J. B. HADAWAY.

EDGE TRIMMING MACHINE.

APPLICATION FILED MAR. 16, 1907.

1,107,668.

Patented Aug. 18, 1914.

5 SHEETS—SHEET 1.

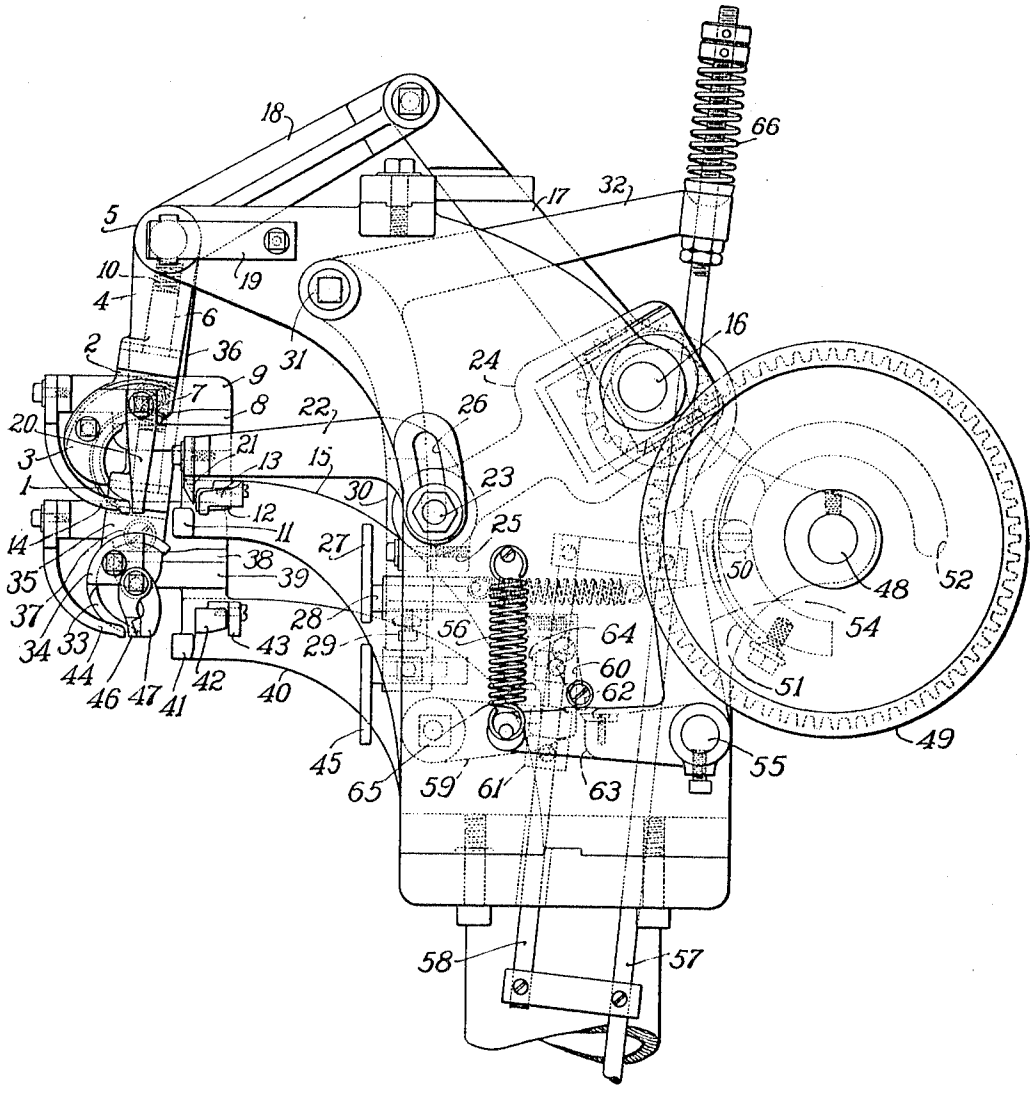

FIG. 1

WITNESSES

