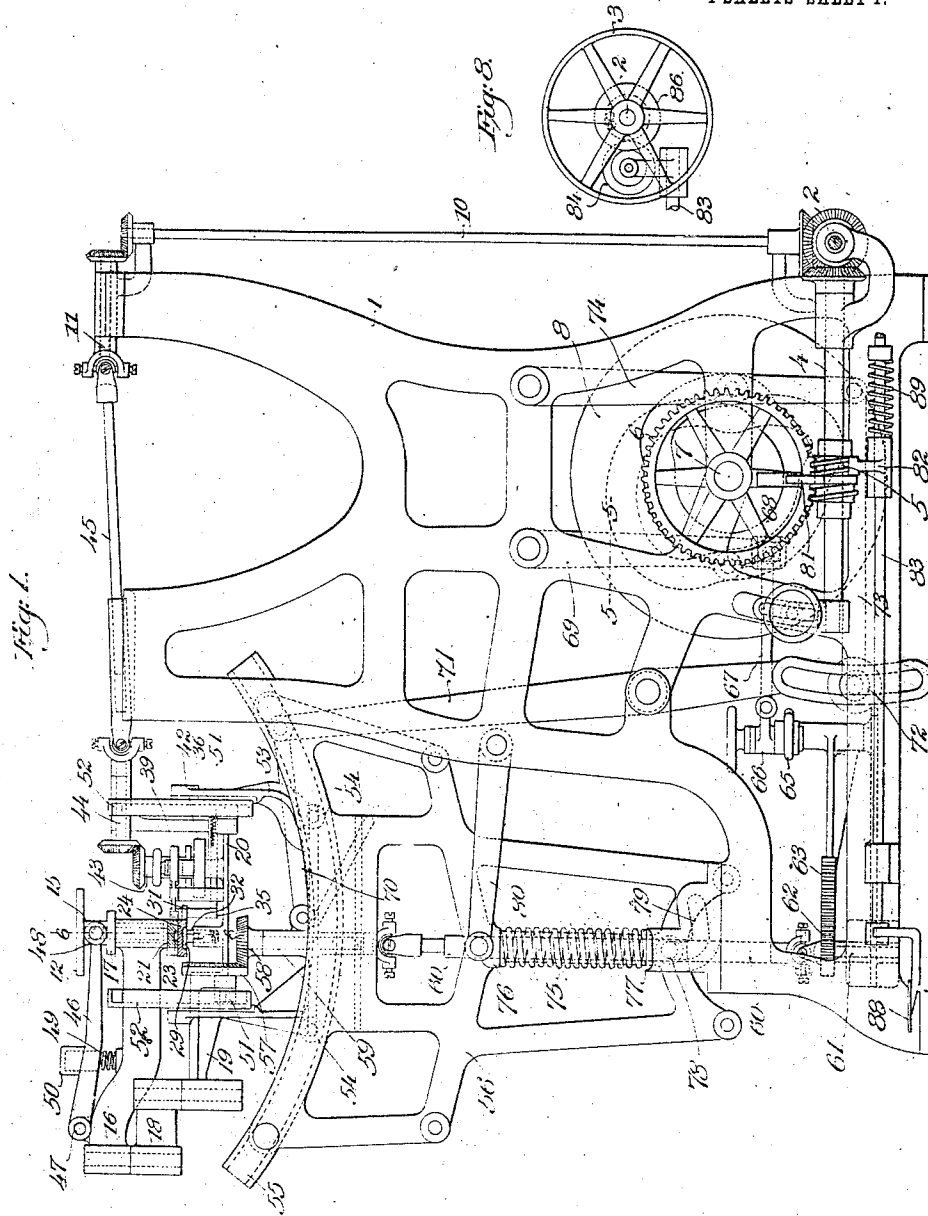


E. E. WINKLEY.
JACK FOR SHOE MACHINERY.
APPLICATION FILED JULY 15, 1901.

1,054,732.

Patented Mar. 4, 1913.

