Aug. 28, 1934. J. F. HARDY 1,971,344

HEEL ATTACHING MACHINE

Filed June 25, 1932 2 Sheets-Sheet 1

Fig. 1

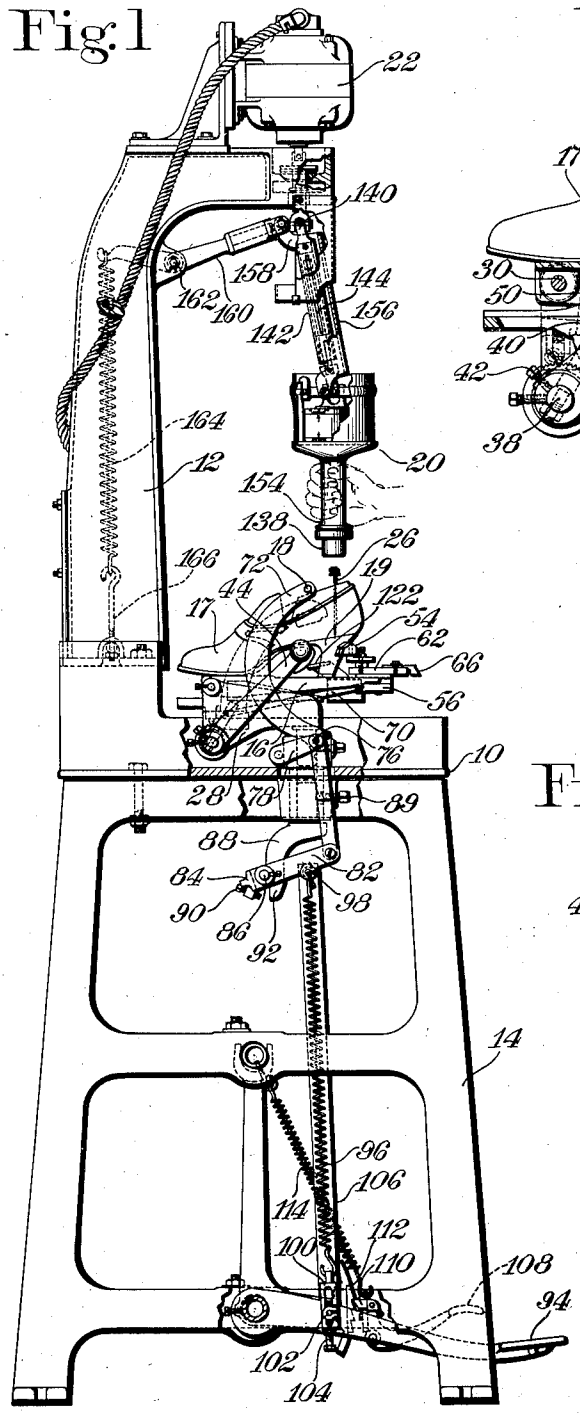


Fig. 2

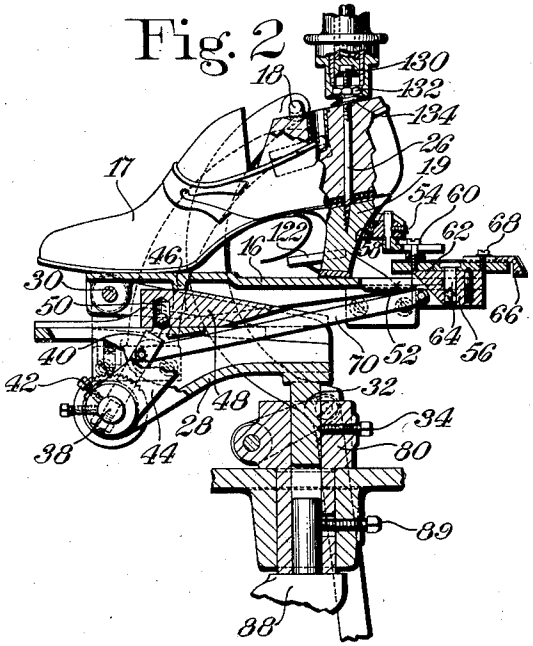
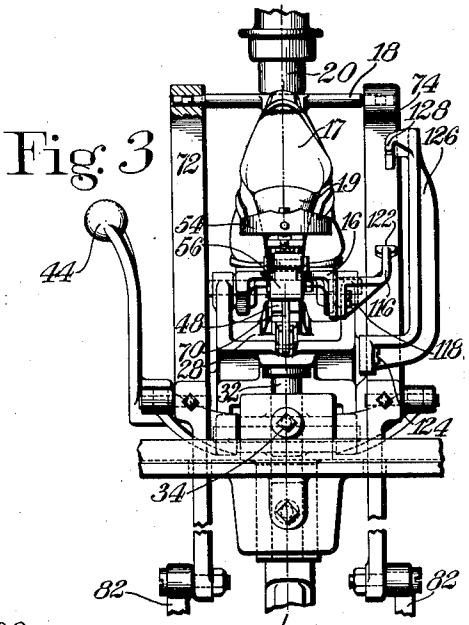