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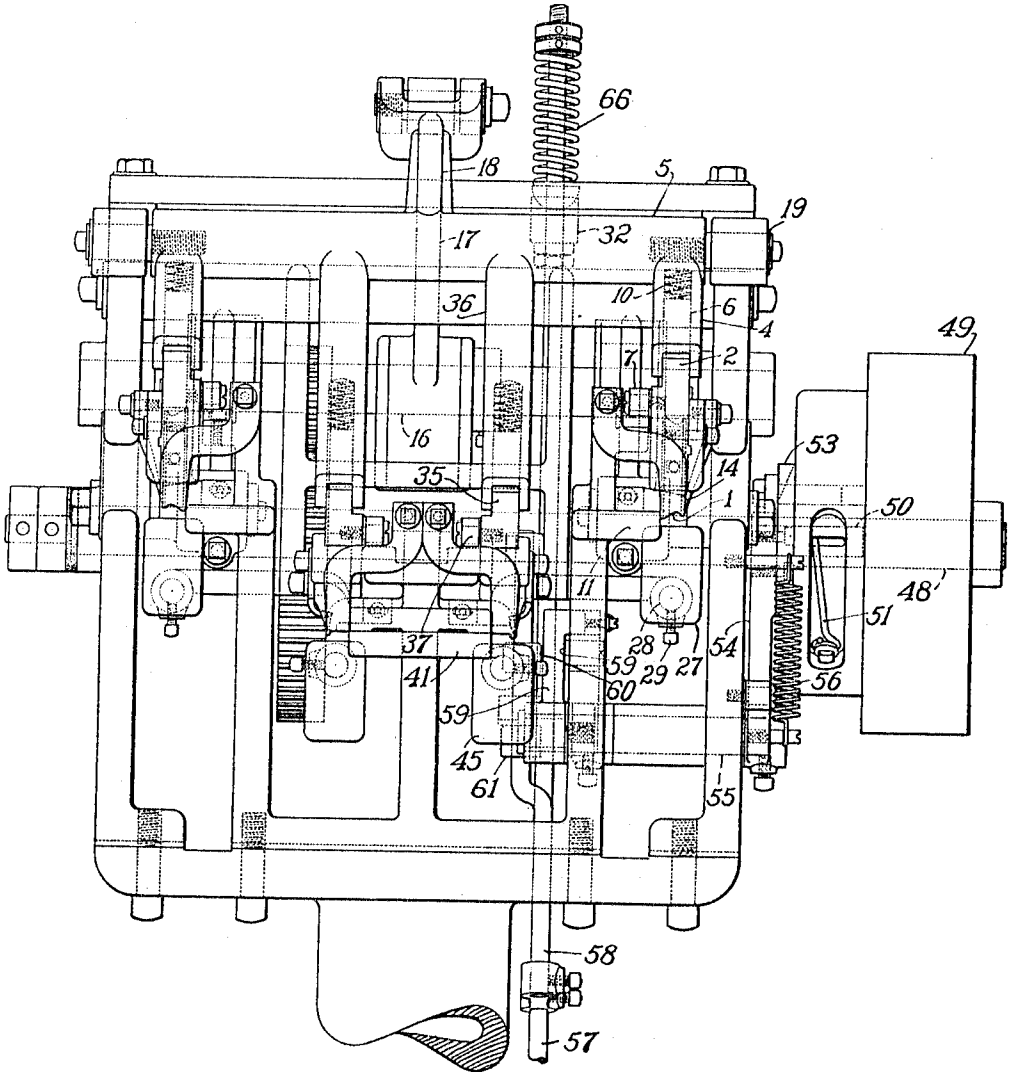

FIG. 2

WITNESSES

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5 SHEETS—SHEET 3.