4 SHEETS—SHEET 1.



Witnesses:
John F. L. Prindler,
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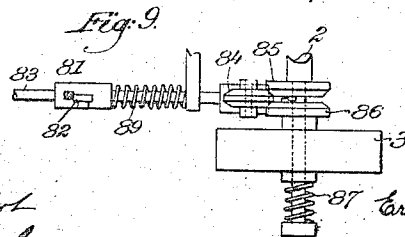
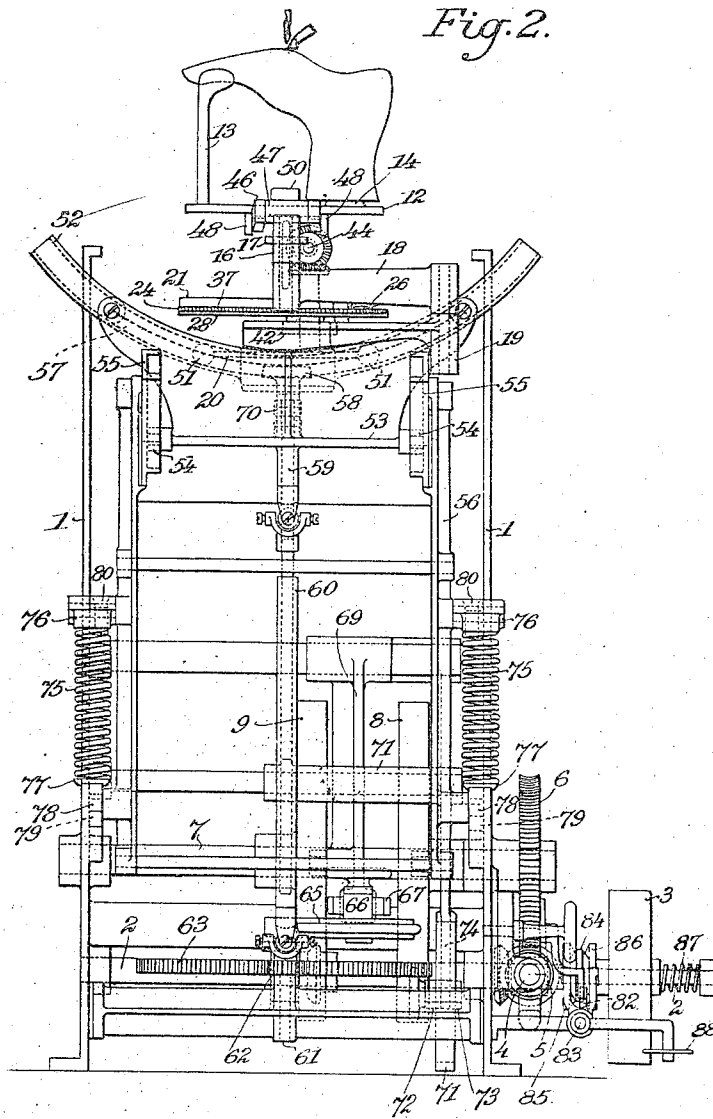
Inventor:
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by his Attorney
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4 SHEETS-SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 3.

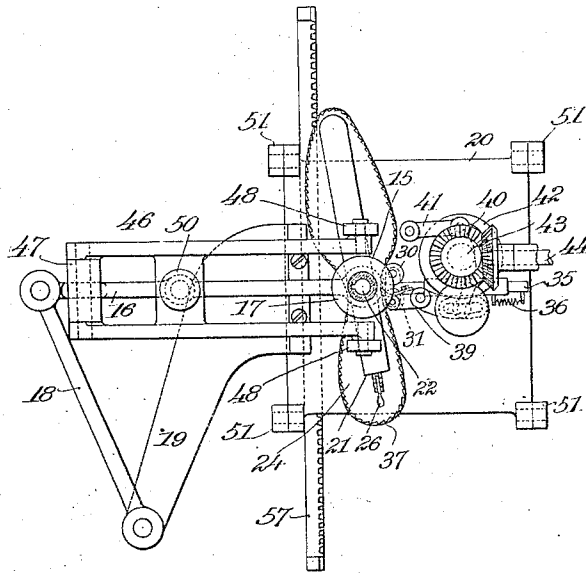
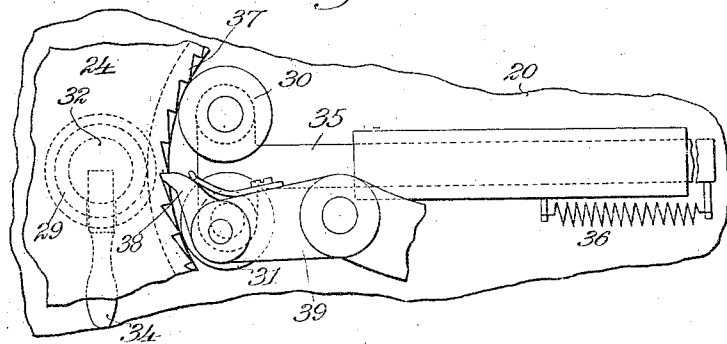


Fig. 4.



Witnesses:

