

Aug. 18, 1942.

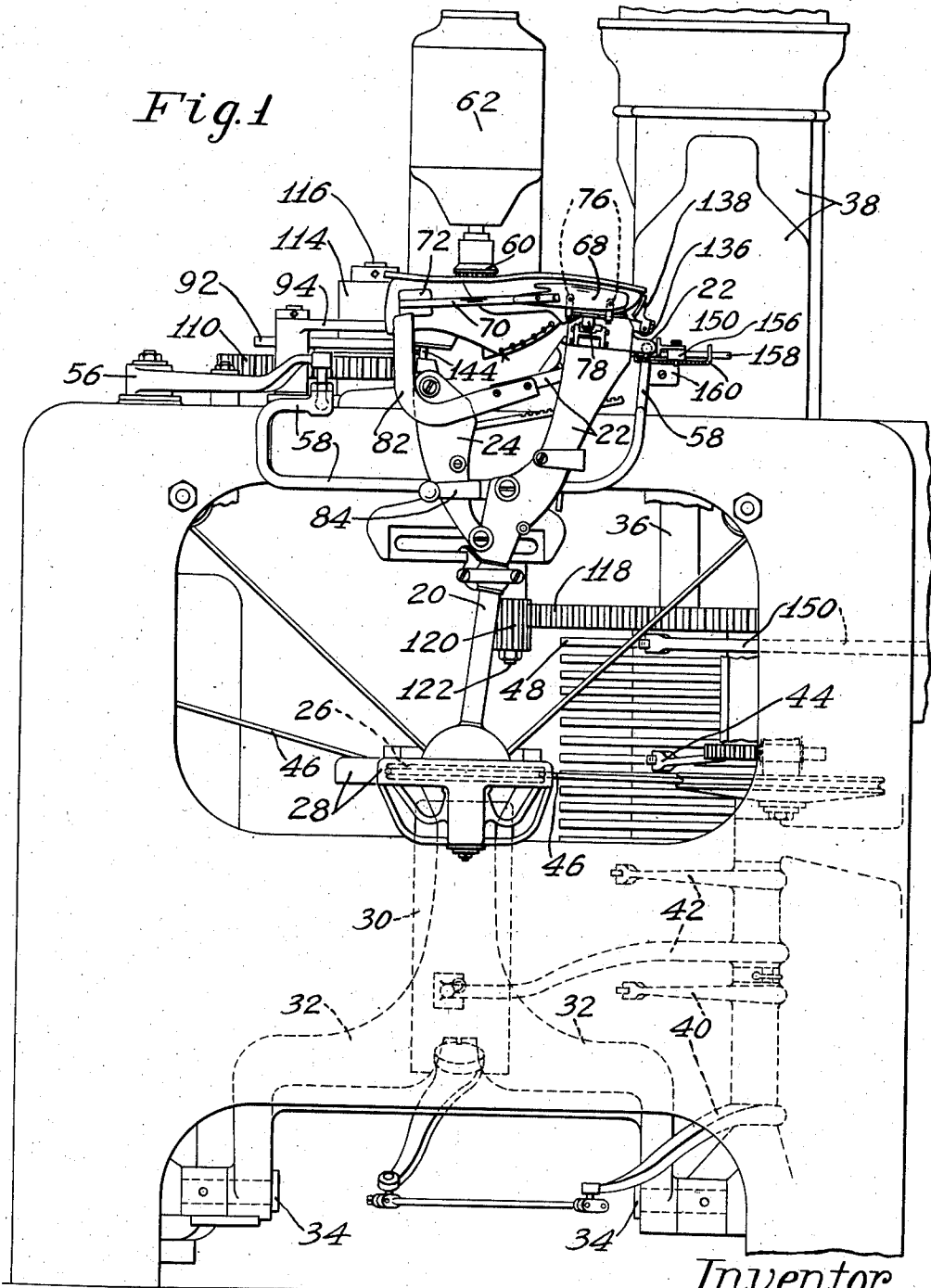
E. J. RAY

2,293,080

SHOE MACHINE

Filed July 27, 1939

6 Sheets-Sheet 1



Witness
Charles J. Olson

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by Fish Wilderth
Cary & Jenney Atty

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SHOE MACHINE

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6 Sheets-Sheet 2

Fig. 2

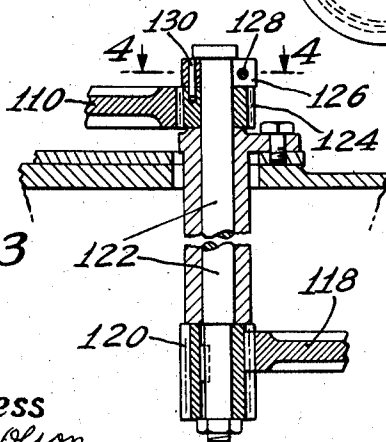
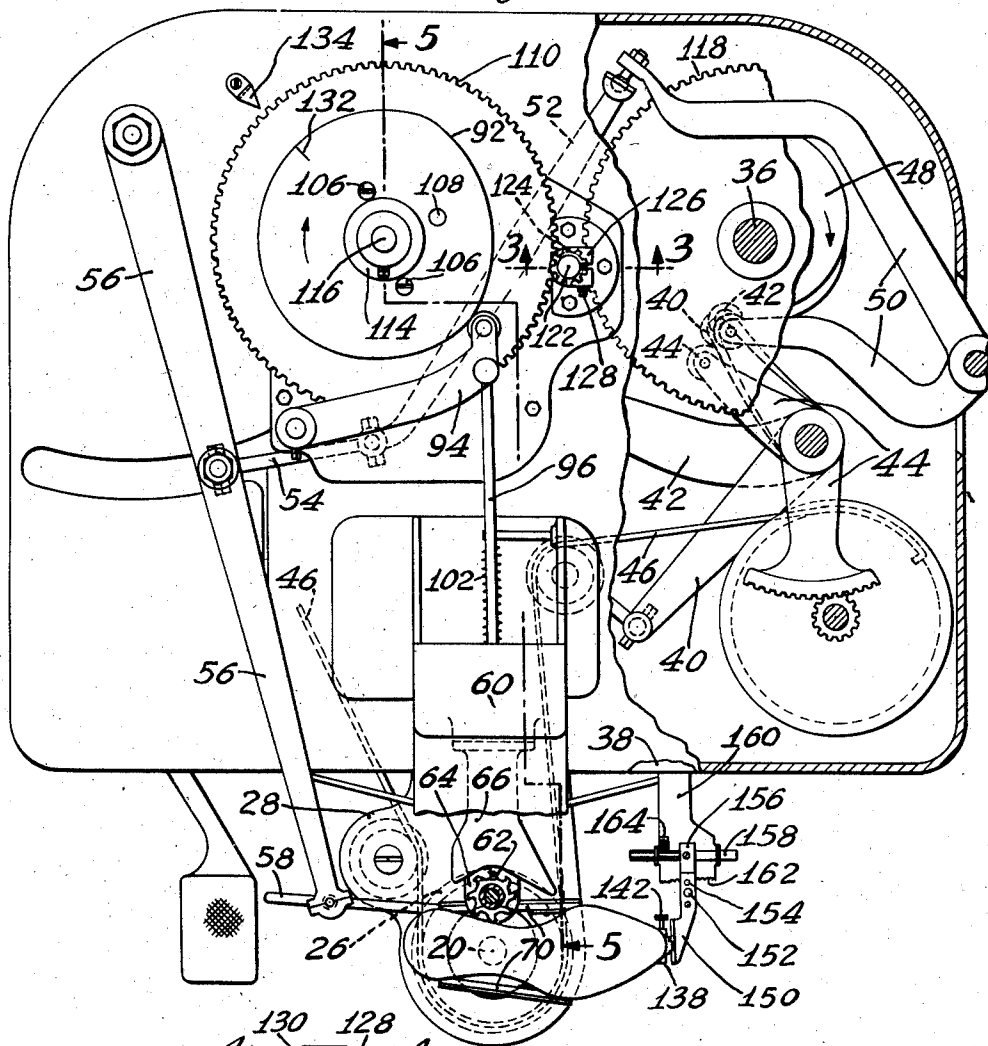