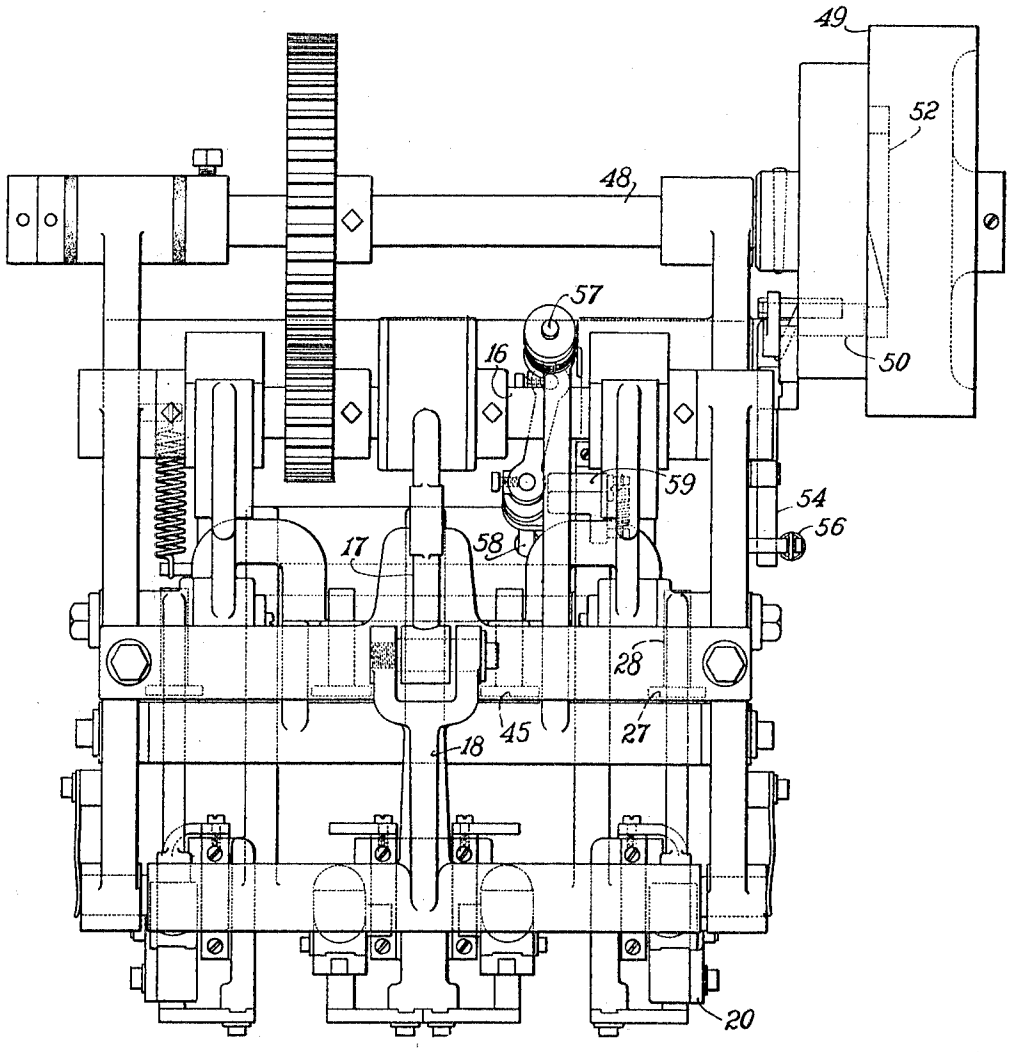

FIG. 3

WITNESSES

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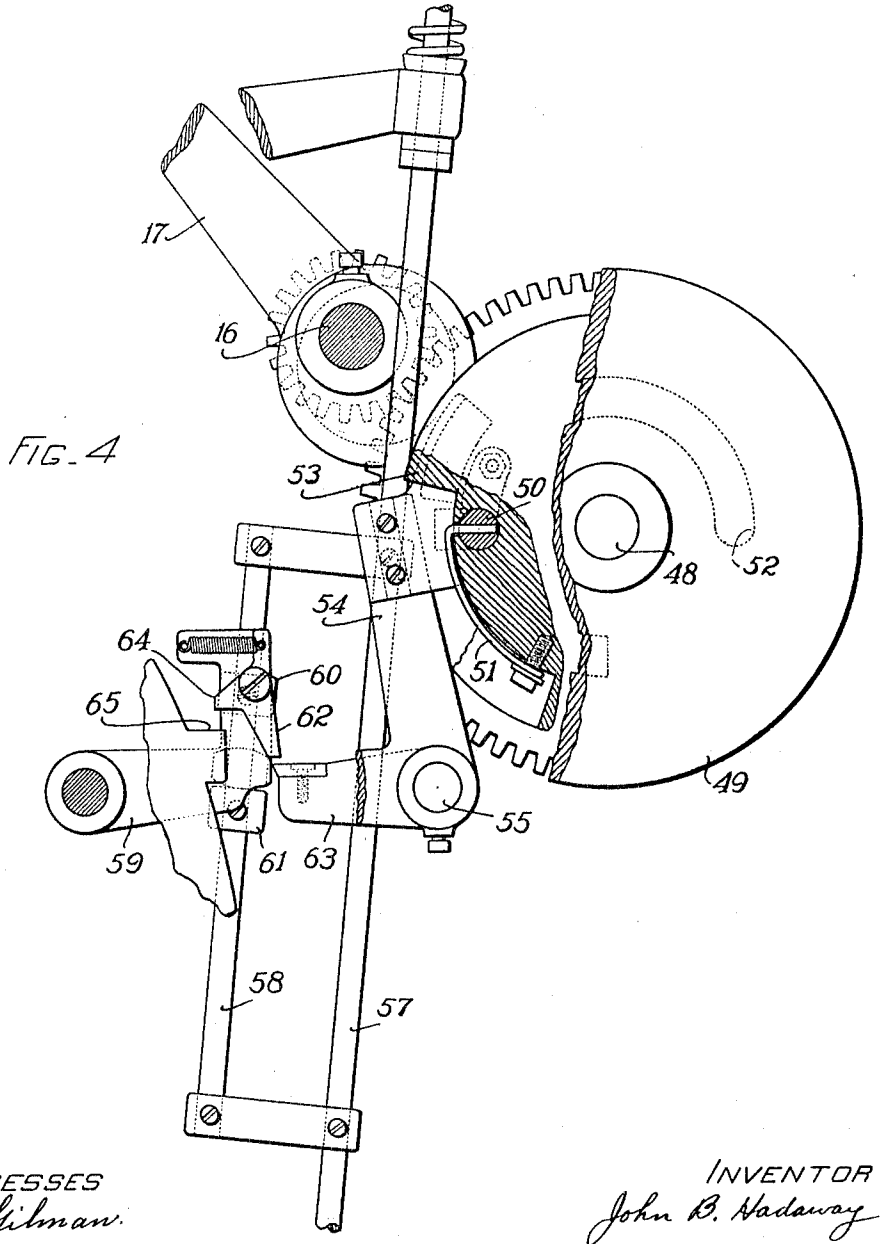
5 SHEETS—SHEET 4.