Fig. 3



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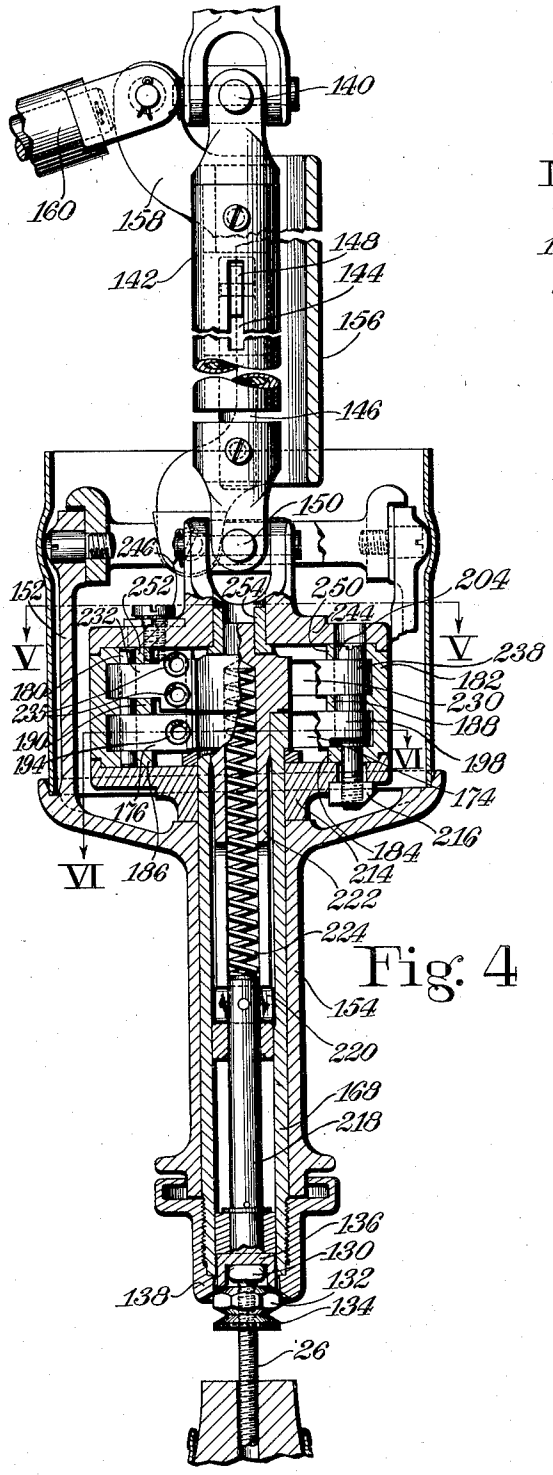