Fig. 3

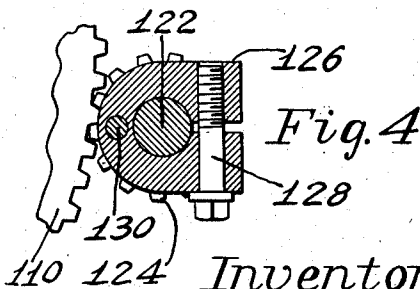


Fig. 4

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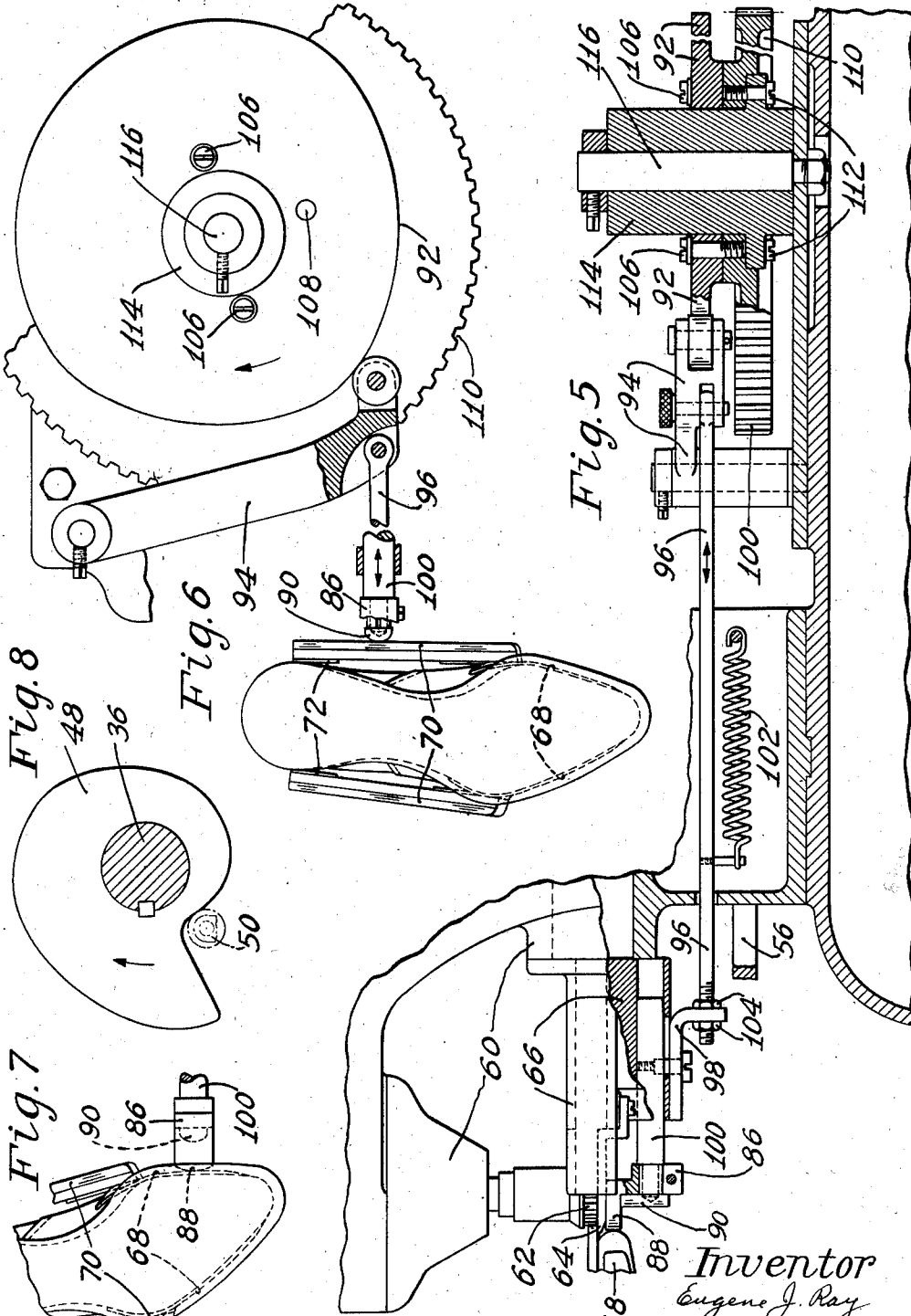
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SHOE MACHINE