FIG. 4



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5 SHEETS—SHEET 5.

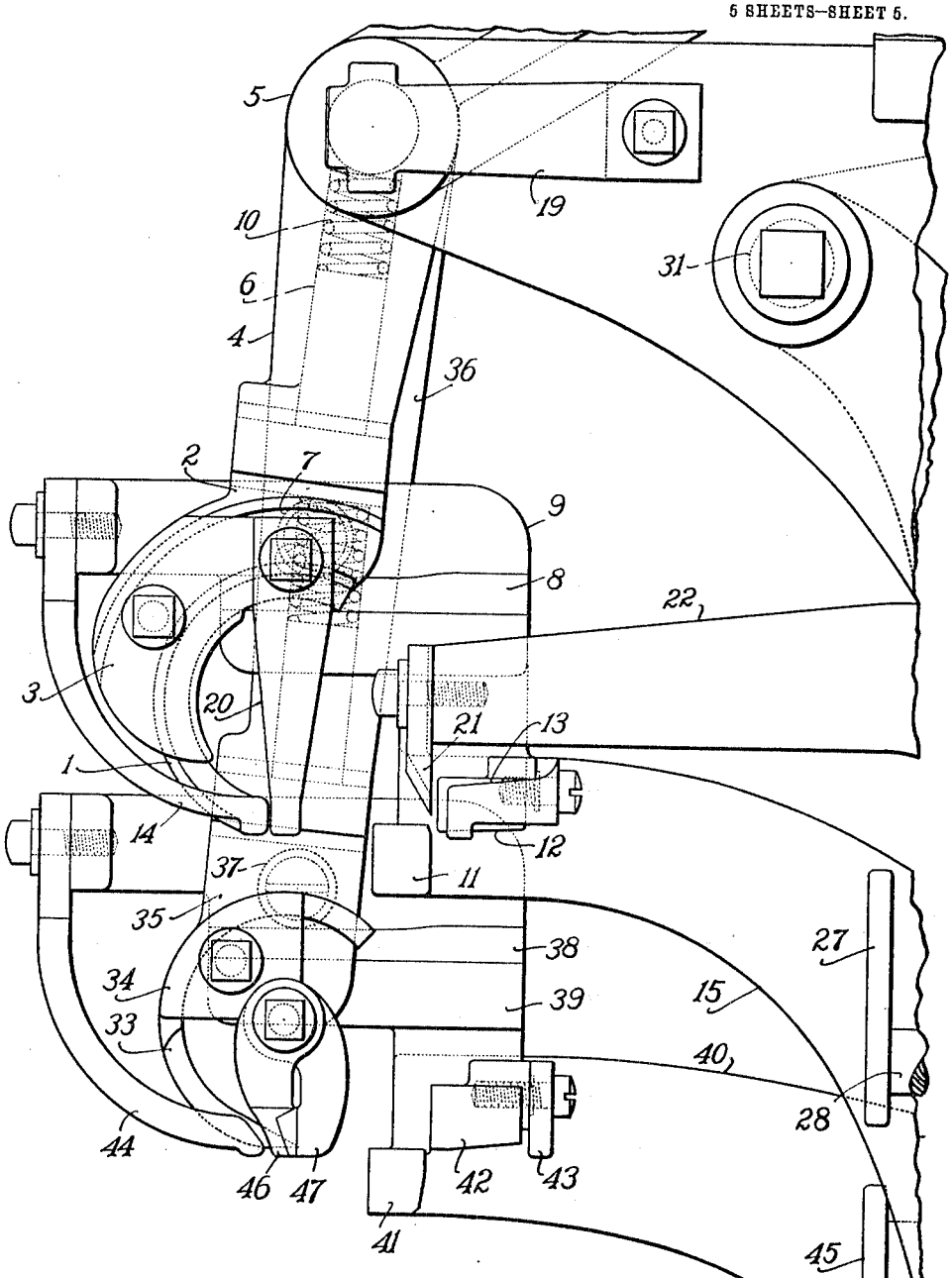

FIG. 5

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN B. HADAWAY, OF BROCKTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

EDGE-TRIMMING MACHINE.

1,107,668. Specification of Letters Patent. **Patented Aug. 18, 1914.**

Application filed March 16, 1907. Serial No. 362,632.