Fig. 4

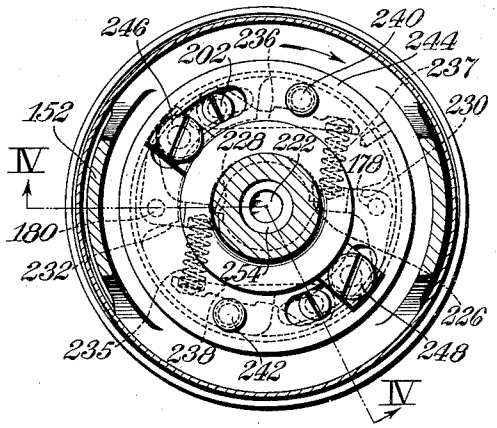


Fig. 5

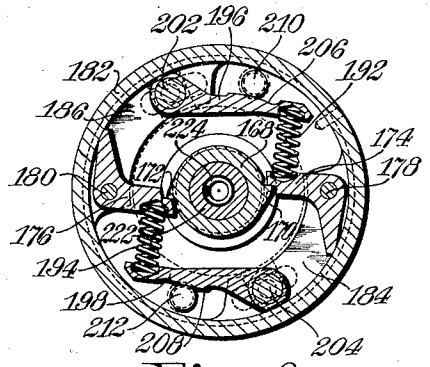


Fig. 6

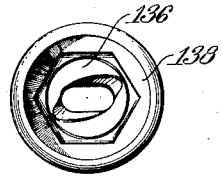


Fig. 7

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UNITED STATES PATENT OFFICE

1,971,344

HEEL ATTACHING MACHINE

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Application June 25, 1932, Serial No. 619,265

11 Claims. (Cl. 12—123)

This invention relates to machines for use in the manufacture of shoes and is illustrated herein as embodied in a machine particularly adapted for use in attaching heels to shoes.

In the practice of a method disclosed in United States Letters Patent No. 1,615,258, granted January 25, 1927, on application of Maurice V. Bresnahan, a lasted shoe and a heel are clamped in assembled relation while a screw is inserted through a hole in the last, through the shoe bottom, and into the heel to clamp the heel to the shoe during the setting of an adhesive which has been applied between the heel and the shoe. This screw may have a nut threaded upon its shank to be turned down into engagement with the top of the last after the screw is driven into the heel to hold the heel clamped to the shoe and last while the adhesive is setting.

In order that the fastener inserting tool may be used conveniently it is desirable that the fastener receiving hole in the last extend in a substantially vertical direction and that the last be positioned with the fastener receiving hole in alinement with the fastener inserting tool. It is also desirable that the tops of the lasts be located always at substantially the same elevation relatively to a clamping means to facilitate the application of uniform pressure to lasts of different shapes and heels of different heights.

An object of the invention, accordingly, is to provide an improved work support arranged to maintain a last upon which the shoe is mounted in an upright position with the fastener receiving hole in the last extending in a substantially vertical direction and with the heel in assembled relation with the shoe. This object has been attained, in the illustrated machine, by the provision of an angularly adjustable plate for engaging and supporting the tread face of the shoe and by means including a wedge-shaped member constructed and arranged to engage and maintain the angularly adjustable plate in adjusted position. As illustrated, the support comprises a bracket, a plate pivotally mounted on the bracket, a wedge mounted in the bracket and adapted to engage the plate to move the plate into adjusted position, and means connected to the wedge for engaging the rear face of the heel, said means being constructed and arranged to be moved to adjusted position when the pivotally mounted plate is moved into adjusted position. In order that the plate may be moved quickly into adjusted position, the illustrated machine has also been provided with a member for engaging the tread surface of an unattached heel and with an abutment to engage the attaching surface of the heel when the support is moved to adjusted position, thereby determining the elevation of the top of the cone of the last relatively to a clamping means. The various features of the invention will be best understood from a description of a preferred embodiment thereof illustrated in the accompanying drawings, in which

Fig. 1 is a view in side elevation illustrating one embodiment of the invention;

Fig. 2 is a view in side elevation partly in section of the last, shoe and heel clamping means;

Fig. 3 is a front elevation of the mechanism shown in Fig. 2;

Fig. 4 is a sectional view of the mechanism for inserting the screw fastener taken along the line IV—IV of Fig. 5;

Fig. 5 is a sectional view taken along the line V—V of Fig. 4;

Fig. 6 is a sectional view taken along the line VI—VI of Fig. 4;

Fig. 7 is a bottom view of the chuck for inserting the screw fastener.

