July 14, 1925. 1,545,575

J. F. STANDISH

HEEL ATTACHING MACHINE

Filed July 17, 1920 3 Sheets-Sheet 1

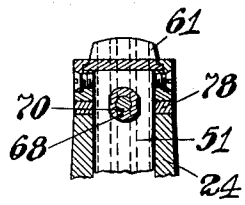


Fig. 9

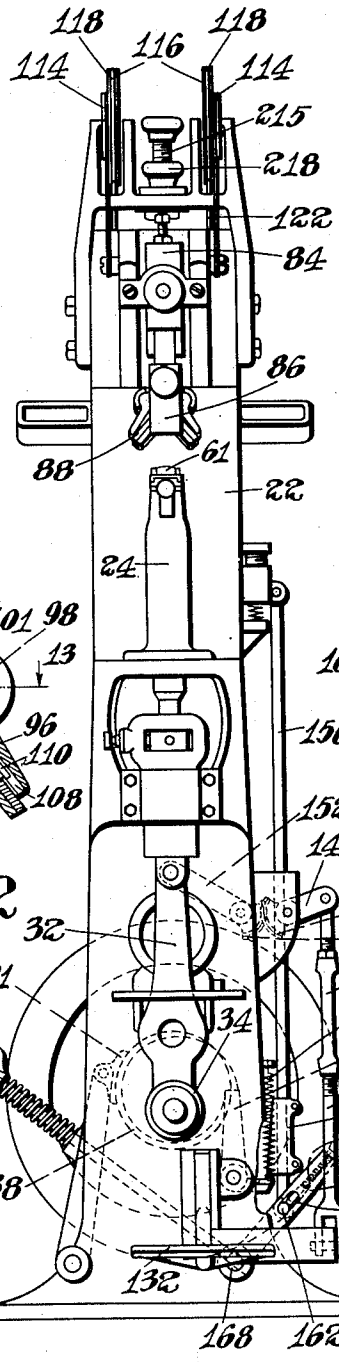


Fig. 1

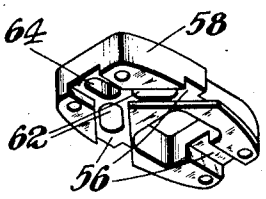


Fig. 10

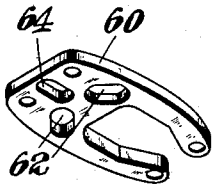


Fig. 11

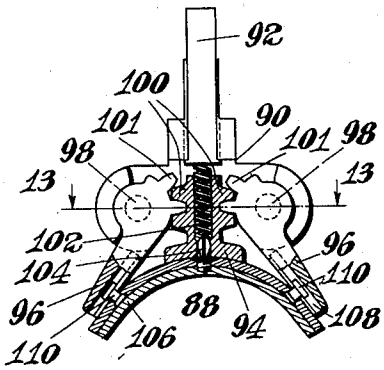


Fig. 12

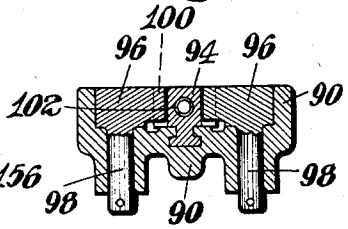


Fig. 13

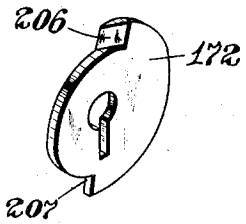


Fig. 15

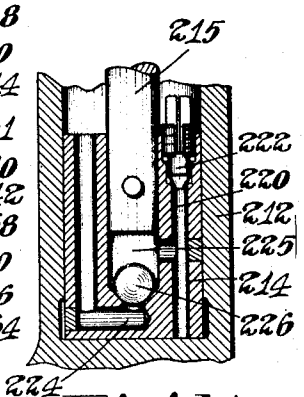


Fig. 14

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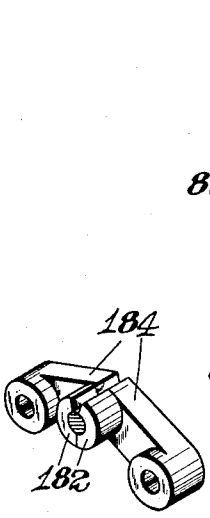


