supporting
45 and presenting heel blanks for treatment, rotary molded cutters arranged to act along the sides of the heel blanks at opposite sides of the relative traversing movement of the blanks and cutters, means for determining
50 the lateral position of the cutters as they act upon a heel blank, means for relatively adjusting the determining means and cutters to vary the action of the cutters upon the heel blanks, and means for automatically tilting
55 the cutters as they and the blanks are relatively traversed.

58. In a machine for making wooden heels for boots and shoes, the combination of a
60 carrier for supporting and feeding wooden heel blanks, and rotary molded cutters mounted to act upon a blank from breast to the central rear portion at opposite sides of the feeding path as the blank is fed by the carrier.

59. In a machine for making wooden heels

for boots and shoes, a carrier having means for securing blanks to it, means for moving the carrier to feed the blanks in a rectilinear path, and a cutting instrumentality arranged
70 on each side of the path constructed and arranged to feed along and around the ends of the blanks.

60. In a machine for making wooden heels for boots and shoes, an endless carrier having means for securing blanks to it, means
75 for moving the carrier to feed the blanks in a rectilinear path, and a cutting instrumentality arranged on each side of the path constructed and arranged to feed along and around the ends of the blanks.

61. In a machine of the class described, a carrier for supporting and feeding blanks, with a movement of translation, and a rotary
80 cutter mounted to act adjacent to the feeding path, said mounting comprising joint mechanism constructed and arranged to permit the cutter to have a swinging movement in a plane perpendicular to the line of feed.

62. In a machine of the class described, a carrier for supporting and feeding blanks,
90 and a rotary cutter mounted to act adjacent to the feeding path, said mounting comprising joint mechanism constructed and arranged to permit the cutter to have a horizontal and vertical movement in a plane per-
95 pendicular to the line of feed and a rotational movement about an axis transverse to the cutter.

63. In a machine of the class described, a carrier for supporting and feeding blanks,
100 and a rotary cutter mounted to act adjacent to the feeding path, said mounting comprising joint mechanism constructed and arranged to permit the cutter to have a swing-
105 ing and vertical movement in a plane perpendicular to the line of feed and a rotational movement about an axis transverse to the cutter, and cam operated mechanism for determining the said movements.

64. In a machine of the class described, a
110 carrier for supporting and feeding blanks, and a rotary cutter mounted to act adjacent to the feeding path, said mounting comprising joint mechanism constructed and ar-
115 ranged to permit the cutter to have a swinging and rising and falling movement in a plane perpendicular to the line of feed and a rotational movement about an axis transverse to the cutter, and cam operated
120 mechanism operating in time relation to the feeding movement for determining the said movements.

65. In a machine of the class described, a carrier for supporting and feeding blanks,
125 a rotary cutter head stationed adjacent to the feeding path, a carrier (105) for the cutter, an arm (75) carrying the carrier and mounted on the main machine frame, there being joint mechanism located in the group
130 of following named positions, viz., between

the cutter head and carrier, carrier and arm, and arm and frame, said joint mechanism being arranged to produce movement comprised among rotational, vertical and horizontal movements, respectively, of the cutter head.

66. In a machine of the class described, a carrier for supporting and feeding blanks, a rotary cutter head stationed adjacent to the feeding path, a carrier (105) for the cutter; an arm (75) carrying the carrier and mounted on the main machine frame, there being joint mechanism located in one or more of the following named positions, viz., between the cutter head and carrier, carrier and arm, and arm and frame, said joint mechanism being arranged to produce move-

ment comprised among rotational, vertical and horizontal movements, of the cutter head, and cam and follower mechanism between the main frame and the cutter head for controlling the said joint mechanism, in time relation to the feed.

67. In a machine of the class described, a carrier, a movable clamp on said carrier, and a cam between the clamp and the machine frame arranged to operate the clamp to hold the work as the clamp enters the machine and to release it as the clamp leaves the machine.

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

LELAND B. WHIPPLE.