John F. L. Prewitt
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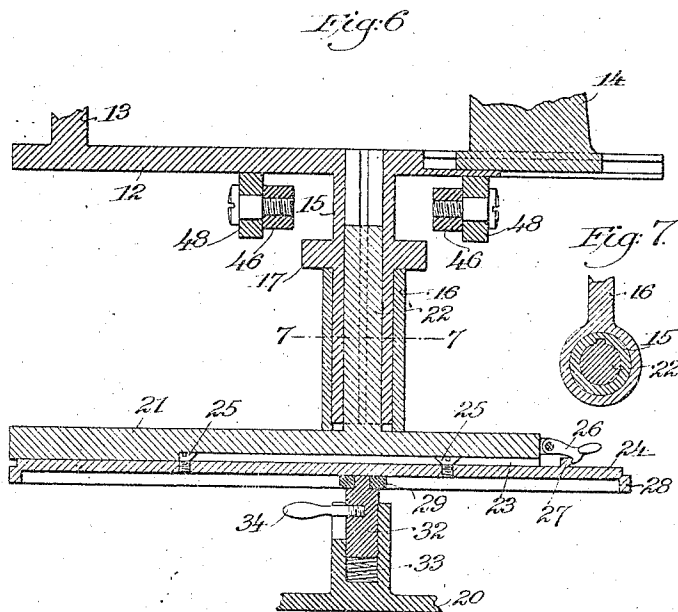
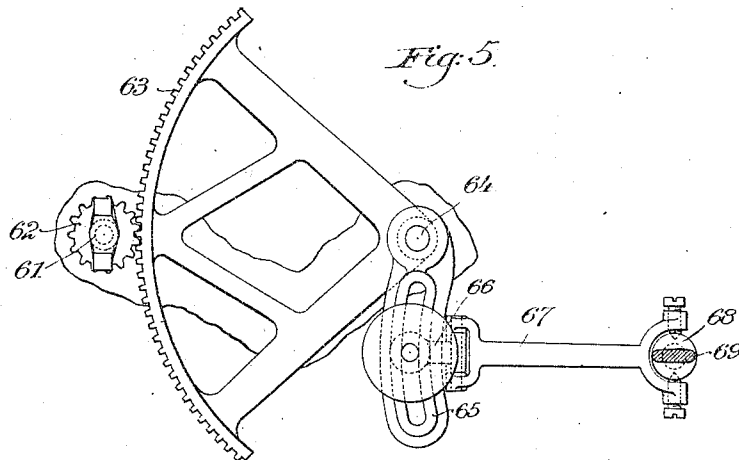
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4 SHEETS-SHEET 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY, OF LYNN, MASSACHUSETTS.

JACK FOR SHOE MACHINERY.

1,054,732.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed July 15, 1901. Serial No. 68,432.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Jacks for Shoe Machinery; 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 machines for operating upon boots and shoes and more particularly to a shoe supporting jack and means for actuating the same to bring the shoe supported thereon into proper position with relation to the tool or tools of a machine as the point of operation of the tool or tools is transferred around the shoe.

In machines used in the manufacture of boots and shoes, such as nailing machines, pegging machines, sewing machines, sole edge finishing machines and the like, the boot or shoe is held in position to be acted upon by the tool or tools of the machine by the operator and is controlled and guided more or less by the operator as the point of application of the tool or tools is transferred around the boot or shoe. In shoe sewing machines of the type known as welt and turn sewing machines and of the type known as out-seam stitchers the lasted shoe is held in the hand of the operator and is manipulated by the operator to properly present the shoe to the sewing mechanism as the shoe is fed forward during the operation of the machine. The shoe is held and manipulated by the operator in substantially the same manner in sole edge finishing machines such as rounding and channeling machines and the like. In nailing and pegging machines the shoe is usually supported upon a jack which is moved by the operator to present the shoe to the nailing or pegging devices. In all these machines, therefore, the position of the shoe with relation to the tool is controlled by the operator and skilled operatives must be employed to run the machines. Even when operatives of the highest skill and of long experience are employed it has been found to be impossible to produce uniform work with the machines now in use or even to produce two shoes which are exactly alike. This is due to the fact that it is impossible to prevent forcing the work ahead of the feed mechanism at times, thereby altering the

timed relation between the shoe and the instrumentalities of the machine, as for instance the relation between the shoe and movable gage of a rounding and channeling machine or of an outseam stitcher. This forcing or crowding of the work also causes the tool to act irregularly on the shoe and in the case of sewing machines produces variations in the length of the stitches. Owing to the peculiar shape or contour of the portion of the shoe to be acted upon it is also impossible to impart precisely the same movements to successive shoes in presenting them to the action of the tool and irregularities occur in the work for this reason.

Various attempts have been made to obviate the objections above noted by providing some of the types of machines above referred to with a shoe supporting jack and with means for actuating the jack to feed the shoe supported thereon to the tool. These attempts have, however, been unsuccessful in producing a practically operative machine capable of doing satisfactory work, as the machines were not provided with means to actuate the jack to bring the shoe into proper position with relation to the tool. In a machine provided with a shoe supporting jack in order to bring the shoe into the proper position with relation to the tool it is necessary to impart to the jack lateral rocking movements to bring the bottom of the last or shoe sole into the desired plane transversely of the last, longitudinal tilting movements to bring the bottom of the last or shoe sole into the desired plane longitudinally of the last, and lateral swinging movements to bring the portion of the edge of the last or shoe sole in proximity with the tool into the desired position with relation to the line of feed. In order to prevent the displacement with relation to the tool of the portion of the shoe to be acted upon by the tool, it is necessary that these movements take place about a center coincident with the point of operation of the tool. These are the movements imparted to a lasted shoe in the hands of an operator in being presented to the tool or tools of a machine of the character above referred to.