Fig. 19

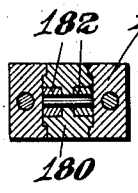


Fig. 18

Fig. 2

Fig. 16

Fig. 17

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HEEL ATTACHING MACHINE

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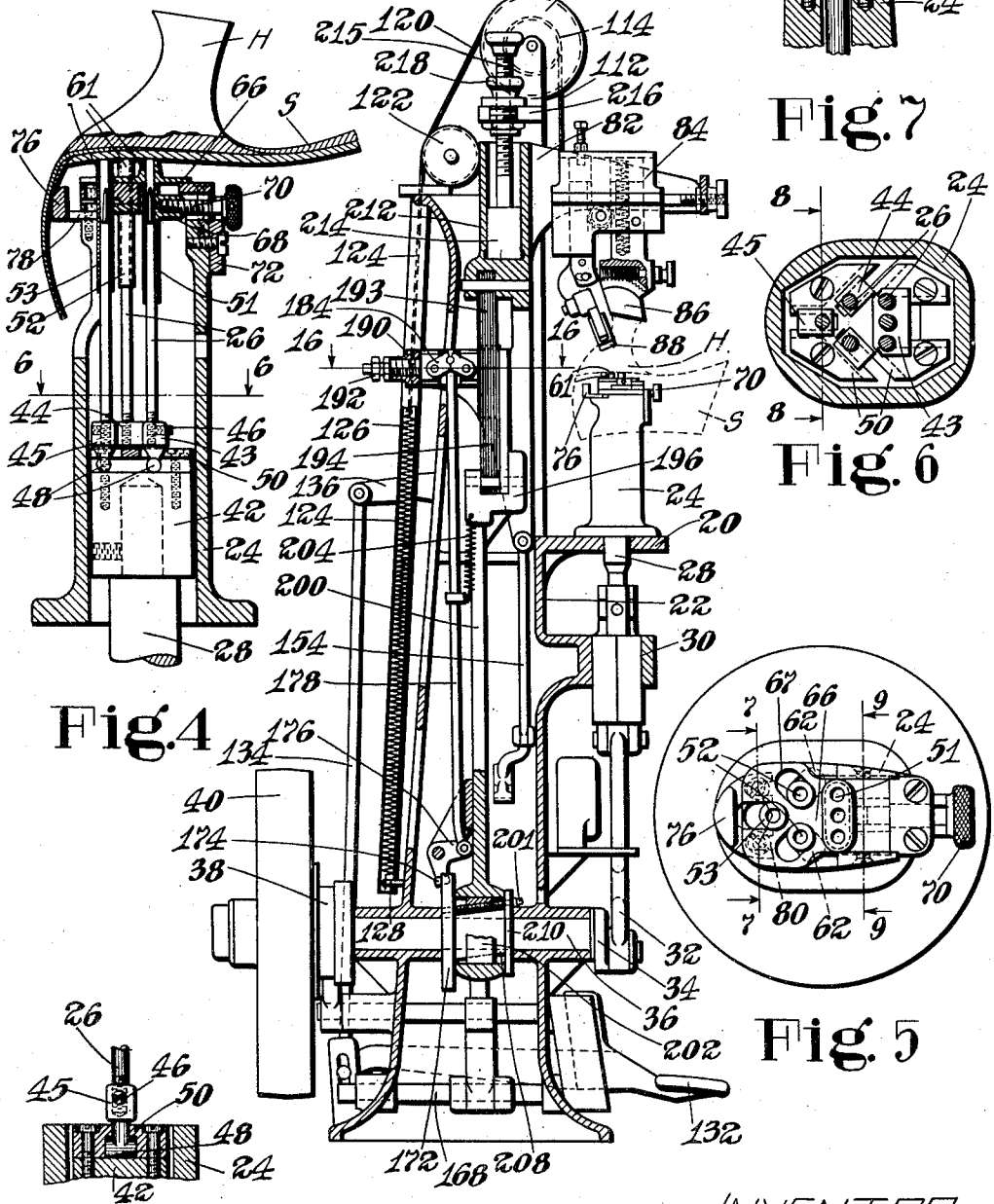