Referring to the drawings, the illustrated machine comprises a table 10 and a standard 12 mounted on a base 14. The table 10 is provided with means including a tread plate or work support 16 and a clamping bar 18 for supporting a lasted shoe 17 and holding a heel 19 in place thereon during the operation of inserting a fastener in the heel 19. The standard 12 carries a fastener inserting or driving tool 20 together with an electric motor 22 for driving said tool.

The tread plate 16 is shaped to engage the tread face of the forepart of the sole of the shoe 17 and is extended to engage the tread face of the heel 19. The plate or support 16 is mounted for angular adjustment to position the shoe with the hole in the last through which a screw fastener 26 passes to clamp the heel and the shoe in assembled relation in substantially vertical position. The plate 16 is pivoted to a bracket 28 by a pin 30, the bracket 28 being adjustably mounted for vertical movement on the table 10 by a post 32. The post 32 is formed as a downward extension of the bracket 28. Mounted below the pin 30 in the bracket 28 is a shaft 38 which carries an arm 40, the arm 40 being secured to the shaft by a set screw 42. A lever 44 is secured to one end of the shaft 38 for moving the arm 40 for a purpose which will hereinafter be described. The bottom of the plate 16 is provided with a downwardly extending lug 46 which bears against a horizontally movable wedge-shaped member 48. The member 48 is provided with a recess 50 into which fits the

ball-shaped end of the arm 40. It is apparent that movement of the lever 44 will transmit movement to the wedge-shaped member 48 thereby raising or lowering the tread plate 16.

The forward end of the plate or support 16, that is, the end nearest the operator, is provided with a slot 52 in which a heel positioning device or gage 54 is mounted for adjusting the position of the heel 19 relatively to the clamping bar 18. The heel positioning device 54 is connected to a block 56 which is arranged for sliding movement in the slot 52. It is to be noted that the block 56 is arranged to carry the positioning member 54 into adjusted position, the movement of the positioning device 54 forwardly or rearwardly depending upon the height of the heel. The positioning device 54 is provided with a heel rest 58 which is particularly adapted for engaging the rear portion of the heel of a high heeled shoe and this back rest 58 may be moved forwardly or rearwardly to adjust the back rest for any type or style of heel. The forward end of the back rest 58 is provided with a slot through which passes a screw 60 which maintains the back rest 58 in adjusted position on a pivoted plate 62 which is pivoted to the block 56 by a pin 64. The other end of the plate 62 is provided with a heel or gage 66 which is particularly adapted to position low heels and this member 66 is adjustably secured to the plate 62 by a screw 68 by means of which the member 66 may be maintained in its adjusted position.

The arm 40 and the sliding block 56 are secured together by a link 70, one end of which is pivotally secured to the arm 40 and the other end to the block 54. By this construction the positioning device 54 is automatically brought into proper position for any height heel when the angular position of the tread plate 16 is changed. That is, when a low heel is to be operated on the plate 16 will be moved upwardly until the tread face of the heel 19 is engaged by the plate 16 and the hole through which the fastener 26 passes is substantially vertical. It is to be noted that in low heels the back surface thereof is substantially vertical whereas in high heels the rear surface of the heel makes a decided angle to the vertical and for this reason it is necessary to move the positioning device 54 rearwardly or forwardly, depending upon the type of heel. Since all high heels do not make the same angle with the vertical it is necessary to adjust the position of the back rest 58 accurately to locate the back rest 58 whereby the heel can be wedged thereagainst by the clamping bar 18 without substantially changing the position of the shoe on the tread plate 16.