To all whom it may concern:

Be it known that I, JOHN B. HADAWAY, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Edge-Trimming Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to edge trimming machines which are used in the manufacture of boots and shoes, and more particularly to a machine for completing the trimming of the sole edge adjacent the breast of the heel.

In the manufacture of a shoe after the outsole and heel have been permanently attached to the other parts of the shoe, the edge of the heel is trimmed, the heel is breasted, and after the heel breasting operation the shank and forepart of the sole are trimmed. During the operations of trimming the edges of the heel and sole, the upper surface of the sole at the heel portion of the shoe, and the upper surface of the projecting edge of the sole or welt at the shank and forepart of the shoe are usually beveled off or, as it is termed in the art, are randed. On account of the obstruction presented by the breast of the heel to the trimming knives, and particularly to the knives which trim the shank and forepart of the sole, a portion of the edge of the sole on each side adjacent the breast of the heel cannot be trimmed to its final shape, and heretofore the final trimming of the shoe has been performed by a hand operation. The hand operation consists in removing the material left at the edge of the sole adjacent the breast of the heel, in randing the upper surface of the sole and welt at this portion of the shoe, and, when the edge of the shank portion of the sole is rounded, in cutting into the sole in line with the breast of the heel.

The object of the present invention is to provide a machine by which this final trimming operation can be easily and quickly performed and with this object in view the invention consists in an edge trimming machine having its parts constructed and arranged as hereinafter described and claimed.

The invention embodied in the machine hereinafter specifically described as embodying the various features of the present invention is believed to be broad and generic in character and not limited to any specific construction or arrangement of parts except where the specific construction and relation of the parts are recited in the claims.

The machine hereinafter specifically described embodies the various features of the present invention in the best form that has yet been devised, and in addition to embodying the broad features of the invention also embodies certain novel features of construction, the advantages of which will be obvious to those skilled in the art from the following description.

The present invention will be clearly understood from an inspection of the accompanying drawings in which is illustrated an edge trimming machine embodying the various features thereof in their preferred form, Figure 1 being a view in side elevation of the machine, Fig. 2 a view in front elevation, Fig. 3 a plan view, Fig. 4 a detail sectional view on an enlarged scale illustrating the mechanism for throwing the knives into and out of operation, and Fig. 5 a detail view in side elevation on an enlarged scale of a portion of the mechanism illustrated in Fig. 1.

The machine illustrated in the drawings is provided with a plurality of edge trimming knives and with gaging devices for determining the position of a shoe with relation to each knife. As illustrated four edge trimming knives are provided, two knives being duplicates of each other except that they are shaped to operate on opposite sides of the shoe sole, and the other two knives also being duplicates of each other with the exception that they are shaped to operate upon opposite sides of the shoe sole. Two of the knives are shaped to operate upon a shoe sole in which the edge of the shank portion of the sole is rounded and the other two knives are shaped to operate upon a sole, the edge of the shank portion of which is substantially flat and flush with the edge of the heel. The two first mentioned knives are arranged to cut along the edge of the shoe sole to the breast of the heel, and with each knife a "cutting in" knife is associated, which is arranged to cut into the edge of the sole in line with the breast of the heel and sever the chip formed by the edge

trimming knife. With each of the other edge trimming knives, a rand trimming knife is associated, so that when a shoe is presented to the knives the edge of the sole adjacent the breast of the heel is trimmed and at the same time the upper surface of the welt and of the shoe sole at the breast of the heel are randed. In connection with each set of gaging devices for the shoe a clamp is provided which is arranged to engage the back or counter portion of the shoe and hold the shoe in position against the gaging devices during the trimming operations.

Referring now to the drawings and particularly to Figs. 1 and 5, 1 indicates an edge trimming knife, the cutting edge of which is shaped to complete the trimming of a shoe sole, the edge of the shank portion of which is rounded. This knife is secured in a knife carrier or block 2 by means of a clamping plate 3. For convenience of adjustment and to bring the cutting edge of the knife into a position in which it will readily cut the sole, the shank of the knife is curved in the arc of a circle, and is received in correspondingly shaped guideways in the knife carrier and clamping plate. The knife block is reciprocated by means of an arm 4 depending from a rock shaft 5, and in order to permit the block to move in substantially a right line it is mounted in the arm 4 so as to be capable of moving longitudinally thereof. To this end the block is provided with a flat sided upward extension which is received in a corresponding recess in the lower end of the arm and with an upwardly projecting stem 6 which is received in a cylindrical bore formed in the arm. The block is guided in its reciprocating movements by means of a guiding roll 7 journaled on the side of the block and arranged to run on a ledge or cam surface 8 projecting from a stationary bracket 9. The knife block is forced downwardly so as to keep the roll 7 in contact with the upper surface of the ledge 8 by means of a coiled spring 10, interposed between the upper end of the stem 6 of the block and the bottom of the bore in the arm 4. The roll 7 and ledge 8 accurately control the path of movement of the edge trimming knife so that the knife is prevented from cutting too deeply, or digging into the sole, and the sole is trimmed with certainty to the desired shape.