Fig. 4

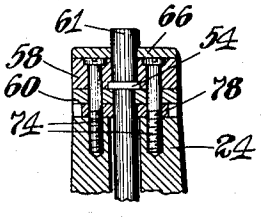


Fig. 7

Fig. 6

Fig. 5

Fig. 8

Fig. 3

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Patented July 14, 1925. 1,545,575

UNITED STATES PATENT OFFICE.

JOHN F. STANDISH, OF WINTHROP, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HEEL-ATTACHING MACHINE.

Application filed July 17, 1920. Serial No. 397,033.

To all whom it may concern:

Be it known that I, JOHN F. STANDISH, a citizen of the United States, residing at Winthrop, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Heel-Attaching Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

My invention relates to machines for securing heels to shoes, it being especially adapted for inside nailing as commonly practised in connection with the attachment of wood heels. The invention is illustrated as embodied in a machine of the type disclosed in Patent No. 1,269,654, issued in my name on June 18, 1918, although in various aspects the invention is not limited to embodiment in machines of this type or to use in machines for securing heels.

It is an object of this invention to provide novel means for establishing preliminary contact of a pressure device with a heel positioned upon the shoe to which it is to be attached, then applying a clamping pressure which will be independent of the height of the heel, and preferably gradually increasing the pressure while the heel is being attached, to better maintain the close relation between the heel-seat and the end of the heel. Upon the release of the pressure, the movement of the parts may be cushioned, the cushioning means also, if desired, furnishing a variable stop to limit the movement.

Another object of the invention is to improve the arrangement of the nail drivers and their guiding means. With these objects in view, the drivers are mounted in holders carrying different numbers of such drivers, which may be selectively used according to the requirements of the work in hand; the drivers are given freedom of movement by being permitted to slide and rock upon their carrier; and the driver guides exercise control over each other in their movement of adjustment.

A further object of the invention is to produce effective engagement of the pressure device with the heel which is being attached. For this purpose I may employ a flexible heel-engaging member, mounted upon supports connected to move together. In this way pressure against one of the supports will cause the others to move with it, and the flexible member, if this is employed, to wrap itself about the heel to hold it firmly.

Other objects will hereinafter be developed, reference being had to the accompanying drawings, in which—

Fig. 1 is a front elevation of one embodiment of my improved heel-attaching machine;

Fig. 2 is a side elevation thereof, looking from the right in Fig. 1;

Fig. 3 is a partial vertical section, viewed from the opposite direction;

Fig. 4 is an enlarged vertical, sectional detail through the jack-post;

Fig. 5 is a top plan view of the jack-post;

Fig. 6 is a horizontal section on the line 6—6 of Fig. 4.

Figs. 7, 8 and 9 are vertical, sectional details on the lines 7—7, 8—8 and 9—9 of Figs. 5, 6 and 5, respectively;

Figs. 10 and 11 are details in perspective of the top and bottom guide-retaining plates of the jack-post;

Fig. 12 is a longitudinal, sectional detail through the heel-fork;

Fig. 13 is a transverse section therethrough on the line 13—13 of Fig. 12;

Fig. 14 is a vertical, sectional detail through the cushioning device;

Fig. 15 is a detail in perspective of the clutch-actuating cam;

Fig. 16 is an enlarged horizontal section on the line 16—16 of Fig. 3;

Fig. 17 illustrates, in side elevation, the toggle connections for the actuating clutch;

Fig. 18 is a transverse section on the line 18—18 of Fig. 16; and

Fig. 19 is a detail in perspective of one of the pairs of toggle links.