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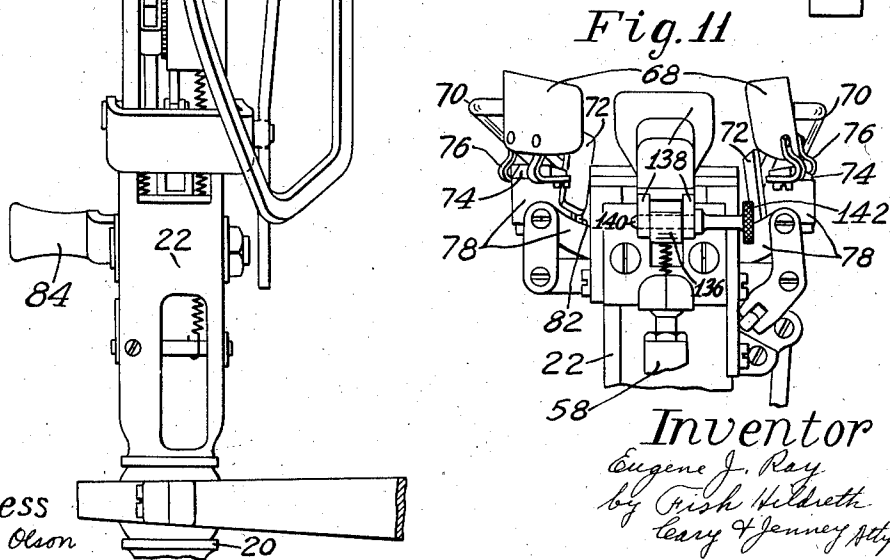
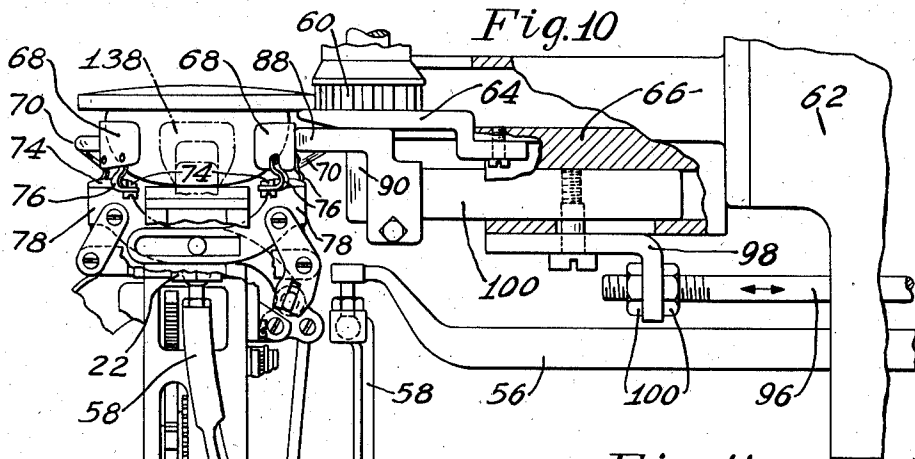
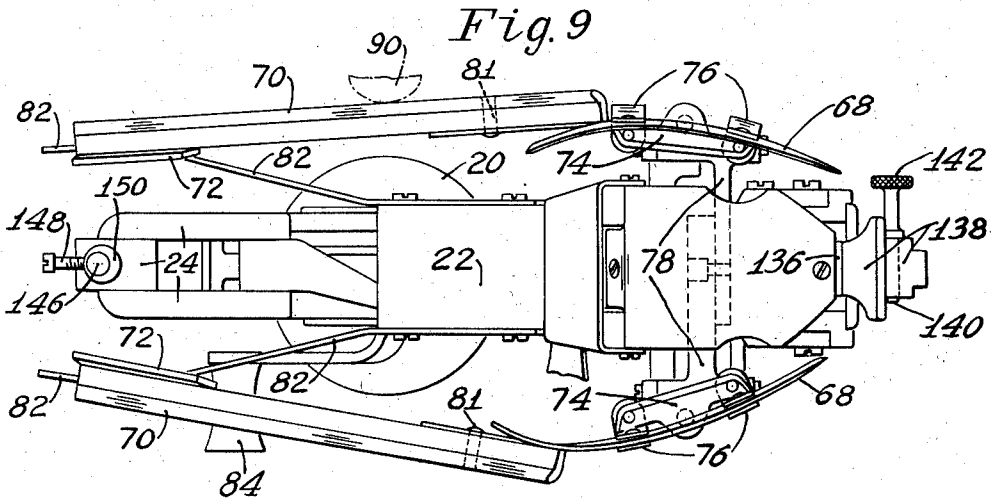
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E. J. RAY
SHOE MACHINE

2,293,080

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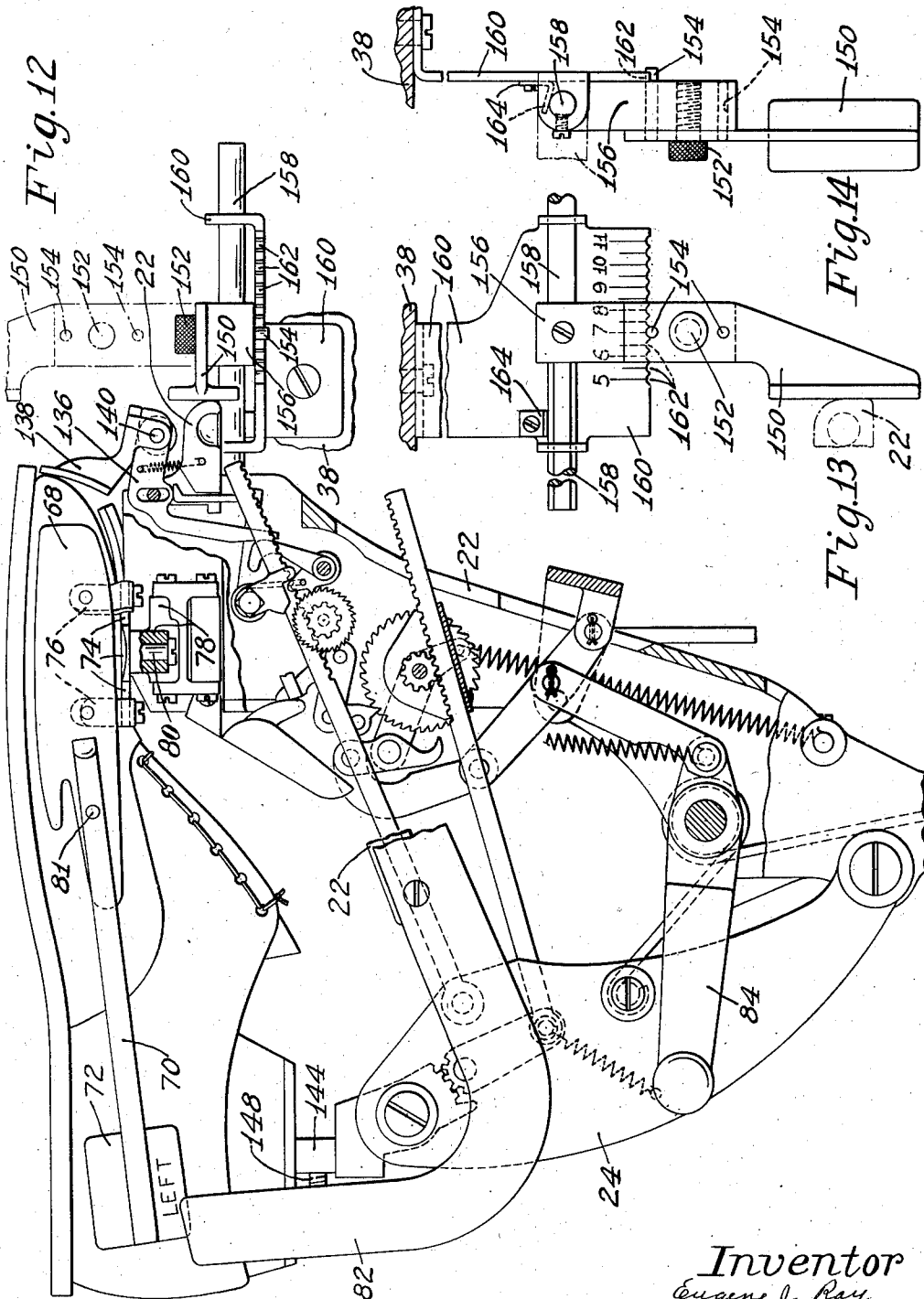
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SHOE MACHINE