The clamping bar 18 is located above the surface of the table 10 and is mounted for movement toward and away from the tread plate 16 to clamp against the plate 16 the lasted shoe 17 and the heel 19 in assembled relation therewith. The clamping bar 18 is adapted to engage and apply this clamping pressure to the cone of the last upon which the shoe is mounted and for this purpose the clamping bar 18 is provided centrally of its length with a serrated portion. A pair of C-shaped links 72, 74 are offset toward the toe end of the tread plate 16 to allow the greatest amount of space to be available to the operator in positioning the shoe 17 within the clamp and these links carry the clamping bar 18 at their upper extremities. Intermediate between their ends the links 72, 74 are pivotally secured to arms 78 of a U-shaped bracket pivotally mounted in a hollow bearing member 80 surrounding the post 32. At their lower ends the links 72, 74 are secured to arms 82 of a yoke 84 which is pivotally mounted on a spindle 86 carried by a bracket 88 secured to the lower extremity of the bearing member 80 by a set screw 89. It will be observed that the arms 82 are substantially longer than the arms 78. By this arrangement whenever the clamping bar 18 is moved upwardly the links 72, 74 are moved upwardly by the arms 82 and are also rocked about the connections 76 with the arms 78 to carry the clamping bar 18 toward the toe end of the shoe 17 to an inoperative position in which the clamping bar 18 will not interfere with the actions of the operator in placing a shoe within the clamp or removing one therefrom. The upward and forward or inoperative position of the bar 18 is adjustably determined by a threaded stop 90 which engages an abutment 92 formed on the bracket 88.

The arms 72, 74 are rocked to operate the above-described clamping apparatus by means of yielding adjustable connections from a treadle 94 (Fig. 1). A coiled spring 96 extends between the treadle rod 94 and the yoke 84. The upper end of the spring is secured to a rod 98 between the arms 82 of the yoke 84 and its lower end is secured to a member 100 having a slot through which extends a pin 102 secured to the treadle 94. The lower end of the slotted member 100 is provided with an adjusting screw 104 by means of which the tension of the spring 96 may be adjusted. Secured to the rod 98 is a treadle rod 106 which is provided with an open slot (not shown) at its lower end for the reception of the pin 102 on the treadle 94. Mounted on the treadle 94 is a locking treadle 108 which carries a pawl 110 arranged to engage a stationary rack 112 when the clamping devices are in operating position. The spring 114 secured to the treadle 108 and to a cross bar mounted on the machine frame or base 14, serves to hold the pawl 110 in engagement with the teeth on the rack 112 and, after clamping pressure has been released, to return the clamping devices to inoperative position.

When the operator depresses the treadle the clamping bar 18 through the arms 82 of the yoke 84 and the arms 72, 74 is rocked toward the cone of the last by a spring 96 and when the treadle 94 has been depressed a distance sufficient to obtain the necessary pressure, the treadle 108 is swung toward the stationary rack 112, causing the pawl 110 to engage the teeth on the rack. It should be understood, however, that under some conditions the operator prefers not to lock the clamping devices in operative positions but prefers to stand on the treadle until the operation to be performed on the shoe has been completed. After the operation has been performed on the shoe 17 the operator steps on the treadle 94 to depress it slightly and then with the toe of his shoe depresses the treadle 108 to disengage the pawl 110 from the rack 112. The treadle 94 and the locking treadle 108 are then moved upwardly under the influence of the spring 94 until the pin 102 strikes the end slot in the rod 106. At this time the pawl 110 is moved upwardly beyond the teeth on the rack and the treadle 94 and the clamping devices connected thereto are swung into inoperative position by the spring 114.

In order accurately to adjust the tread plate 16 for various heights of heels a heel supporting bracket 116 is secured to the tread plate 16 by screws 118. The bracket 116 is provided with an upwardly projecting portion 122 which has a surface for engaging the tread face of a heel. The heel engaging surface of the member 122, as shown, extends above the surface of the tread

plate 16 but it may be substantially flush with or even below the surface of the tread plate 16. Secured to the bracket 28 by screws 124 is a member 126 which co-operates with the member 122 to act as a stop or abutment for the heel when adjusting the tread plate 16 to its proper position. The upper end of the member 126 is provided with a downwardly extending portion 128 which engages the attaching face of a heel. When it is desired to adjust the tread plate 16 to its proper position a heel of the type and height to be attached to the shoe 17 is placed on the member 123 and the tread plate is angularly adjusted, as hereinbefore described, until the attaching face of the heel engages or contacts with the member 128. The member or stop 128 and the heel supporting member 122 are so arranged that, regardless of the height of the heel, the cone of the last which is engaged by the clamping bar 18 is always in substantially the same elevation, thus insuring that the pressure applied to the last by the clamping bar 18 will be substantially the same in all sizes and types of shoes.