Mounted upon a bracket 20 projecting horizontally from a frame 22 is a jack-post or work-support 24, which, in the type of machine arranged for inside nailing, has mounted within it nail-drivers 26. Arranged to reciprocate within the jack-post is a plunger 28 guided at 30 in the frame and operated by a connecting rod 32, which is joined to the pin of a crank-disk 34 fast upon one extremity of a power-shaft 36 journaled in the lower portion of the frame.

Near the opposite extremity of the shaft 36 is arranged a single rotation clutch 38, one portion of which is driven by a pulley 40 belted to some suitable source of power. Secured upon the top of the plunger 28 is a carrier head 42 having mounted upon it driver holders 43, 44 and 45. Into these holders the drivers 26 are threaded, being fixed in place by set-screws 46. To provide for a lateral movement of adjustment of the drivers, their holders are mounted to slide upon the carrier, and since this adjustment is effected from points near the upper extremities of the drivers separated from the holders, to prevent the latter from cramping in the ways they are also arranged to rock. For this purpose each holder has a cylindrical, horizontally extending end portion 48 movable in ways between the top of the carrier and guide-plates 50 bolted thereto and overhanging the ends 48. It will be seen that these cylindrical portions can not only move bodily in their ways, but can also rock or turn about their axes and thus adapt themselves to changes in the angles of the drivers. They are entirely free from sharp edges, which might tend to bind upon the walls of the ways. The upper extremities of the drivers move in guide-tubes 51, 52 and 53, these respectively corresponding to the holders 43, 44 and 45. Tubes 52, 53 are provided with lateral flanges 54 mounted to slide in ways 56 formed in an upper plate 58 secured to the top of the jack-post, with an interposed bottom plate 60. The upper ends of the tubes extend beyond the plate 58 at 61, and here serve to support the shoe to which a heel is to be applied. Within the tubes the securing nails are held for the attaching operation upon the ends of the drivers. The plates 58 and 60 have vertically alined slots 62, 62, oppositely inclined at opposite sides of the plates, these slots being for the purpose of receiving the tubes 52, while at the rear ends of the plates, extending along their axes, is a slot 64, in which is held the tube 53. The tubes 51, which receive the drivers carried by the holder 43, are shown as three in number lying in a line parallel to the breast of a heel operated on, being furnished by parallel bores in a single block, the holder being similarly arranged. The guide 51 has a plate or flange 66 overlying the top of the plate 58 and having slots 67 oppositely inclined to the slots 62 in the plates 58 and 60. That is, these slots 67 respectively intersect the slots 62, and are separated from them, considered horizontally, by angles of 90 degrees. At the front of the guide 51 is a horizontal boss 68, threaded to receive a screw 70 mounted to turn in a plate 72 secured upon the front of the jack-post. Upon turning this screw, the guide 51 will be moved either inwardly or outwardly, and its slots 67 will exert a cam action upon the guides 52, causing them to be moved similarly in their slots 62. For example, if the guide 51 is shifted outwardly to increase the distance between the points at which the nails are to be driven, the guides 52 will have a similar movement. For nailing heels of small transverse dimensions, in which it is desired to have the securing means close together, the driver in the central bore only of the guide 51 may be employed in connection with the drivers of guides 52, 52 and 53. The nails will thus lie at the apices of a rhombus. For attaching a larger heel, when the holders 51 and 52 are moved outwardly away from one another, the outer bores of the first-mentioned holder may be utilized, the points of attachment then being at the apices of a pentagon. It is to be noted that in either the contracted or expanded nailing, the bores of the guide 51 will be in their travel maintained in symmetrical relation to the side guides 52. The guide 53, which is at the rear of the heel and with which there is occasion for less frequent adjustment, is clamped between the plates 58 and 60 by screws 74 passing through the plates into the top of the jack-post. These screws also hold in position an adjustable back-gage 76, which contacts with the rear of the interior counter portion of a shoe, and has a horizontal flange 78 lying between the plate 60 and the jack-post. This flange is slotted at 80 to embrace the screws 74, and, upon loosening these screws, may be shifted in its relation to the body of the jack-post to vary the position of the nailing as a whole to the heel which is to be attached. In the adjustments which have been described, and which are effected by movements of the guides, the driver holders follow the travel of the guides freely and without binding by virtue of the combined sliding and rocking of the cylindrical portions 50 of the holders in their ways.