To enable that portion of the shoe which is to be cut by the trimming knife to be placed accurately in the desired position with relation to the knife, gaging devices are provided which, as illustrated in the drawings, comprise a gage block 11 to engage the breast of the heel of a shoe, a gage block 12 to engage the side or edge of the heel, a crease gage 13 to enter the crease between the upper and sole of the shoe at the heel portion of the shoe, and a gage 14 to bear upon the edge of the shank portion of the sole at the rear of the edge trimming knife and also enter the crease between the upper and welt of the shoe. These gages are all stationary, the blocks 11 and 12 being rigidly supported on or forming a part of an arm 15 of the machine frame which arm is integral with the bracket 9 referred to, the crease gage 13 being secured to the gage 12 so as to be adjustable laterally for different thicknesses of soles and the edge or crease gage 14 being secured to the outer end of the bracket 9.

The rock shaft 5 is oscillated through an eccentric on a shaft 16 by means of an eccentric strap and link 17 and an arm 18 projecting from the rock shaft, and the extent of movement imparted to the rock shaft is such that the cutting edge of the edge trimming knife passes along the edge of the shoe sole and completes its movement just as it reaches the breast of the heel.

While the edge trimming knife is cutting along the edge of the sole the shoe is held rigidly in position by the gaging devices, and in order to permit the knife to follow the curve of the sole, means are provided whereby the knife is allowed to move laterally. To this end the rock shaft 5 is mounted so as to be capable of moving longitudinally and is pressed upon at each end by a leaf spring 19. To guide the knife during its cutting movement, a crease guide 20 is provided which is secured to the clamping plate 3 and projects downwardly into the crease between the upper and the welt at one side of the cutting edge of the knife. This crease guide moves with the knife and assists in causing the knife to follow the curvature of the sole.

To sever the chip formed by the edge trimming knife it is necessary to cut into the edge of the sole in line with the breast of the heel. The knife for performing this operation is indicated at 21 and is secured upon the forward end of a lever arm 22 pivotally mounted upon a stud 23. The lever arm 22 is provided with a hub which is embraced by a split collar formed at the forward end of a lever arm 24 and the two arms 22 and 24 are secured together by a clamping bolt 25. The rear end of the arm 24 is provided with a slot in which a block is mounted engaged by an eccentric on the shaft 16, the construction being such that the arms 22 and 24 are oscillated during each revolution of the shaft. The edge of the knife 21 is located in line with the face of the gage block 11 which engages the breast of the heel, so that each time the knife is actuated a cut is made in the edge of the sole in line with the breast of the heel and the chip formed by the edge trimming knife is severed from the sole.

The breast of the heel of a shoe is sometimes a plain surface and sometimes more or less curved. It is therefore desirable that means be provided whereby the angle of the cut made by the "cutting in" knife 21 with relation to the edge of the sole may be varied. To enable the angle of the cut to be varied the pin 23 which forms the fulcrum of the lever arms 22 and 24 is mounted in a slot 26, which is curved in the arc of a circle the center of which is the cutting edge of the knife 21. To change the angle of the cut the clamping bolt 25 is loosened and the pin 23 is adjusted in the slot 26 and secured in position and then the clamping bolt 25 is again tightened to secure the lever arms 22 and 24 together.

The clamping plate which engages the rear or counter portion of the shoe is indicated at 27 and is mounted by means of a stem 28 and clamping screw 29 in an arm 30 depending from a rock shaft 31. This rock shaft is actuated from a foot-treadle through an arm 32 as will be hereinafter described. The plate 27 engages the rear or counter portion of the shoe and presses the breast of the heel against the gage block 11.