Referring now to Fig. 2 it will be noted that the end of the fastener 26 is fluted or slabbed off to permit the fastener to be inserted in a heel without the necessity of first forming a hole for the reception of the fastening. In other words, the fastener 26 acts as a drill to form a hole in the heel 19. The other end of the fastener is provided with an elongated head 130 by means of which the fastener can be turned into the work. Immediately below the head 130 the shank of the fastener is threaded to receive the clamping nut 132. The nut 132 is provided with a collar on which is mounted a conical washer 134. The purpose and operation of the parts of the screw fastener will be more clearly understood when the mechanism for inserting the fastener has been described.

The mechanism 20 for inserting the screw fastener 26 comprises a screw driver 136 and a wrench 138. The screw driver 136 and the wrench 138 are provided with a telescopic driving connection which includes a universal joint 140 connected to the armature shaft of the motor 22 and to a sleeve 142 which is provided with diametrically opposed slots 144 extending longitudinally of the sleeve. A shaft 146 mounted for sliding movement in the sleeve 142 is arranged with a key 148 which fits into the openings 144. The lower end of the shaft 146 is provided with a universal joint 150 and acts through connections to rotate the fastener inserting mechanism 20.

The fastener inserting mechanism 20 is supported in a frame 152 which, as is shown best in Figs. 1 and 4, is in the form of a shell having a downwardly extending portion 154 shaped to form a convenient hollow handle by means of which the operator may move the tool to operating position. The portion 154 is hollow and in this handle the driving connections for the wrench 138 and the screw driver 136 are concentrically rotated. The shell 152 is supported in inoperative position by a supporting member 156 which is pivotally secured to the shell 152. The portion of the member 156 nearest the operator forms a convenient shield to prevent accidental contact with the constantly rotating telescopic driving connection. The upper end of the member 156 is provided with a pair of upstanding arms 158 which are pivotally connected to a lever 160 fulcrumed to the standard 12 at 162 and projecting into an opening formed in the standard 12. Connected to the other end of the lever 160 is a spring 164 having its other end secured to a hook-shaped member 166 adjustably secured to the lower end of the standard 12. By this construction the fastener inserting mechanism is normally maintained in a position which does not interfere with the actions of the operator in placing work on the support 16 or in removing the work therefrom but permits the fastener inserting mechanism readily to be moved to operative position.

The wrench 138 is threaded on the lower end of a hollow shaft 168 which is arranged to rotate within the hollow handle 154. The enlarged upper end of the hollow shaft 168 is provided with diametrically opposed ratchet teeth 170, 172 (Fig. 6) which are adapted to be engaged by pawls 174, 176, respectively. The pawls 174, 176 are pivoted at 178, 180 respectively to a rotating cylindrical frame 182 which is positively connected to the motor 22 through the universal joint 150. The pawls 174, 176 are prevented from moving axially by inwardly extending projections 184, 186 of the frame 182, these projections being located below the pawls, and by projections 188, 190 located above the pawls. It will be noted that the pivots 178, 180 extend through these projections. The pawls 174, 176 are normally held in engagement with the ratchet teeth 170 and 172 by springs 192 and 194, respectively. The springs 192 and 194 are held under tension by arms 196, 198 which are pivoted to the projections above-referred to by screws 202 and 204 respectively. The arms 196, 198 are provided with cam surfaces 206, 208 which bear against pins 210, 212 secured to a ring cap 214. The tension of the springs 192 and 194 may be adjusted by rotating the frame 182 relatively to the ring cap 214, thereby moving the pins 210, 212 along the cam surfaces formed on the arms 196, 198. The parts are maintained in adjusted position by the screws 202 and 204 which extend through slots formed in the ring cap 214 and are threaded to nuts 216 on the lower side of the ring cap 214. It is apparent that by tightening the screws 202, 204 the frame 182 and the ring cap 214 are securely clamped together.