To hold the work firmly upon the support with a heel clamped in position upon the shoe to which it is to be attached, an abutment or pressure-device is mounted upon a head 82 vertically movable in ways 83 in the upper portion of the frame and including a supporting slide 84 movable horizontally in the head, this slide having a pressure member 86 for contact with the tread surface of the heel, and a fork 88 arranged to co-operate with the rear of the heel. The mounting, interconnection and adjustment of the elements 86 and 88 may be as disclosed in the patent previously referred to. The fork 88 has a carrier member 90 formed with a shank 92 fixed in the slide. Mounted upon the carrier are three supporting members—a central support 94 arranged to slide upon the carrier, and op-

posite side members 96, 96 pivoted at 98 on said carrier. At opposite sides of the central member are formed rack-teeth 100, with which mesh teeth of segmental gears 101 upon the side members, causing all these elements to move together. The central member is held in its extreme forward position, with the side members forced back under its influence, by a spring 102 seated in a socket in the member 94, and bearing against a wall of the carrier. The other end of the socket receives a friction-stud 104 projecting from the rear central portion of a flexible band 106. This band, to give it the proper body and stability in its bearing upon the work, may be made up of a plurality of thicknesses of some such material as leather. Extending longitudinally of the outer extremities of the side members 96, 96 are ways 108, in which slide the heads of studs 110 fixed in the band 106 near its outer ends. Under the influence of the spring 102 the supports cause the band to assume a rather flat curve, or one of large radius, as is best illustrated in Fig. 12 of the drawings, this being of such a contour as to readily receive the largest heel which is to be operated on. As the pressure device is brought into contact with the heel, the central member 94 yields under the pressure, and in traveling rearwardly causes the side members 96 to move toward one another, thus wrapping the band about the heel to give perfect contact throughout the entire length of the band, the heads of the studs 110 traveling in their slots during this movement of self-adjustment. The heel is thus very perfectly held against rearward displacement under the clamping pressure and by means which has no tendency to deface it, nor to bring ununiformly distributed stresses which will tend to split it. Because of the manner in which the band is attached to the supports by its studs, it may easily be removed and renewed.