In my pending application Serial No. 690,634, filed September 14, 1898, I have disclosed and broadly claimed mechanism for actuating a shoe supporting jack to impart the necessary movements to a shoe supported thereon to bring the shoe into the

proper position with relation to the tool, the movements imparted to the jack to bring the sole of the shoe into the desired plane taking place about a center substantially co-

incident with the point of operation of the tool.

The object of the present invention is to provide a shoe supporting jack and actuating mechanism therefor of improved and simplified construction and mode of operation, whereby the jack is actuated to bring the shoe into the proper position with relation to the tool, as the point of operation of the tool is transferred around the shoe, and with this object in view my invention consists in the devices and combinations of devices hereinafter described and claimed.

A mechanism embodying my invention in its preferred form is illustrated in the accompanying drawings but it is to be understood that my invention is not limited to the specific form of mechanism shown but may be embodied in many different constructions without departing from the spirit thereof.

Referring to the drawings, Figure 1 is a view in side elevation of a mechanism embodying my invention, the driving pulley and a portion of the stop mechanism being broken away to show underlying parts, Fig. 2 is a front view of the mechanism shown in Fig. 1, Fig. 3 is a plan view of the carriage upon which the jack is mounted and the mechanism carried thereby detached from the machine, the supporting stem of the jack being shown in section. Fig. 4 is an enlarged detail plan view of a portion of the feeding mechanism for the jack and the mechanism for swinging the jack laterally. Fig. 5 is a detail plan view on the line 5—5 of Fig. 1 of a portion of the mechanism for actuating the jack to bring the sole of the shoe into the desired plane. Fig. 6 is a sectional view on the line 6—6, Fig. 1. Fig. 7 is a sectional view on the line 7—7, Fig. 6, and Figs. 8 and 9 are detail views in side elevation and plan of the driving pulley and portions of a stop mechanism.

1 indicates the main frame of any suitable construction for supporting the operating parts. Mounted in suitable bearings in the lower rear portion of the frame 1 is a driving shaft 2 provided with a suitable driving pulley 3. A shaft 4 is journaled in the main frame at right angles to the shaft 2 and is driven therefrom by beveled gears connecting the shafts as shown. To the shaft 4 is secured a worm 5 which meshes with a worm wheel 6 secured to a shaft 7 journaled in the frame 1 to which is also secured the cam disks 8 and 9 from which movements are imparted to the jack to bring the sole of the shoe into the desired plane through mechanism which will be hereinafter described. At the rear of the frame 1 is a vertical shaft

2 through beveled gears as shown and at its upper end similarly connected with a short horizontal shaft 11 journaled in the upper, rear portion of the frame. From the shaft 11 feeding movements are imparted to the jack to transfer the point of operation of the tool around the shoe through mechanism to be hereinafter described.

The jack which I have illustrated in the drawings consists of a base plate 12 having secured thereto or formed integral therewith upwardly extending toe and heel rests 13 and 14 for supporting a last in the usual manner. Projecting downwardly from the base plate 12 is a tubular spindle 15 which is journaled so as to rotate and slide vertically in a sleeve on the free end of a horizontally swinging arm 16, the downward movement of the spindle being limited by a flange 17 thereon contacting with the upper end of the sleeve. The arm 16 is pivoted at one end of an arm 18, the other end of which is pivoted to a bracket 19 secured to a carriage 20. The above described construction is such that the jack is free to rotate in the sleeve of arm 16 and can be moved bodily with relation to the carriage 20 in any direction in a horizontal plane. This construction, therefore, allows the jack to move to transfer the point of operation of the tool around the shoe and to bring the edge of the sole or last into the desired position with relation to the line of feed. In order to impart these movements to the jack the following mechanism is provided: 21 designates a plate extending parallel with the base plate 12 of the jack and provided with an upwardly projecting spindle 22 which projects into the tubular spindle 15 of the jack and to which it is connected by means of a spline as shown in Fig. 7, the construction being such that the base plate 12 of the jack is caused to rotate with the plate 21 but is free to move vertically with relation thereto. The lower face of plate 21 is provided with a dove-tailed groove 23 which extends to one end of the plate. By means of this groove a pattern plate or form 24 is detachably secured to the plate 21, the pattern plate 24 being provided with headed screws 25 which are arranged to engage the groove 23 and hold the plate in position. In order to hold the plate 24 from movement endwise of the groove 23 a hook or latch 26 is pivoted to the end of the plate 21 and arranged to engage a projection 27 on the upper surface of plate 24. Plate 24 is provided at its edge with a downwardly projecting flange 28 which corresponds in size and shape to the portion of the shoe supported upon the jack which is to be operated upon by the tool. The flange 28 is a guiding flange and cooperating therewith are guide rolls or disks 29, 30 and 31 mounted upon the carriage 20, the rolls 30 and 31 being arranged to bear