The screw driver 136 is mounted for rotation within the hollow shaft 168 and is secured to the lower end of a shaft 218, the upper end of the shaft 218 being provided with a key 220 which fits into diametrically opposed slots in a hollow shaft 222. The shaft 218 is normally held against the lower end of the shaft 222 by a spring 224 which is mounted within the hollow shaft 222. The upper end of the hollow shaft 222 is provided with ratchet teeth 226, 228 which engage pawls 230 and 232, respectively. The pawls 230 and 232 are pivoted to the cylindrical frame 182 by the pivots 178, 180 hereinbefore referred to. The pawls 230, 232 are normally held against the ratchet teeth 226, 228 by pairs of spiral springs 235, 237. The outer ends of these springs are received in cup-like depressions formed in arms 236, 238 which are pivoted to the cylindrical frame 182 by the screws 202 and 204. The arms 236 and 238 are provided with cam surfaces which engage pins 240 and 242, respectively, said pins being secured to the upper ring cap 244. By this construction the tension of the springs 234, 235 may be adjusted in substantially the same manner as the tension of the springs 192 and 194, that is, the upper ring cap 244 is provided with slots through which screws 246 and 248 are passed, the ends of the screws being threaded into projections 250, 252. When it is desired to increase the tension of the springs 235, 237 the screws 246, 248

are loosened and the upper ring cap turned relatively to the frame 182 and when the pins 240 and 242 have been moved against the cam surfaces formed on the arms 236, 238 to move the arms toward the center of the cylindrical frame to obtain the desired tension on the springs, the screws 246 and 248 may be tightened to maintain the parts in their adjusted position. The top of the shaft 222 is surrounded by a spacing washer 254 formed of friction material and fitting into a hole formed in the ring cap 244.

It is to be noted that the screw driver 136 can be rotated to drive a screw a predetermined distance by the adjustment of the springs 234 and 235, that is, the springs may be adjusted to permit the ratchet teeth 226, 228 to slip past the ends of the pawls 230 and 232 so that the rotation of the screw driver 136 will cease when the screw has been driven the desired depth. The wrench 138 is arranged to stop rotating when the washer 134 is brought up against the top of the last and since the pitch of the threads on the shank of the screw fastener 26 is less than the pitch of the threads of the slabbed-off end of the screw fastener 26 it is not necessary that the tension of the springs 192, 194 be as great as the pressure of the springs 234, 235 and, accordingly, the pawls 174, 176 are arranged to slip when sufficient clamping pressure is set up by the nut 132. If the tension on the springs 192 and 194 were too great the threads in the nut 132 and the shank of the screw fastener 26 would strip and for this reason it is desirable that only light pressure be brought upon the pawls 174 and 176.

Although the parts of the machine have been described in detail it is believed desirable for a more complete understanding of the invention to describe briefly the operation of the machine. The operator will adjust the tread plate 16 to the desired position as hereinbefore described to accommodate the work. When the tread plate has been properly adjusted for the particular shoe to be operated upon the operator places a heel 19 on the tread plate 116 and against the yielding back rest 58 and a shoe on the tread plate 16 with the heel seat of the shoe engaging the top surface of the heel. The clamping pressure is then applied through the bar 18 temporarily to maintain the parts in assembled relation. With the parts of the machine in this position the operator grasps the hollow handle 154 and moves the tool 20 downwardly into engagement with the screw fastener 26. The screw fastener is then driven into the heel until the resistance to the screw is sufficient to cause the pawls 230, 232 to slip, thereby stopping the rotation of the screw driver. The wrench 138 then continues its rotation to turn the nut 132 against the top of the last and when sufficient clamping pressure has been set up the pawls 174 and 176 slip, thereby permitting the wrench to come to rest. The operator then removes the tool 20, which returns to the position shown in Fig. 1, releases the clamping pressure on the shoe and removes the shoe from the machine. The parts of the machine are now in position to operate on another shoe.