Filed July 27, 1939

6 Sheets-Sheet 5



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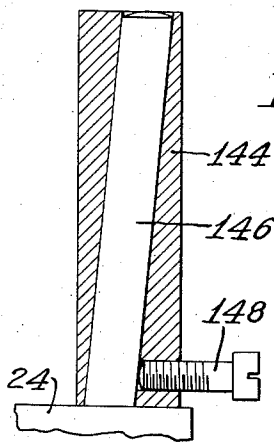
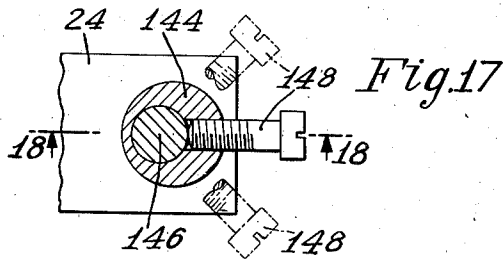
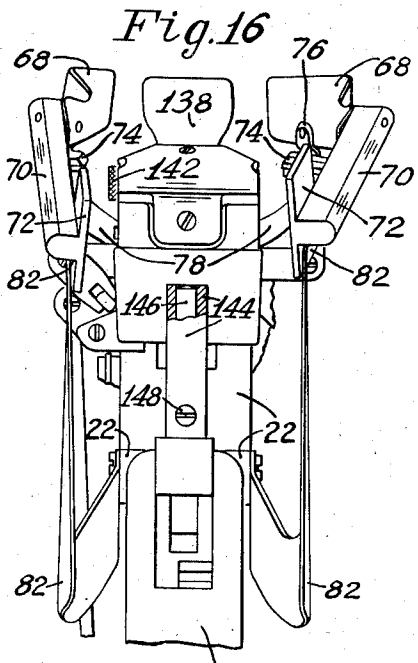
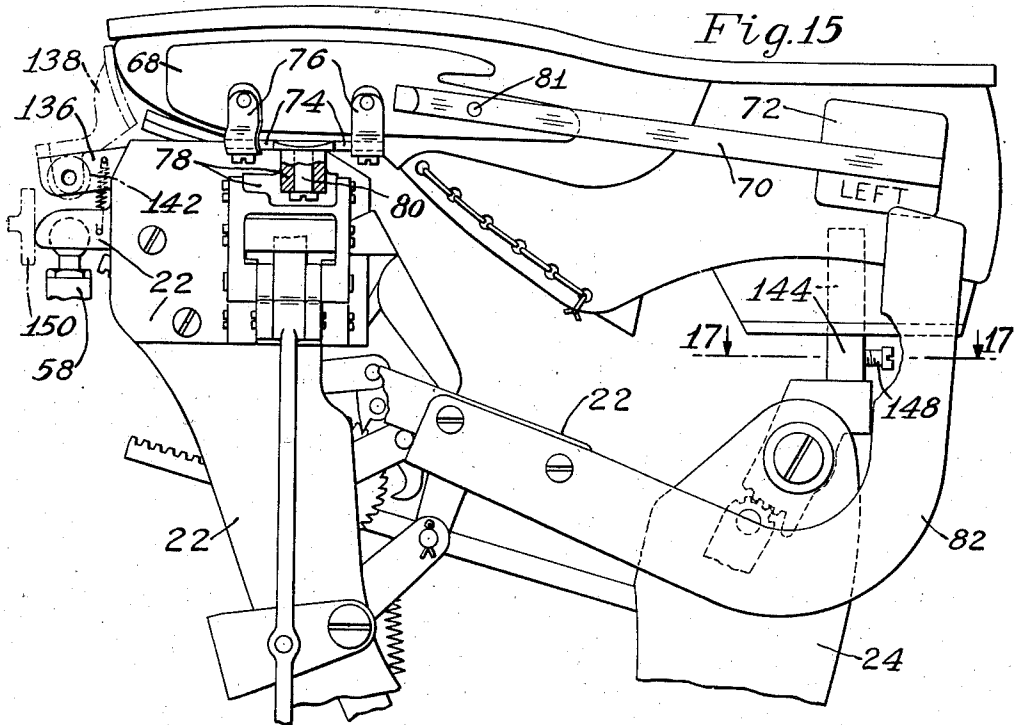
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SHOE MACHINE

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6 Sheets-Sheet 6



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Fig. 18

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UNITED STATES PATENT OFFICE

2,293,080

SHOE MACHINE

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Application July 27, 1939, Serial No. 236,874

17 Claims. (Cl. 12-17)

The present invention relates to machines for use in the manufacture of shoes, and is intended primarily as an improvement in the edge trimming machine disclosed in applicant's prior Patent No. 2,115,978 dated May 3, 1938, although the invention in its broader aspects is not limited to automatic machines in which mechanism is provided, as in the patented machine, for imparting relative movement to operating devices and a shoe supporting jack, nor is it limited as to its broader features to performing an edge trimming operation on the shoe.

The object of the invention is to provide a machine comprising a shoe supporting jack and devices for performing an operation on the shoe along its bottom margin with improved means for determining the contour line followed by said devices during the relative movement of said devices and jack.

Heretofore this contour line has been determined by means of a guiding device bearing against some part of the shoe itself or against a rigid pattern or templet clamped on the shoe bottom or supported on the sides of the shoe as in applicant's patent above referred to. Determination of the contour line in any of these ways is open to certain objections. The use of the shoe itself to cooperate with guiding devices tends to reproduce in the contour line the irregularities in the surface of the shoe, as for instance, the irregularity at the junction of the shoe vamp with the toe cap or with the quarter or irregularities occasioned by the misplacing of the inseam. The use of rigid patterns or templates, regardless of their position with relation to the shoe, necessitates the use of a large number of templates for different sizes and styles of shoes and the use of a rigid pattern or templet clamped upon the shoe bottom interferes with operations which it may be desired to perform along the bottom margin.

To provide an improved means for determining the contour line followed by devices performing an operation along the bottom margin of the shoe, a feature of the present invention contemplates determining at least a portion of the contour line by means of a templet comprising a flexible member supported in contact with and conforming generally with the contour outline of a substantial length of a lasted shoe upper adjacent the bottom margin of the shoe. The use of such a templet member cooperating with a guide engaging the templet permits the determining of a contour line corresponding to the general outline of the shoe being acted upon without reproducing the irregularities and inaccura-

cies of the surface of the shoe. Broadly considered, this feature of the invention contemplates a flexible templet member of any desired length arranged to engage any desired portion of the shoe upper. In the construction hereinafter described in which this feature and additional features of the invention have been embodied, two flexible templet members have been provided arranged for engagement with opposite sides of the shoe.

In connection with a flexible templet member arranged to engage a portion of the lasted shoe upper, a feature of the present invention contemplates the provision of a rigid templet member arranged to engage another portion of the shoe upper. Specifically this feature of the invention is embodied in a construction in which the flexible templet member is arranged to engage the forepart of the shoe and the rigid member is arranged to engage the shank portion of the shoe.

At the forepart of the shoe, the templet members engage the shoe upper adjacent the bottom margin of the shoe, which portion of the shoe upper presents a surface substantially free of sharp curvatures against which the flexible templet members can fit closely. The shank portion of the shoe adjacent the bottom margin, however, presents surfaces having comparatively sharp curvatures and, accordingly, at this portion of the shoe the templet members are arranged to extend along the upper at a greater distance from the shoe bottom where the curvature is more uniform.