against the outer edge of flange 28 and the roll 29 against the inner edge midway between rolls 30 and 31. The roll 29 is rotatably mounted upon the upper end of a pin 32 mounted to reciprocate vertically in a bearing projecting upwardly from the carriage 20. The pin 32 is held raised with the roll 29 in position to bear against the inner edge of flange 28 by means of a coiled spring 33 and is provided with a laterally projecting handle 34 by means of which the pin can be depressed to move the roll 29 below the flange 28 to allow the removal of the plate and the substitution of another of a different size or shape. By engaging the flange 28 the rolls 29, 30 and 31 act to swing the jack laterally and bring the edge of the last or shoe sole into the desired position with relation to the line of feed. In order to enable the rolls to engage the flange at all times without binding, notwithstanding the changes in the curvature of the flange, the rolls 30 and 31 are mounted upon a slide 35 which reciprocates in a guideway on the carriage 20 and is actuated in a direction to press the rolls against the flange by means of a coiled spring 36, one end of which is connected to the slide and the other end to the carriage 20. The edge of the plate 24 above the flange 28 is provided with ratchet teeth 37 which are engaged by a spring-pressed pawl 38 pivotally mounted upon one end of a lever 39 pivoted on the carriage 20. The other end of lever 39 is connected by means of a link 40 to an arm 41 pivoted on the carriage 20. The arm 41 is provided with a roll which engages a cam groove in the cam disk 42 secured to a vertical shaft 43 journaled in the carriage 20.

The shaft 43 is rotated from the shaft 11 through the following connections:—A short horizontal shaft 44 is journaled in a bracket secured to the carriage 20 and is connected at one end through bevel gears to the shaft 43 and at the other end to the shaft 11 by means of a telescoping rod 45 which has universal joint connections with the shafts 44 and 11. By the rotation of shaft 43 and cam 42 through the connections above described the lever 39 is oscillated and the pawl 38 is caused to engage the ratchet teeth 37 and impart an intermittent feeding movement to the jack. As a means for adjusting the throw of pawl 38 the connection between the lever 39 and link 40 is made adjustable as shown. The flange 28 is of a shape corresponding to that portion of the shoe which is to be acted upon by the tool and the rolls 29, 30 and 31 are so placed that the desired portion of the shoe is presented to the tool as the jack is fed forward by the action of pawl 38. As the jack is fed forward it is swung laterally by the action of rolls 29, 30 and 31 on flange 28 and the rolls are so placed that this swinging move-

ment takes place about an axis which passes through the point of operation of the tool. The bottom of the last or shoe supported on the jack is of irregular contour and in order to keep the shoe at the proper elevation at all times to be acted upon by the tool, the jack is yieldingly pressed upwardly by means of a frame 46 pivoted at 47 on the arm 16. The side members of this frame extend beneath the base plate 12 of the jack and at their inner ends are provided with blocks 48 rotatably mounted thereon which bear against the lower surface of the base plate. The frame 46 is pressed upwardly by means of a coiled spring 49, the lower end of which rests against the arm 16 and the upper end of which is received in a socket 50 formed in the cross-bar of the frame 46. The blocks 48 bearing against the under surface of the base plate 12 serve to hold the jack yieldingly in raised position while permitting the jack to be rotated in the sleeve of the arm 16.

The mechanism so far described serves to actuate the jack to transfer the point of operation of the tool around the shoe and to swing the jack laterally about an axis passing through the point of operation of the tool to bring the edge of the last or shoe into the desired position with relation to the line of feed. In order to bring the bottom of the last or the shoe sole into the desired plane it is necessary to rock the jack laterally and tilt it longitudinally. In the machine shown in the drawings the frame 20 is moved in two directions about a center substantially coincident with the point of operation of the tool to accomplish this result, the direction of such movements being at right angles to each other. To allow the frame 20 to be moved in one direction it is provided with rolls 51 which are received in guideways 52 secured to or formed integral with a carriage 53, the construction being such that the carriage 20 is supported by the guideways 52 and is movable along the same. The guideways 52 are curved in the arcs of circles the centers of which are situated in a line which passes through the point of operation of the tool so that as the frame 20 moves along the guideways 52 the frame and the jack carried thereby swing about an axis which passes through the point of operation of the tool. To allow the frame 20 to be moved at an angle to the direction of movement above described, the carriage 53 is provided with rolls 54 which are received in guideways 55 on a frame 56, the construction being such that the carriage 53 is supported in said guideways and is movable along the same. The guideways 55 are curved in the arcs of circles, the centers of which are in a line which passes through

the point of operation of the tool so that a movement of the carriage 53 along the guideways 55 swings the carriage 53 with the carriage 20 and the jack about an axis passing through the point of operation of the tool at a right angle to the axis about which the carriage 20 swings in moving along the guideways 52. By moving the carriage 20 in the guideways 52 and the carriage 53 in the guideways 55 the jack can be rocked laterally and tilted longitudinally at any time during the operation of the tool upon the shoe to bring the bottom of the last or sole of the shoe into the desired plane. It will be noted that the axes about which the carriages 20 and 53 swing are always located in fixed vertical planes which intersect at right angles. It will also be noted that the axis about which the carriage 20 swings always passes through the point of operation of the tool regardless of the movement of the carriage 53 in the guideways 55 and that the axis about which the jack swings laterally to bring the edge of the last or shoe sole into the desired position with relation to the line of feed always passes through the point of operation of the tool regardless of changes in the position of the jack due to the movements of carriages 20 and 53. As a result of this construction and operation the movements which are imparted to the jack to bring the shoe into the desired position with relation to the tool do not displace the portion of the shoe about to be acted on by the tool. The shoe is thus under absolute control at all times and uniform and accurate work is produced by the machine.