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

1. A machine for operating upon shoes having, in combination, a tool for inserting a fastener through a hole in a last, and means for supporting the shoe with the hole in the last in alinement with said tool, said means including an angularly adjustable tread plate, a positioning member on said plate constructed and arranged to engage the back of a heel to be placed in assembled relation to the shoe, and means connected to the positioning member constructed and arranged to move the positioning member to adjusted position upon movement of the tread plate to adjusted position.

2. A machine for operating upon shoes having, in combination, means adapted to engage the cone of a last having a shoe thereon to clamp the shoe and a heel in assembled relation, a pivoted tread plate for engaging and supporting the tread face of the shoe, a positioning member on said plate constructed and arranged to engage the back of the heel, and means connected to the positioning member and arranged to move the positioning member to adjusted position upon movement of the tread plate to adjusted position.

3. A machine for operating upon shoes having, in combination, a clamp adapted to engage the cone of the last having a shoe thereon to clamp the shoe and a heel in assembled relation, a pivoted tread face for engaging and supporting the tread face of the shoe, a gage adjustably mounted on said plate and constructed and arranged to engage the back of the heel, and means connected to said gage and arranged to move the gage to adjusted position upon movement of the tread plate to adjusted position.

4. A machine for operating upon shoes having, in combination, a clamp adapted to engage the cone of a last having a shoe thereon to clamp the shoe and a heel in assembled relation, a pivoted tread plate for engaging and supporting the tread face of the shoe, means arranged to engage said plate and to move said plate to adjusted position, a gage adjustably mounted on said plate and constructed and arranged to engage the back of the heel, and a link connected to said adjusting means and to said gage, said link being arranged to move the gage to adjusted position upon movement of the tread plate to adjusted position.

5. A shoe supporting device having, in combination, a plate for engaging and supporting the tread face of a shoe, means on said plate for engaging the rear wall of the heel of a shoe, means for moving the plate to adjusted position, and a connection between the first-mentioned means and the second-mentioned means arranged to move the heel engaging means to adjusted position upon movement of the plate to adjusted position.

6. A shoe supporting device having, in combination, a pivoted plate for engaging and supporting the tread face of a shoe, a gage on said plate for engaging the rear wall of the heel of the shoe, means for moving and maintaining the plate in adjusted position, and connections between the gage and the adjusting means arranged to move the gage to adjusted position upon movement of the plate to adjusted position.

7. A shoe supporting device having, in combination, an angularly adjustable tread plate for engaging and supporting a shoe, a gage for engaging the rear wall of the heel of the shoe, a wedge-shaped member constructed and arranged to engage said plate and to move said plate to adjusted position, and means connecting the gage and the wedge-shaped member for moving the gage to adjusted position upon movement of the tread plate to adjusted position.

8. A device for clamping a heel to a lasted shoe having, in combination, a bracket, a plate pivotally mounted upon said bracket, a wedge mounted for sliding movement in said bracket and adapted to engage said plate to maintain the plate in adjusted position, a clamping bar arranged to engage the cone of the last upon which the shoe is mounted to clamp the shoe against the plate, and a gage arranged to engage the back of a heel to position the heel relatively to the clamping bar.

9. A device for securing a lasted shoe and a shoe heel in assembled relation having, in combination, a clamping bar for engaging the top of the last on which the shoe is mounted, a support adjustable to determine the elevation of the top of the last relatively to said clamping bar, and means constructed and arranged to determine the adjusted position of said support, said means including a member secured to the support for engaging the tread face of a heel, and an abutment for engaging the attaching face of said heel.

10. In a device for securing a lasted shoe and a shoe heel in assembled relation, a clamping device, an adjustable support for the shoe and heel, means associated with said support for engaging the tread surface of an unattached heel, and an abutment to engage the attaching surface of said heel when the support is moved to adjusted position, thereby determining the elevation of the top of the cone of the last relatively to the clamping means.

11. A device for securing a lasted shoe and a shoe heel in assembled relation having, in combination, a clamping bar for engaging the top of the last on which the shoe is mounted, an adjustable support for the shoe and heel, a member secured to said support for engaging the tread face of a heel, and a stationary abutment constructed and arranged to engage the attaching surface of said heel, said member and said abutment co-operating to determine the adjusted position of said support relatively to said clamping means.

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