One of the edge trimming cutters which is shaped to act on the sole of a shoe, the edge of the shank portion of which is substantially flat and flush with the edge of the heel, is indicated at 33. The shank of this cutter is curved in the arc of a circle and is secured by means of a clamping plate 34 to a knife block or carrier 35. The block 35 is mounted in the lower end of an arm 36 projecting downwardly from the rock shaft 5 and is guided in its movements by a guide roll 37 which runs upon a ledge 38 projecting from a bracket 39 on an arm 40 of the machine frame. The knife block 35 is of substantially the same construction as the knife block 2 and is mounted and actuated in substantially the same manner. The gaging devices for locating the shoe in the proper position with relation to the knife 33 are substantially the same as those associated with the edge trimming knife 1, the gages 41, 42, 43 and 44 corresponding respectively with the gages 11, 12, 13 and 14 hereinbefore described. The clamping plate 45 is constructed and arranged in the same manner as the plate 27 and is mounted in an arm projecting downwardly from the same rock shaft 31. It will be noted that the arm 36 which actuates the knife 33 is longer than the arm 4 which actuates the knife 1 and that the knife 33 is arranged to cut somewhat beyond the breast of the heel of a shoe when in position against the gage 41. This movement of the edge trimming knife is permitted by reason of the fact that the edge of the shank portion of the sole operated upon is substantially flat and flush with the edge of the heel. Associated with the trimming knife 33 is a rand knife 46 and upper guard 47 which are both secured to the knife block 35 so as to travel with the knife 33. The knives 33 and 46 can be used to trim and rand the sole of a shoe, the edge of the shank portion of which is flat, and these operations can be performed upon a shoe sole, the edge of the shank portion of which is rounded, by presenting the shoe first to the knives 1 and 21 and then to the knives 33 and 46. The other knives and the gaging and clamping devices associated therewith are duplicates of those already described with the exception that they are arranged to operate upon the opposite sides of a shoe. The two edge trimming knives are actuated by means of arms projecting downwardly from the rock shaft 5, the clamping plates corresponding to the plates 27 and 45 and being mounted in arms projecting downwardly from the rock shaft 31, and the mechanism for actuating the knife corresponding to the knife 21 is a duplicate of the mechanism for actuating the knife 21. It will be evident therefore that all of the edge trimming knives are actuated simultaneously by a common actuating mechanism and that the same mechanism is utilized for actuating each one of the clamping plates.

The shaft 16 is driven through intermeshing gears from a driving shaft 48 upon which is mounted a driving pulley 49. To enable the mechanism for actuating the edge trimming and "cutting in" knives to be readily controlled by the operator a suitable clutch mechanism is provided between the pulley 49 and shaft 48. Preferably this clutch mechanism is of a type which will allow the driving shaft to make but one complete revolution each time the clutch is thrown into operation. The clutch mechanism illustrated in the drawings comprises a pin 50 mounted in a disk secured to the shaft 48 and acted upon by a spring 51 which tends to force the pin into a slot 52 formed in the face of the pulley 49. The pin 50 is provided with a lateral projection which is adapted to be engaged by the wedge shaped portion of a plate 53 secured to a lever 54. The lever 54 is rigidly secured to a rock shaft 55 so that when the shaft 55 is rocked in one direction the plate 53 is moved out of engagement with the pin, which is then free to enter the slot 52 of the pulley 49, and when the shaft 55 is rocked in the opposite direction the plate 53 is brought into the path of movement of the projection on the pin 50 and withdraws the pin from engagement with the pulley 49 as soon as the shaft has made one revolution. The shaft 55 is rocked in one direction by a spring 56 connected to the horizontal arm of the lever 54 and is rocked in the opposite direction through suitable connections from a treadle actuated rod 57.

To the rod 57 a rod 58 is secured which passes through a projection on a pivotally mounted arm 59, and which is provided with blocks 60 and 61 above and below the arm. Upon the arm 59 a spring-pressed pawl 62 is mounted which during the downward movement of the arm 59 is adapted to engage an arm 63 projecting from the rock shaft 55 and thereby rock the shaft 55 in a direction to remove the plate 53 from engagement with the pin 50 of the clutch mechanism. The pawl 62 is provided with a projection 64 which, after the shaft 55 has been rocked, engages a projection 65 on the machine frame, so that during the continued downward movement of the arm 59 the pawl 62 is moved out of engagement with the arm 63 and the plate 53 is returned into the path of movement of the pin 50 by means of the spring 56. The rod 57 at its upper end passes through the arm 32 by means of which the clamping plates are actuated, and is provided above the arm with a coiled spring 66 interposed between the arm and nuts on the upper end of the rod. The rod 57 thus serves both to actuate the clamping plates and to throw the mechanism for actuating the knives into operation. When the rod is depressed the clamps are first actuated, and the shoe to be operated upon is clamped in position before the block 60 on the rod 58 engages the arm 59. The continued downward movement of the rod compresses the spring 66, swings the arm 59 downwardly and through the pawl 62 and arm 63 rocks the shaft 55 as above described. The rod 57 is held depressed by the operator until the trimming operation is completed, but before the rod reaches its lowest position the pawl 62 is tripped so that the driving shaft is stopped as soon as it makes one complete revolution.

It will be noted that the gears connecting the driving shaft 48 and the shaft 16 are so proportioned that the shaft 16 makes three complete revolutions for one revolution of the shaft 48. A complete reciprocation is imparted to the edge trimming knives and to the cutting-in knives during each revolution of the shaft 16, so that each time the machine is thrown into operation by the operator the knives make three complete cutting strokes. The knives thus travel over the same portion of the work a plurality of times, and an accurate trimming of the sole to the desired shape is insured.