The head 82 is held normally raised, to free the jack-post for the application of the work, by flexible means, which may consist of a pair of wire ropes 112 attached to the head at opposite sides and passing over and being fixed to circumferential surfaces 114 formed upon wheels 116 journaled at the top of the frame. At the portions of the wheels of maximum diameter, this being considerably greater than the surfaces 114 and thus increasing the leverage, are surfaces 118, about a portion of which pass and are secured two flexible members 120, which, upon leaving the surfaces 118, travel over guide-pulleys 122 mounted for rotation at the rear of the upper portion of the frame, and then enter the ends of tubular casings 124 extending in an approximately vertical direction along the frame. Within the casings and protected thereby, the members 120 are attached to springs or motor members 126, the opposite ends of which springs are fixed at 128 to the frame. To move the pressure device toward the heel upon which it is to bear, both operator-controlled and power-actuated means are provided. Guided in vertical slots 130 formed in the frame at the lower rear portion, is a treadle 132 having a floating fulcrum, furnished by a link 134 depending from a lever 136 arranged to turn near the central rear portion of the frame. The opposite or forward extremity of the lever 136 is forced up to hold the floating fulcrum of the treadle in a normally lowered position, by a spring 138 interposed between a bracket projecting from the frame and the end of a screw 140 threaded vertically through the forward extremity of the lever 136. By changing the position of this screw, the tension of the spring 138 may be varied, and therefore the resistance which it exerts to the upward displacement of the fulcrum of the treadle. Articulated near the central portion of the treadle is a link 142, adjustable in length by a turnbuckle 144, and joined at its upper extremity to a lever 146 fulcrumed in the frame and having at its inner end a gear-segment 148. With this segment meshes a like segment 150, formed upon a lever 152 fulcrumed upon the frame adjacent to the lever 146 and joined by a link 154 to the head 82. When the treadle is depressed by the operator, the spring 138 is at first sufficient to prevent movement of the floating fulcrum of the treadle, so that the latter turns about this as a fixed point, lowering the link 142. This, through the geared levers 146 and 152, likewise lowers the head 82, bringing the tread pressure member 86 and the fork 88 against the heel which they are to hold. The contact with the heel arrests the movement of the link 142, which in its turn acts as a fulcrum, and as pressure is continued by the operator upon the treadle, the link 134 is raised, lowering the forward end of the lever 136. To this lever, between its fulcrum point and the spring 138, is pivoted a rod 156, having secured near its lower extremity a contact member 158 movable against the horizontal arm of a bell-crank lever 160, which is held normally raised by a spring 161 to hold the clutch 38 against operation. As the rod 156 is lowered, the action of the contact member upon the lever 160 withdraws it from cooperation with the clutch, permitting this to become engaged to rotate the shaft 36 from the pulley 40. Upon the end of the rod 156 is a pin 162, movable in a slot 164 in an arm 166 turning upon a rod 168 extending transversely of the lower portion of the frame. A spring 170 resists the

movement of the pin in the slot. This pin, slot and arm connection so guides the lower end of the link 156 in its downward travel that it is also moved outwardly away from the clutch lever 160. This causes the contact member 158, after it has tripped the clutch, to become disengaged from the lever and release it, permitting its restoration by the spring 161 to its normal position, in which it stops the action of the clutch at the end of a single rotation. A constantly-acting friction brake 171 aids in stopping the shaft 36.