Suitable guiding means are provided to engage the members of the templet and cooperate with the templet in determining the contour outline followed by the devices which operate upon the shoe. In the construction hereinafter described, these guiding means comprise two guides, one of which is arranged to engage the templet members extending along the forepart of the shoe, and the other to engage the templet members extending along the shank portions of the shoe. At certain portions of the shoe, it is feasible to utilize the last supported surface of the shoe upper adjacent the bottom margin of the shoe as a means for determining the contour outline and, accordingly, a feature of the present invention is embodied in a construction in which guiding means are provided which, at certain times during the transfer of the operating devices about the shoe, engage the templet and, at other times, engage the last supported upper directly. In the construction hereinafter described, one of the

guides which cooperates with the templet members at the forepart of the shoe is also utilized as a guiding means directly engaging the last supported upper.

In connection with the templet and templet engaging guide or guides, a pattern cam moving in timed relation to the transfer of the operating devices about the shoe is preferably employed to vary the position of the guide or guides, and thus cause the operating devices to follow a contour line differing from the contour of the templet, and more especially at the shank portions of the shoe. In connection with this pattern cam, a feature of the present invention contemplates a novel construction and arrangement which facilitates the substitution of one pattern cam for another. As hereinafter described, this feature is embodied in a construction in which the pattern cam for controlling the position of the templet guide or guides is mounted on its supporting shaft so as to be readily removable axially of the shaft.

The machine hereinafter described as embodying the several features of the present invention is provided with a shoe supporting jack, the movements of which in causing the point of operation of the trimming cutter to be transferred around the shoe are produced and controlled through suitable operating connections from a series of pattern cams mounted upon a pattern cam shaft which is rotated in timed relation to the progress of the trimming cutter around the shoe. As embodied in a machine of this character, a feature of the present invention contemplates the provision of cams and connections, and more particularly the cams and connections which produce the feeding movement of the shoe and the variable movement of the templet guide, constructed and arranged so that the movement of the shoe and guide at certain points during the trimming operation is retarded to permit the formation of comparatively sharp angles or curves on the shoe sole, and more particularly at the junction of the shank and forepart.

The jack of the illustrated machine is similar except as hereinafter described to that disclosed in applicant's prior patent above referred to and in the patent to Cross No. 2,056,713 dated October 6, 1936. The jack disclosed in said patents is provided with toe clamping devices comprising two toe clamps arranged for engagement with opposite sides of the shoe adjacent the toe of a shoe supported on the jack. In accordance with a feature of the present invention the members of the templet which engage the forepart of the shoe are mounted on the arms which, in the jack of said patents, carry the toe clamps. The templet members which engage the forepart of the shoe, therefore, in accordance with the present invention, also act as toe clamping devices which locate the toe portion of the shoe laterally in position on the jack.

In connection with the jack of the illustrated machine, features of the present invention also contemplate the provision of a toe gage for determining the longitudinal position of the shoe on the jack which toe gage is constructed so as to be movable out of operative position so as not to interfere with the templet and shoe guides during the sole trimming operation, and also the provision of an improved last pin supporting device by which the lasted shoe may be properly adjusted on the jack, regardless of inaccuracies in the location of the last pin hole.

In connection with an automatic machine of the character illustrated, a feature of the present invention also contemplates the provision of novel and improved means for determining the position of the jacked shoe in the machine at the start of the operation, said means comprising a gage mounted on the main frame of the machine arranged to engage the jack as it is moved by the operator to starting position and locate the toe of the shoe in a predetermined position and thereafter to be moved out of operative position where it will not interfere with the operation of the machine.

In addition to the features of invention above referred to, the present invention also consists in certain combinations, devices, and arrangements of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art from the following description taken in connection with the accompanying drawings in which Figure 1 is a view in front elevation of an automatic sole edge trimming machine embodying the several features of the invention; Figure 2 is a plan view of the machine with portions of the frame broken away to show underlying parts; Figure 3 is a detail sectional view, taken on the line 3—3 of Figure 2; Figure 4 is a detail sectional plan view taken on the line 4—4 of Figure 3; Figure 5 is a sectional view, taken on the line 5—5 of Figure 2, illustrating particularly the cam and connections for actuating the templet guide and illustrating the guide in contact with the toe portion of the shoe; Figure 6 is a detail plan view of the cam and actuating connections for the templet guide and showing the guide in contact with the rigid templet member at the shank portion of a shoe in the machine; Figure 7 is a detail plan view of the templet guide illustrating the guide in contact with the templet member at the forepart of the shoe; Figure 8 is a detail view of the pattern cam from which, through suitable connections, feeding movement is imparted to the jack to carry the shoe past the templet guide; Figure 9 is a plan view of the shoe supporting jack with the templet members mounted thereon; Figure 10 is a detail view illustrating in side elevation and partly in section the shoe supporting jack, the trimming cutter and the templet guide; Figure 11 is a view of the toe end of the upper portion of the shoe supporting jack; Figure 12 is a view in front elevation of the shoe supporting jack with a portion of the supporting frame broken away to show underlying parts; Figure 13 is a view in front elevation of the gage with which the toe portion of the jack is brought into engagement to locate the toe of the shoe in a predetermined position in the machine at the start of the operation; Figure 14 is an end view of the gage illustrated in Figure 13; Figure 15 is a view in front elevation of the shoe supporting jack looking in the opposite direction from Figure 12; Figure 16 is a view in end elevation, partly in section of the shoe supporting jack illustrated in Figure 15 looking towards the heel end of the jack; Figure 17 is a detail sectional view, taken on the line 17—17 of Figure 15; and Figure 18 is a detail sectional view taken on the line 18—18 of Figure 17.

Except as hereinafter described, the machine illustrated in the drawings is the same in all essential particulars as the machine of applicant's prior Patent No. 2,115,978 above referred to.

The shoe supporting jack of the machine comprises a vertically arranged spindle 20 having

rigidly formed on its upper end a frame 22 which carries the toe support of the jack and to which is pivotally connected the heel supporting arm 24. At its lower end the jack spindle 20 is connected by universal connections to turn with a pulley 26 which is supported on the end of a forwardly extending jack supporting arm 28. The arm 28 is pivotally supported for vertical swinging movements on a support 30 which is carried on a vertical pivot post journaled in a frame 32 which is in turn pivoted for swinging movements forward and back on two pivot studs 34 on the base of the machine. The jack is thus supported in the machine as is usual in automatic machines of this type so that it can be moved at either its upper or its lower end in any direction and can be rotated. During the edge trimming operation, the position of the jacked shoe with relation to the trimming cutter is controlled as is also usual in the type of automatic machines, by a series of pattern cams on a vertical pattern cam shaft 36 which is driven so as to make one complete revolution during the trimming of each shoe by a driving and stopping mechanism, the housing for which is indicated at 38. The pattern cam actuated connections for controlling the position of the shoe include a cam lever 40 which is connected to the support 30, the cam lever 42 which is connected to the frame 32, and a cam lever 44 which through connections including the cord 46 is connected to the pulley 26. The mechanism for controlling the position of the shoe with relation to the trimming cutter also includes a pattern cam mounted on the pattern cam shaft 36, and connections actuated by the cam to impart a feeding movement to the jack to transfer the point of operation of the trimming cutter around the bottom margin of the shoe. This feed cam is indicated at 48, and the connections actuated by the feed cam include the cam lever 50, links 52 and 54 connecting the cam lever feed lever 56 and a link 58 connecting the feed lever 56 with a socket at the toe end of the jack at the upper end of the rigid frame 22. The sole trimming cutter is indicated at 60 and is secured upon the lower end of a vertical shaft driven by an electric motor mounted in the housing indicated at 62. Beneath the cutter a sole support or sole guide 64 is located which is secured to a bracket 66 projecting from the housing 62. This sole support is arranged to extend beneath the sole edge of a shoe supported on the jack and corresponds to the crease guide of the machine disclosed in applicant's prior patent.