The movements above described are imparted to the carriages 20 and 53 from the cam disks 8 and 9 by mechanism which may be described as follows:—To the carriage 20 is secured a curved rack 57 with which meshes a beveled gear 58 secured to the upper end of a shaft 59 journaled in the carriage 53. The shaft 59 is connected at its lower end by means of a universal joint to a telescoping shaft 60 which is connected at its lower end by means of a universal joint to a short vertical shaft 61 journaled in the lower front portion of the frame 1. To the shaft 61 is secured a pinion 62 with which meshes a segmental gear 63 mounted to oscillate about a vertical pivot pin 64. The segmental gear 63 is provided with a slotted arm 65 in the slot of which is adjustably secured a block 66. To the block 66 is pivotally connected one end of the link 67, the other end of which is pivotally connected to a roll 68 rotatably mounted on the lower end of a lever 69 pivoted to the frame of the machine. The lever 69 is provided with a roll which engages a cam groove in the face of cam disk 9. Through the connections above described the carriage 20 is

moved in either direction along the guideways 52 during the rotation of shaft 7, the connections between the shafts and levers above described permitting an easy operation of the mechanism regardless of the position of the carriage 53 on the guideways 55.

The carriage 53 is connected by means of a link 70 to the upper end of a lever 71 pivoted on the frame of the machine. The lower end of lever 71 is slotted and in this slot is adjustably mounted a block 72 to which is pivoted one end of a link 73, the other end of which is pivotally connected to a lever 74 pivoted on the frame of the machine. The lever 74 is provided with a roll which engages a cam groove in the face of the cam disk 8. The above described construction is such that a movement of the frame 53 along the guideways 55 is produced during the rotation of shaft 7.

In order to remove the jack from proximity to the tool to enable a shoe which has been acted upon to be removed and another shoe placed upon the jack, the frame 56 is arranged to be depressed and swung outward from the frame 1. To allow the frame 56 to be so moved it is yieldingly held in raised position by means of coiled springs 75 at each side of the frame, said springs being interposed between lugs 76 on the frame 56 and lugs 77 on the frame 1. The upward movement of the frame 56 is limited by studs 78 at the lower ends of the side of the frame 56 which engage curved slots 79 in the frame 1, the studs 78 being pressed against the upper end of the slots when the frame 56 is in a position to bring the shoe supported on the jack in proximity to the tool. Outward movement of the frame 56 when in this position is prevented by means of the studs 78 engaging the slots 79 and by links 80 connecting the frame 56 with the frame 1. The shape of the slots 79 is such that when the frame 56 is depressed against the tension of springs 75 the studs travel in the slots and swing the frame 56 about the pivotal connection of the links 80 and move the jack outward from the frame 1. The outward movement of the jack is limited by the contact of the studs 78 with the inner ends of slots 79 in which position the studs are prevented from upward movement and lock the frame 56 in position. To bring the shoe into the proper position with relation to the tool the movements imparted to the jack to position the shoe must have a certain timed relation to the movement of the jack in transferring the point of operation of the tool around the shoe.

In the mechanism shown in the drawing the number of ratchet teeth on the pattern plate or form preferably varies with the size of the form and as a convenient means for securing the proper timed relation between

the movements of the jack in positioning the shoe and the movement of the jack in transferring the point of operation of the tool around the shoe when a change is made in the size of the form, a number of worm gears 6 of different sizes are provided and the mechanism is arranged to allow the removal of the worm gear 6 and the substitution of a gear of a different size. By replacing the worm gear 6 with a gear of proper size when a form of a different size is placed in the machine the cams 8 and 9 will be actuated in proper timed relation with the movement of the jack in transferring the point of operation of the tool around the shoe. In order to allow the worm gear 6 to be replaced by a gear of a different size, one end of the shaft 4 is supported in a bearing pivotally mounted on the driving shaft 2, and the other end of shaft 4 is supported in a bearing adjustably secured to the frame 1 as is clearly shown in Fig. 1.