Fast upon the shaft 36 is a cam-disk 172, with the rear face of which contacts a roll 174 rotatable upon the vertically extending arm of a bell-crank lever 176 fulcrumed upon the frame. The other arm of this lever is connected by a link 178, through an eye 180 at its upper end, with central pivot bosses 182 projecting adjacent to each other upon the sides of a double toggle lever 184, 184. The opposite ends of this lever bear against blocks 186 and 188 arranged to slide in an arm 190 extending rearwardly in a horizontal direction from the lower portion of the head 82. The outer block 186 contacts with an adjusting screw 192 threaded through the outer end of the arm 190, while the companion block 188 rests against the outer of a set of vertical clutch-plates 193 depending from the head 82. Interleaved with the plates 193 is another set of plates 194 rising vertically from a slide or actuator 196 movable in vertical ways 198 in the head. The slide 196 is joined by an eccentric rod 200 with an eccentric 202 mounted near the center of the shaft 36. A spring 204, joining the rod 178 with the slide 196, holds said rod in a normal raised position, so that the toggle-lever is broken and the plates 193 and 194 are free from clutching pressure. When the rotation of the shaft 36 begins, an inclined cam-surface 206 upon the disk 172 travels in contact with the roll 174. This lowers the link 178 to straighten the toggle 184, forcing the block 188 against the clutch-plates and causing their engagement. The force of this engagement may be varied, by altering the position of the screw 192 to shorten or lengthen the normal distance between the connections of the toggle-lever to the blocks 186 and 188. As long as the clutch is maintained in action by the contact of the roll 174 with the vertical rear face of the disk 172, the slide 196 and head 82 are moved together under the influence of the eccentric 202, causing the pressure device 86, 88 to force the heel against the shoe to which it is to be attached by an amount which, on account of the preliminary pressure on the setting device by the treadle, is independent of the height of the heel operated on. The relation of the eccentric 202 and the crank-disk 34 is such that this clamping pressure continues during the nailing operation. This is of especial utility in maintaining the work in contact with the ends 61 of the guide-tubes as the nails are forced into the work. Sometimes there is, at the points at which the nails enter, a considerable thickness of yieldable material, this being especially true of turn shoes, which is forced away by the entering nails, causing these to become deflected and to enter the heel improperly. This is prevented by exerting upon the work the continued pressure as the nails are driven, the inside of the shoe being constantly held in contact with the guide-tubes. The nailing operation having been completed, the surface of the disk 172 passes from the roll 174 at a point 207, releasing the bell-crank lever 176 and allowing the link 178 to be raised by its spring to free the clutch. The head 82 is thereupon raised to the initial position, to which it is moved by the springs 126, the tension of these springs being multiplied by the leverage afforded by the wheel surfaces 114 and 118 of different diameters. The extent of the pressure which is applied by the members 86 and 88 may be varied by an adjustment of the eccentric 202. This eccentric is in the form of a collar arranged to slide longitudinally of the shaft upon an inclined portion 208 between the disk 172 and an opposite disk 210. The eccentric collar is held in position upon the inclined portion and moved thereon to the desired point by a screw 201 mounted to turn in the disks and being threaded through the collar. The width of the eccentric strap upon the rod 200, or its dimension longitudinally of the shaft 36, is equal to the distance between the disks 172 and 210, so that, wherever the eccentric may be adjusted, it will still be within the strap. The dimensions of the inclined portion of the shaft and of the collar are such that the eccentricity may be varied to the extent necessary for the proper application of pressure.

The momentum of the head 82, after it has been released by the clutch-plates 193 and 194, is preferably absorbed by a dash-pot device employing in the present instance air as a cushioning medium, although obviously some other fluid might be utilized. This may consist of a cylinder 212, formed vertically in the head and positioned to move over, in the ascent of the head, a piston 214 entering the cylinder and having its rod 215 threaded through a bracket 216 at the top of the frame, the rod being locked in position in the bracket by a check-nut 218. As the cylinder travels along the piston, which fits it closely, the air within the cylinder is expelled through a passage 220 in the piston having a contracted opening controlled by a valve 222. The flow of air through this valve may be so adjusted that the head is brought to rest, when the end of

the cylinder contacts with the adjacent end of the piston, without undue shock. The point at which this positive arrest of movement occurs may be changed by raising or lowering the screw upon which the piston 214 is mounted, thus altering the vertical relation of its contact end. To prevent there being a resistance exerted to the downward movement of the head 82 by the dash-pot device, there is formed through the piston a passage 224, the inner end of which communicates with a chamber 225 within the piston, which chamber is also connected to the passage 220. The communication between the passage 224 and the chamber is controlled by a check-valve 226 opening upwardly. The suction exerted upon the check-valve in the downward movement of the head raises the former from its seat, providing for a free flow of air through the passages 224 and 220 and chamber 225 into the interior of the cylinder. Upon opposite movement of the cylinder, the valve 226 seats itself, closing the passage 224 and diverting all the air expelled through the contracted and controlled opening of the passage 220.