During the sole trimming operation the jack is moved to transfer the point of operation of the cutter around the sole margin and during this transfer, the contour line followed by the cutter, and consequently the outline of the shoe sole, after being trimmed is determined by the engagement of guiding means fixed with relation to the trimming cutter in the direction of feeding movement of the jack and arranged to bear against the members of a templet mounted on the jack.

In accordance with a feature of the present invention these templet members comprise a pair of flexible plates indicated at 68 supported on the jack so as to extend along substantially the entire length of the forepart on each side of the shoe, and to bear against the last supported upper closely adjacent the bottom margin of the shoe. These plates are comparatively thin and are sufficiently flexible to conform generally with the contour outline of the lasted shoe upper with-

out, however, fitting into the irregularities and inaccuracies of the surface such, for instance, as the shoulder formed at the junction of the toe cap with the vamp. In addition to these flexible templet members, the illustrated machine is also provided with rigid templet members indicated at 70 which are secured at their forward ends to the rear ends of the flexible templet members and extend rearwardly along the shank portions of the shoe at each side of the shoe. At their rear ends, these rigid templet members are provided with plates 72 which are arranged to bear against each side of the shoe at the heel portion and, in order to facilitate the proper location of the rigid members 70 with relation to the bottom margin of the shoe, they are arranged to extend along the upper at a greater distance from the shoe bottom than the edges of the flexible members which fit closely against the shoe upper.

To support the flexible templet members on the jack so as to be movable into and out of engagement with the forepart of a shoe on the jack, each plate 68 is connected to a block 74 by means of clips 76, the vertical portions of which are riveted to the plates, and the horizontal portions of which extend beneath and are bolted to the block 74. The blocks 74 are mounted upon the upper ends of levers 78 supported in the jack so as to be movable towards and from each other. In order to permit the plates 68 to press evenly against the last supported upper along a substantial length of the forepart of the shoe, the blocks 74 are mounted in the levers 78 by means of vertical pivot pins 80. Each rigid templet member 70 is secured at its forward end by means of a single pivot pin 81 to a rearwardly projecting portion of a flexible templet member 68, the pivotal connection permitting a vertical adjustment of the rigid templet members about the pivots to bring them into any position desired to suit the particular style of shoe being operated on. The rigid templet members 70 are supported from the plates 68 in such a manner, as clearly shown in Fig. 9, that during the movements of the plates 68 towards the forepart of the shoe the plates 72 at the rear ends of the rigid templet members are brought into engagement with the heel portion of the shoe. Movement of the upper ends of the levers 78 towards each other thus brings all of the members of the templet into engagement with the shoe and clamps them firmly in the desired relation to the bottom margin of the shoe. Movement of the upper ends of the arms 78 away from each other removes all of the templet members from engagement with the shoe and, as the rigid members 70 reach their outer positions, the rear ends of the members rest upon and are supported by the upper ends of curved plates 82 secured to and projecting upwardly from a portion of the jack frame 22.

The jack of the illustrated machine is the jack disclosed in applicant's prior patent above referred to and more fully described in the patent to Cross No. 2,056,714 dated October 6, 1936. In the jack of the illustrated machine, however, the toe clamps of the Cross jack have been omitted and the blocks 74 to which the flexible templet members are secured have been mounted on the toe clamp actuating levers in substantially the position of the toe clamps. The flexible templet members in the illustrated machine are, therefore, moved into and out of engagement with the shoe by the same mechanism which is used in the Cross jack to actuate the toe clamps, and the flexible templet members,

in addition to acting as a templet, also act as toe clamps to locate the shoe laterally on the jack.

As fully described in the Cross patent, the lasted shoe is located longitudinally on the jack by the movement of the heel supporting arm 24 towards the toe support on the frame 22 and thereafter the toe clamps, which in the present instance are the flexible templet members 68, are moved into engagement with the forepart of the shoe through connections from the jacking lever 84, and finally by continued movement of the jacking lever the shoe is firmly clamped on the jack. The connections from the jacking lever for moving the flexible templet members into engagement with the shoe and for clamping the shoe on the jack are illustrated in the drawings accompanying the present application, but inasmuch as these connections are fully described in the Cross patent and in applicant's prior patent, a repetition of this description is believed to be unnecessary.

The guiding means which cooperate with the templet members in determining the contour line followed by the trimming cutter comprises two guiding surfaces formed on a block 86, one of said surfaces being indicated at 88 arranged to engage the flexible forepart members of the templet closely adjacent the bottom margin of the shoe and the other surface being indicated at 90 arranged to engage the rigid templet members on a level more remote from the bottom margin of the shoe. The block 86 having guiding surfaces 88 and 90 is mounted in the machine substantially in alinement transversely of the direction of the feeding movement of the jack with the point of operation of the trimming cutter on the sole edge. The jack is constantly pressed inwardly towards the trimming cutter as is usual in this type of automatic shoe machine and, consequently, as the point of operation of the cutter is transferred around the shoe, the position of the sole of the shoe with relation to the cutter is determined by the contact of the templet members with the guiding surfaces 88 and 90. The surfaces 88 and 90 are so arranged with relation to the external surfaces of the templet members that during the transfer of the point of operation around the shoe the guiding surfaces pass smoothly from the rigid to the flexible templet member on one side of the shoe and again from the flexible member to the rigid member at the other side of the shoe. At the toe portion of the shoe the last supported upper presents a smooth even surface and, accordingly, in the illustrated machine this surface is used to cooperate directly with a guiding surface, the surface 88 which cooperates with the flexible templet members at the forepart of the shoe being conveniently utilized as a guiding means to cooperate directly with the last supported upper at the toe of the shoe.