The mechanism shown in the drawings is provided with a simple stop mechanism by means of which the mechanism for actuating the jack is automatically thrown out of operation after the point of operation of the tool has been transferred around the shoe. This stop mechanism may be briefly described as follows: An arm or lug 81 is secured to the worm gear 6 which when the worm gear completes its revolution is arranged to engage an arm 82 secured to a rod 83 mounted to reciprocate and oscillate in bearings on the frame 1. A roll 84 having a wedge shaped periphery is mounted upon one end of the rod 83 and is arranged to be forced between the clutch collars 85 and 86 secured to the shaft 2 and hub of driving pulley 3 respectively when the rod 83 is moved longitudinally by the engagement of arm 81 with arm 82. The driving pulley 3 is loosely mounted upon the end of driving shaft 2 and is pressed in a direction to bring the clutch collars 86 and 85 into engagement by means of a coiled spring 87 surrounding the shaft and interposed between the hub of the pulley and a collar on the end of the shaft. A treadle 88 is secured to the rod 83 by means of which the rod can be rotated to move the arm 82 from the path of arm 81, and a coiled spring 89 surrounding the rod 83, and having one end secured to one of the bearings of the rod and the other end secured to the arm 82 acts to move the rod longitudinally in a direction to remove the roller 84 from between the clutch collars 85 and 86 and also to rotate the rod 83 in a direction to bring the arm 82 into the path of arm 81.

The operation of the mechanism shown in the drawings and above described has already been sufficiently indicated in connection with the description of the construction

and will be fully understood by those skilled in the art.

It will be understood that the mechanism embodying my invention will be connected by suitable gearing to the machine in which it is used, so as to operate in timed relation to the various instrumentalities of such machine.

In the mechanism illustrated in the drawings and above described, means are provided for actuating the jack to transfer the point of operation of the tool around the shoe. While it is preferable to so actuate the jack, as thereby any possibility of altering the timed relation between the shoe and the mechanism for actuating the jack to bring the shoe into the proper position with relation to the tool is avoided, it is to be understood that my invention as to its broader features is not limited thereto and that the point of operation of the tool may be transferred around the shoe by other means, as for instance by the feeding devices of the machine in which the jack is used, without departing from the spirit thereof.

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

1. The combination with an operating tool, of a shoe-supporting jack, means for actuating the jack to transfer the point of operation of the tool around the shoe means for tilting the jack, and means for imparting lateral swinging movements to the jack as such point is transferred around the shoe to maintain the portion of the edge of the last or shoe sole in proximity to the tool in substantially the same position with relation to the direction of feed throughout the entire operation on the shoe, all of the said lateral swinging movements taking place about an axis passing through the point of operation of the tool, substantially as described.

2. The combination with an operating tool, of a jack, means for actuating the jack to transfer the point of operation of the tool around the shoe, means for swinging the jack laterally about an axis passing through the point of operation of the tool, and means for moving the jack about a center substantially coincident with the point of operation of the tool to bring the sole of the shoe into the desired plane, substantially as described.

3. The combination with an operating tool, of a jack movable about two axes located in relatively fixed intersecting planes, means for actuating the jack to transfer the point of operation of the tool around the shoe, means for moving the jack about said axes to bring the sole of the shoe into the desired plane, and means for swinging the jack laterally, substantially as described.

4. The combination with an operating tool, of a jack movable about two axes lo-

cated in fixed planes and intersecting at the point of operation of the tool, and mechanism acting automatically to actuate the jack to transfer the point of operation of the tool around the shoe and to move the jack about said axes to bring the sole of the shoe into the desired plane, substantially as described.

5. The combination with an operating tool, of a jack movable about two axes located in fixed planes and intersecting at the point of operation of the tool, means for actuating the jack to transfer the point of operation of the tool around the shoe, means for moving the jack about said axes to bring the sole of the shoe into the desired plane, and means for swinging the jack laterally about an axis passing through the point of operation of the tool, substantially as described.

6. The combination with an operating tool, of a carriage mounted to move about two axes located in fixed planes and intersecting at the point of operation of the tool, a jack movably mounted on said carriage and mechanism acting automatically to move the jack to transfer the point of operation of the tool around the shoe, and to move the carriage to bring the sole of the shoe into the desired plane, substantially as described.

7. The combination with an operating tool, of a carriage mounted to move about a center substantially coincident with the point of operation of the tool, a second carriage mounted thereon to move at an angle thereto about the same center, a jack movably mounted upon the second carriage, and mechanism acting automatically to move the jack to transfer the point of operation of the tool around the shoe and to move said carriages to bring the sole of the shoe into the desired plane, substantially as described.

8. The combination with an operating tool, of a jack movable about two axes located in relatively fixed intersecting planes at least one of which passes through the point of operation of the tool, means for actuating the jack to transfer the point of operation of the tool around the shoe, and means for moving the jack about said axes to bring the sole of the shoe into the desired plane, substantially as described.

9. The combination with an operating tool, of a shoe-supporting jack movable to transfer the point of operation of the tool around the shoe means for tilting the jack, and means for imparting lateral swinging movements to the jack as such point is transferred around the shoe to maintain the position of the edge of the last or shoe sole in proximity to the tool in substantially the same position with relation to the direction of feed throughout the entire operation on the shoe, all of said lateral swinging move-

ments taking place about an axis passing through the point of operation of the tool, substantially as described.