The nature and scope of the present invention having been indicated, and a machine embodying the several features of the invention in their preferred form having been specifically described, what is claimed is:—

1. An edge trimming machine, having, in combination, a gage to engage the breast of the heel of a shoe, a clamp to engage the shoe and press the breast of the heel against the gage, a reciprocating edge trimming knife arranged to cut along the edge of the shoe sole and means to actuate the knife and clamp.

2. An edge trimming machine, having, in combination, gaging devices to determine the position of a shoe comprising a gage to engage the breast of the heel, a gage to engage the edge of the heel, a gage to enter the crease between the sole and upper at the heel of the shoe, and a gage to engage the edge of the shank portion of the sole, and an edge trimming cutter arranged to cut along the edge of the sole adjacent the breast of the heel.

3. An edge trimming machine, having, in combination, an edge trimming cutter arranged to trim the edge of a shoe sole adjacent the breast of the heel, and gaging devices for the shoe including a gage to engage the edge of the shank portion of the sole at the rear of the edge trimming cutter.

4. An edge trimming machine having, in combination, gaging means to determine the position of a shoe, a reciprocating edge trimming knife arranged to cut along the edge of the sole adjacent the breast of the heel and means for supporting the knife having provision to permit a lateral movement of the knife during the cutting operation.

5. An edge trimming machine, having, in combination, gaging means to determine the position of the sole edge and heel breast of a shoe, a knife arranged to cut into the edge of the sole in line with the breast of the heel and means for adjusting the angle of cut of said knife with relation to the edge of the sole.

6. An edge trimming machine, having, in combination, gaging means to determine the position of the sole edge and heel breast of a shoe, a pivotally mounted knife arranged to cut into the edge of the sole in line with the breast of the heel and means to adjust the fulcrum of the knife to change the angle of cut with relation to the edge of the shoe sole.

7. An edge trimming machine, having, in combination, gaging means to determine the position of the sole edge and heel breast of a shoe, a clamp to hold the shoe in engagement with said gaging means, an edge trimming knife arranged to cut along the edge of the sole adjacent the breast of the heel and a treadle and suitable connections for first throwing the clamp and thereafter the edge trimming knife into operation.

8. An edge trimming machine, having, in combination, gaging means to determine the position of a shoe, a reciprocating cutter arranged to cut along the edge of the sole adjacent the breast of the heel and a crease

gage movable with the cutter arranged to enter the crease between the sole and the shoe upper.

9. An edge trimming machine, having, in combination, gaging means to determine the position of a shoe, a reciprocating edge trimming knife arranged to cut along the edge of the sole adjacent the breast of the heel, a knife carrier, a guide to support the knife carrier and regulate the depth of cut and a spring to hold the knife carrier in engagement with said guide.

10. An edge trimming machine, having, in combination, gaging means to determine the position of a shoe, an edge trimming knife and a randing knife arranged to cut along the edge of the sole from a point adjacent the breast of the heel up to the breast of the heel and means for actuating said knives.

11. In a machine for cutting in shoe shanks, a knife adapted to be moved along the edge of the shank of a shoe toward and away from the heel, a second knife movable transversely of the path of said first knife, and a stop against which said heel may be located.

12. In a machine for cutting in shoe shanks, a knife adapted to be moved along the edge of the shank of a shoe toward and away from the heel, a second knife movable transversely of the path of said first knife, a stop against which said heel may be located, and a second stop against which said edge may be located.

13. In a machine for cutting in shoe shanks, a knife adapted to be moved along the edge of the shank of a shoe toward and away from the heel, a stop against which said heel may be located and a stop against which said edge may be located.

14. In a machine for cutting in shoe shanks, a knife adapted to be moved along the edge of the shank of a shoe toward and away from the heel, a stop adapted to limit the movement of said heel vertically and horizontally, and a stop against which said edge may be located.

15. In a machine for cutting in shoe shanks, a knife adapted to be moved along the edge of the shank of a shoe toward and away from the heel, a second knife movable transversely of the path of said first knife, and a stop adapted to limit the movement of said heel vertically and horizontally.

16. An edge trimming machine, having, in combination, a reciprocating edge trimming knife yieldingly held against movement at an angle to the path of its reciprocating movement, and means for actuating said knife to trim the edge of the shank of a shoe sole.

17. A machine of the class described, having, in combination, an edge trimming knife of the shape of the contour of the trimmed portion of the edge of the shank, and having a cutting stroke of predetermined extent, and means for positioning the heel breast of a shoe at the end of the cutting stroke of said knife.

18. A machine of the class described, having, in combination, an edge trimming knife constructed and arranged to trim the edge of the shank of a shoe sole from the point where the rotary trimming began, or left off, to the breast of the heel, and means for positioning the heel breast at the end of the cutting stroke of said knife.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN B. HADAWAY.

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