At the forepart of the shoe the flexible templet members conform closely to the last supported surface of the upper, and at this portion of the shoe and around the toe, the templet guide acts closely adjacent to the bottom margin of the shoe. As a consequence, at these portions of the shoe the contour line followed by the trimming cutter will closely approximate the contour of the bottom margin of the shoe while the contacting guiding surface 88 remains stationary. At the shank portion of the shoe, however, the templet members do not conform to

the sharp curvatures of the bottom margin of the shoe and, furthermore, the guiding surface 90 engages the templet at a considerable distance from the bottom margin. As a consequence, in order to cause the trimming cutter to follow the desired contour line at the shank portion of the shoe, a pattern cam and suitable connections is provided for controlling the position of the guide. Conveniently this pattern cam is arranged to control the position of the block 86 carrying the surface 88 and 90 throughout the entire edge trimming operation, the cam being so shaped, however, that the block 86 is held substantially stationary during the operation on the forepart. The pattern cam for controlling the position of the block 86 is indicated at 92 and is arranged to act on a lever 94 connected by a link 96 and strap 98 to a slide 100 carrying at its forward end the block 86 and mounted to slide in a guideway in the projection 66 from the housing 62.

A spring 102 connected to the link 96 acts to hold the follower of the cam lever 94 in contact with the pattern cam 92, and adjustable locking nuts 104, by means of which the strap 98 is secured to the link 96, provide a means for adjusting the initial position of the guiding surfaces 88 and 90 of the block 86.

The pattern cam 92 makes one complete revolution during the trimming of each shoe and, consequently, rotates in unison with the pattern cams on the pattern cam shaft 36. For different styles of shoes, it is necessary to use pattern cams of different shapes to control the position of the templet guides and, in order to permit the ready substitution of one pattern cam 92 for another, the cam is supported independently of the pattern cam shaft 36. As illustrated, particularly in Figures 5 and 6, the pattern cam 92 is removably secured by means of two screws 106 and a pin 108 to the hub of a gear 110 which is secured by means of screws, one of which is indicated at 112, to the projecting flange of an elongated sleeve 114 mounted to rotate upon a vertical supporting stud 116. The pattern cam 92 is thus supported separately from the pattern cam shaft 36 upon the vertical stud 116 so that it can be readily removed axially of the stud and of the supporting sleeve 114.

The machine illustrated in the drawings is adapted for operation upon both right and left shoes, the same cam 92 being utilized for both rights and lefts by removing the cam and replacing it with the other side up. In thus inverting the cam 92 the starting position of the cam with relation to the cam follower of the cam lever 94 is changed and, in order to bring the cam into the proper position with relation to the cam follower at the start of the operation without disturbing the pattern cam shaft 36 and the pattern cams thereon, means are provided for disconnecting the gear 110 from the connections through which it is driven from the pattern cam shaft 36 so as to permit an independent rotation of the gear 110 with the cam 92 thereon to bring the cam into the required position with relation to the cam follower. In the construction illustrated, the gear 110 is driven from a gear 118 on the pattern cam shaft 36 (see Figs. 2, 3 and 4) through a pinion 120 on the lower end of a vertical shaft 122 meshing with the gear 118 and a pinion 124 on the upper end of the shaft 122 meshing with the gear 110. To permit an independent rotation of the gear 110, the pinion 124 is secured to the shaft 122 by means of a split

collar 126 clamped to the shaft by means of a bolt 128 and provided with a pin 130 projecting downwardly into the gear 124 which, except as restrained by the pin 130, is free to rotate on the shaft 122. When the split sleeve 126 is loosened by unscrewing the bolt 128, the pinion 124 and consequently the gear 110 with the cam 92 are free to rotate independently of the pattern cam shaft 36 and the gear 110 can be rotated to bring the cam into the desired starting position. This position is indicated by a suitable mark 132 on the cam so located as to be in alignment with a fixed pointer 134 on the machine frame when the cam is in the proper starting position.

The illustrated machine is adapted to produce shoe soles having comparatively sharp angles or curves at certain points and more particularly at the junction of the inside shank with the forepart. To facilitate the formation of soles having angles or curves of this character, the cam 92 and the cam 48 which is the principal cam producing the feeding movement of the shoe past the templet guide are formed with surface cooperating with their cam followers to retard the movements of the shoe and of the templet guide while the trimming cutter is operating at certain points along the shoe, and particularly while the trimming cutter is passing from the inside shank portion of the shoe to the forepart.

As has been stated, the jack of the illustrated machine is the jack disclosed and fully described in the patent to Cross No. 2,056,714. The jack disclosed in the Cross patent is provided with a feeler to engage the toe of the shoe as the shoe is moved longitudinally into position on the jack and trips into operation the stopping and locking devices which determine the longitudinal position of the shoe on the jack.

In the illustrated machine, this feeler, which is indicated at 136, is provided with a toe engaging portion 138 separate from the main portion of the feeler and mounted thereon so as to be removable after the shoe is located on the jack so as not to interfere with the templet guide as it passes along the last supported surface at the toe portion of the shoe. To enable the toe engaging portion 138 to be conveniently removed, it is mounted between ears projecting from the main portion of the feeler and is held in position by a removable pin 140 provided at its outer end with a knurled head 142.

The last pin hole of a last is sometimes inaccurately located in the last or becomes somewhat worn so that unless provision is made for correcting the error, the last when placed upon the last supporting pin of the jack will not be properly located with relation to the templet members which may be higher on one side of the shoe than the other. To permit lasts having last pin holes inaccurately located to be adjusted with relation to the templet members, the heel supporting last pin of the illustrated machine is mounted on the heel supporting arm 24 so as to permit angular adjustment of the axis of the pin laterally of a last placed on the jack. As illustrated in Figures 17 and 18, this adjustment of the last pin is permitted by mounting the last pin, indicated at 144, upon a stud 146 which extends longitudinally through the pin 144 at an angle to the axis of the pin. This construction permits the rotation of the pin 144 on the stud 146 to change the inclination of its axis, the pin being secured in any desired adjusted position by

means of a set screw 148 passing through the lower portion of the pin and bearing against the stud 146.

The gage of the illustrated machine which is mounted on the main frame of the machine and arranged to engage the jack in proximity to the toe of a shoe located on the jack is indicated at 150 and when the gage is in operative position is arranged to contact with the toe portion of the jack adjacent the toe engaging feeler 136. After the shoe is located and clamped on the jack, the jack is moved by the operator until stopped by the gage 150 and thus the lasted shoe on the jack is brought to the proper position with relation to the trimming cutter to start the trimming operation on the shoe sole. In order not to interfere with the operation of the machine, the gage 150 is mounted so as to be swung upwardly and inwardly to an inoperative position, and to this end the gage is secured by means of a thumb screw 152 and pins 154 to an arm 156 fastened to a horizontal shaft 158 which is rotatably mounted at one side of the jack in a bracket 160 extending from the frame of the machine. To enable the gage 150 to be located in the proper position for shoes of different sizes, the shaft 158 to which the arm 156 carrying the gage is secured is mounted so as to be longitudinally movable. When in operative position the correct location of the gage is determined by a series of notches 162 formed in the front edge of the bracket supporting the shaft 158 and arranged to be engaged by one of the pins 154 connecting the gage 150 with the arm 156. In the operative position of the gage 150, the arm 156 rests on and is supported in a horizontal position by the bracket 160. A leaf spring 164 mounted on the bracket and bearing against the shaft 158 serves to retain the arm in a vertical position when the gage 150 is swung upwardly to an inoperative position.