10. The combination with an operating tool, of a jack movable to transfer the point of operation of the tool around the shoe, means for swinging the jack laterally about an axis passing through the point of operation of the tool, and means for moving the jack about a center substantially coincident with the point of operation of the tool to bring the sole of the shoe into the desired plane, substantially as described.

11. The combination with an operating tool, of a jack movable to transfer the point of operation of the tool around the shoe and also movable about two axes located in relatively fixed intersecting planes at least one of which passes through the point of operation of the tool, and means for moving the jack about said axes to bring the sole of the shoe into the desired plane, substantially as described.

12. The combination with an operating tool, of a jack movable to transfer the point of operation of the tool around the shoe and also movable about two axes located in relatively fixed intersecting planes, means for moving the jack about said axes to bring the sole of the shoe into the desired plane, and means for swinging the jack laterally, substantially as described.

13. The combination with an operating tool, of a jack movable to transfer the point of operation of the tool around the shoe and also movable about two axes located in fixed planes and intersecting at the point of operation of the tool, and means for moving the jack about said axes to bring the sole of the shoe into the desired plane, substantially as described.

14. The combination with an operating tool, of a jack movable to transfer the point of operation of the tool around the shoe and also movable about two axes located in fixed planes and intersecting at the point of operation of the tool, means for moving the jack about said axes to bring the sole of the shoe into the desired plane, and means for swinging the jack laterally about an axis passing through the point of operation of the tool, substantially as described.

15. The combination with an operating tool, of a carriage mounted to move about two axes located in fixed planes and intersecting at the point of operation of the tool, a jack movable to transfer the point of operation of the tool around the shoe mounted on said carriage, and means for moving the carriage to bring the sole of the shoe into the desired plane, substantially as described.

16. The combination with an operating tool, of a carriage mounted to move about a center substantially coincident with the

point of operation of the tool, a second carriage mounted thereon to move at an angle thereto about the same center, a jack mounted upon the second carriage movable to transfer the point of operation of the tool around the shoe, and means for moving said carriages to bring the sole of the shoe into the desired plane, substantially as described.

17. The combination with an operating tool of a shoe supporting jack, a pattern plate secured thereto provided with a guiding flange, means cooperating with said plate to actuate the jack to transfer the point of operation of the tool around the shoe, and relatively yielding guides engaging said flange and cooperating therewith to swing the jack laterally about the point of operation of the tool, substantially as described.

18. The combination with an operating tool, of a jack, jack supporting means, a pattern plate secured to the jack and removable laterally therefrom while the jack remains supported, means cooperating with said plate to swing the jack laterally, and means to intermittently actuate the jack to transfer the point of operation of the tool around the shoe, substantially as described.

19. The combination with an operating tool, of a shoe supporting jack movable to transfer the point of operation of the tool around the shoe, jack supporting means, a pattern plate secured to the jack and removable laterally therefrom while the jack remains supported, and means cooperating with said plate to swing the jack laterally as the point of operation of the tool is transferred around the shoe, substantially as described.

20. The combination with an operating tool, of a shoe supporting jack, a pattern plate secured thereto provided with a guiding flange, means for actuating the jack to transfer the point of operation of the tool around the shoe and relatively yielding guides separate from said jack-actuating means engaging said flange and cooperating therewith to swing the jack laterally about the point of operation of the tool as the point of operation of the tool is transferred around the shoe, substantially as described.

21. The combination with an operating tool, of a shoe supporting jack, jack sup-

porting means, a pattern plate secured to the jack and removable laterally therefrom while the jack remains supported, and mechanism cooperating with said plate constructed and arranged to swing the jack laterally and to actuate the jack to transfer the point of operation of the tool around the shoe, substantially as described.

22. The combination with an operating tool of a shoe supporting jack, means for actuating the jack to transfer the point of operation of the tool around the shoe, means for maintaining the surface of the sole in proximity to the tool in substantially the same plane during the transfer of the point of operation around the shoe, and means for imparting lateral swinging movements to the jack as such point is transferred around the shoe to maintain the portion of the edge of the last or shoe sole in proximity to the tool in substantially the same position with relation to the direction of feed throughout the entire operation on the shoe, all of the said lateral swinging movements taking place about an axis passing through the point of operation of the tool, substantially as described.

23. The combination with an operating tool of a shoe supporting jack movable to transfer the point of operation of the tool around the shoe, means for maintaining the surface of the sole in proximity to the tool in substantially the same plane during the transfer of the point of operation around the shoe, and means for imparting lateral swinging movements to the jack as such point is transferred around the shoe to maintain the portion of the edge of the last or shoe sole in proximity to the tool in substantially the same position with relation to the direction of feed throughout the entire operation of the shoe, all of said lateral swinging movements taking place about an axis passing through the point of operation of the tool, substantially as described.

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

ERASTUS E. WINKLEY.

Witnesses:

FRED O. FISH,

HORACE VAN EVEREN.