As has been stated, the illustrated machine is designed for operation upon both right and left shoes. A somewhat different location of the gage 150 is required for right and left shoes of the same size. Accordingly to change the machine for operation from a left to a right shoe, the gage 150 is removed from the arm 156 and another gage substituted therefor, this interchange being permitted by the removable securing means comprising the thumb screw 152 and pins 154.

The nature and scope of the invention having been indicated, and a machine embodying the several features of the invention having been specifically described, what is claimed is:

1. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising a plurality of flexible plates, each of which is arranged to contact with and to conform generally with the contour outline of a substantial length of shoe upper adjacent the bottom margin of the shoe, and a guide engaging the templet and cooperating therewith to determine the contour line followed by said operating means while the guide is in engagement with the templet during said relative movement.

2. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet

comprising a flexible plate supported in contact with and conforming generally with the contour outline of a lasted shoe upper adjacent the bottom margin of the shoe, and a guide engaging the templet and cooperating therewith to cause said operating means to follow a contour line determined substantially by the contour of the last while the guide is in engagement with said plate.

3. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet comprising a pair of flexible plates supported for engagement with opposite sides of the shoe, and conforming generally with the contour outline of a substantial length of shoe upper adjacent the bottom margin of the shoe, and a guide engaging the templet and cooperating therewith to cause said operating means to follow a contour line determined substantially by the contour of the last while the guide is in engagement with said plates.

4. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising members supported on the jack for engagement against the lasted shoe upper and having portions thereof of rigidly formed and other portions thereof consisting of flexible plates, each of which is arranged to contact with and to conform generally with the contour outline of portions of shoe upper adjacent the bottom margin of the shoe, and guiding means cooperating with the templet to determine the contour line followed by said operating means.

5. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, and a templet mounted on the jack for engagement with the shoe upper, said templet comprising flexible plates, each of which is arranged to contact with and conform generally with the contour outline of the forepart portions of the shoe upper adjacent the bottom margin of the shoe, and additional rigidly formed members extending along the shank portion of the shoe, and guiding means cooperating with the templet to determine the contour line followed by said operating means.

6. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising flexible members engaging with and conforming generally with the contour outline of the forepart portions of the shoe upper adjacent the bottom margin of the shoe, and rigidly formed portions extending along the shank portions of the shoe, and a pair of guides one of which is arranged to engage the flexible members of the templet and the other of which is arranged to engage the rigid portions of the templet and cooperate with said members to determine the contour line followed by said operating means during the transfer of

said operating means around the bottom margin of the shoe.

7. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising flexible members engaging with and conforming generally with the contour outline of the forepart portions of the shoe upper adjacent the bottom margin of the shoe, and rigidly formed portions extending along the shank portions of the shoe, and a pair of guides one of which is arranged to engage the flexible members of the templet and the other of which is arranged to engage the rigid portions of the templet and cooperate with said members to determine the contour line followed by said operating means during the transfer of said operating means around the bottom margin of the shoe, and means including a pattern cam for controlling the position of the last-mentioned guide.

8. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising members extending along substantial lengths of shoe upper adjacent the bottom margin of the shoe, and guiding means engaging at different times during said relative movement the templet and the shoe upper to determine the contour line followed by said operating means.

9. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising flexible members engaging with and conforming generally with the contour outline of the forepart portions of the shoe upper adjacent the bottom margin of the shoe, and rigidly formed portions extending along the shank portions of the shoe, and guiding means engaging at different times during said relative movement the rigid and flexible members of the templet and the shoe upper to determine the contour line followed by said operating means.

10. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, means comprising a guide past which the shoe is fed for determining the contour line followed by said operating means, pattern cams and suitable connections for imparting said relative movement to the jack and said operating means and for moving the guide transversely to the direction of said relative movement acting to retard said relative movement and the transverse movement of the guide while said operating means is operating along the junction of the shank and forepart of the shoe.

11. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, means com-

prising a guide past which the shoe is fed for determining the contour line followed by said operating means, means including a pattern cam rotating in timed relation to the transfer of said operating means along the bottom margin of the shoe for moving the guide transversely to the direction of said relative movement, a supporting shaft for said pattern cam, and means for mounting the cam on the shaft permitting its ready removal axially of the shaft.

12. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, means comprising a guide past which the shoe is fed for determining the contour line followed by said operating means, pattern cams rotating in timed relation to the transfer of said operating means along the bottom margin of the shoe, and suitable connections for imparting said relative movements to the jack and said operating means, a pattern cam shaft on which said pattern cams are mounted, a pattern cam rotating in unison with said pattern cams and suitable connections for moving said guide transversely to the direction of said relative movement, a supporting shaft for said last-mentioned cam separate from said pattern cam shaft, and means for mounting said last-mentioned cam on its shaft permitting ready removal of the cam axially of the shaft.

13. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising members extending along opposite sides of the forepart portion of the shoe upper adjacent the bottom margin of the shoe, a guide to engage the templet and cooperate therewith in determining the contour line followed by said operating means while the guide is in engagement with the templet during said relative movement, and means for actuating the templet members to engage the toe portion of the shoe and locate this portion of the shoe laterally on the jack.

14. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, a templet mounted on the jack for engagement with the shoe upper, said templet comprising members extending along opposite sides of the forepart portion of the shoe upper adjacent the bottom margin of the shoe, a guide to engage the templet and cooperate therewith in determining the contour line followed by said operating means while

the guide is in engagement with the templet during said relative movement, a jacking lever mounted on the jack, and connections actuated by the jacking lever for moving the templet members into engagement with the toe portion of the shoe to locate this portion of the shoe laterally on the jack and for thereafter clamping the shoe on the jack.

15. A shoe machine having, in combination, means for operating upon a shoe, a shot supporting jack comprising a heel support and a toe rest relatively movable towards each other to locate a shoe longitudinally on the jack, said operating means and jack being relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, means comprising a guide past which the shoe is fed for determining the contour line followed by said operating means arranged to bear directly against the last supported upper at the toe portion of the shoe, a feeler arranged to engage the toe of the shoe, means controlled by the feeler for determining the longitudinal position of the shoe on the jack, and means supporting the feeler permitting its ready removal to prevent interference with said guide.

16. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of a lasted shoe supported on the jack, pattern cams and suitable connection for imparting said relative movement to said operating means and jack, means to locate the toe of a shoe regardless of size at a given point on the jack, and a gage to contact with the jack adjacent said point adjustable to locate said point at the start of the operation on the shoe at a distance from the point of operation varying with the size of the shoe.

17. A shoe machine having, in combination, means for operating upon a shoe and a shoe supporting jack relatively movable to transfer said operating means along the bottom margin of the lasted shoe supported on the jack, a templet mounted on the jack for engaging with the shoe upper, said templet comprising flexible members contacting with and conforming generally with the contour outline of the forepart portions of the shoe upper adjacent the bottom margin of the shoe, rigidly formed members mounted on said flexible members and extending along the shank portion of the shoe, guiding means to engage said templet members and cooperate therewith in determining the contour line followed by said operating means while the guiding means is in engagement with the templet members, and means for actuating the flexible templet members to engage the toe portion of the shoe.

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