In using the machine, the operator places a shoe S to be heeled upon the jack-post, resting the innersole through which the attaching nails are to be driven upon the ends 61 of the guide-tubes, with the rear of the counter portion against the gage 76. Prior to this, the guide-tubes and the gage will have been adjusted to bring the nailing points at the desired position for the particular size of heel being operated upon and nails supplied to the tubes 52 and 53, and those of the tubes 51 which are to be utilized for the particular work in hand. Now depressing the treadle 132, the operator, through the link connection 142, brings the pressure member 86 against the tread-surface of the heel H, which he has placed upon the jacked shoe, and the fork 88 against the rear of said heel, the pressure upon the central member 94 of the fork causing the side members 96 to wrap the band 106 uniformly about the heel. Continued pressure upon the treadle trips the clutch 38 through the rod 156, starting the power operation of the machine. First, the cam-disk 172, through the toggle-lever 184, locks the clutch-plates 193 and 194, causing the eccentric 202 to move the head with the pressure devices against a heel to clamp it positively upon the shoe. During the application of this pressure by the eccentric, the crank-disk 34 raises the drivers 26 through their guide-tubes to force the nails contained therein through the sole of the shoe into the heel. The cam-disk 172 thereupon frees the clutch 193, 194, releasing the head 82, which withdraws the contact-device from the heel under the influence of the springs 126, the shock of the head in rising being taken up by the dash-pot device. When the end of the cylinder 212 contacts with the end of the piston, the upward movement of the head is positively arrested, and the machine is restored to its normal condition, ready for another operation.

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

1. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a movable carrier for the pressure member, connections to the carrier for moving it, an actuator for the carrier, means for moving the actuator, means for connecting the actuator and carrier, and means for rendering the connecting means active and for maintaining such action and causing movement of the pressure member during the movement of the driving member.

2. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a movable carrier for the pressure member, connections to the carrier for moving it, an actuator for the carrier, power means for moving the actuator, means for connecting the actuator and carrier, and means effective in the operation of the machine for rendering the connecting means active and for maintaining such action and causing movement of the pressure member during the movement of the driving member.

3. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a movable carrier for the pressure member, connections to the carrier for moving it, an actuator for the carrier, power means for moving the actuator, co-operating friction members fixed to the carrier and actuator, and means for forcing the friction members into engagement.

4. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a slidable carrier for the pressure member, an actuator mounted to slide in the carrier, means for moving the actuator, and means for connecting the actuator and carrier.

5. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a slidable carrier for the pressure member, an actuator for the carrier, means for moving the actuator, friction-plates fixed to the actuator and carrier, and means for forcing the plates into engagement.

6. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, a slidable carrier for the pressure member, an actuator for the carrier, means for moving the actuator, friction-plates fixed to the actuator and carrier, means for forcing the plates into engagement, and means arranged to vary the force of engagement of the plates.

7. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a slide movable in the head, a power-shaft connected to the slide, co-operating friction-plates fixed to the slide and head, a toggle mounted upon the head and co-operating with the plates, and connections to the power-shaft to actuate the toggle.

8. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a slide movable in the head, a power-shaft connected to the slide, co-operating friction-plates fixed to the slide and head, a toggle mounted upon the head and co-operating with the plates at one extremity, means arranged to vary the position of the opposite extremity of the toggle, and connections to the power-shaft to actuate the toggle.

9. In a heel-attaching machine, a movable nail-driving member, an opposite movable pressure member, a power-shaft, operating means for the member carried by the power-shaft, said operating means being variable in position upon the shaft to alter the action of the member operated, and means arranged for control by the operator to effect such variation.

10. In a heel-attaching machine, a movable nail-driving member, an opposite movable pressure member, a power-shaft having an inclined section, an eccentric surrounding said section, means arranged to move the eccentric to different positions along the section, and connections between the eccentric and one of the movable members.

11. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a slide movable in the head, a power-shaft having an inclined section, an eccentric surrounding said section, means arranged to move the eccentric to different positions along the section, connections between the eccentric and slide, friction-plates fixed to the slide and head, a toggle mounted upon the head and co-operating with the plates, and connections to the power-shaft to actuate the toggle.

12. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, an operating shaft for the machine, a clutch controlling the application of power to the shaft, a treadle, a plurality of links upon which the treadle is hung, and connections from one of the links to the pressure member and from another link to the clutch.

13. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, an operating shaft for the machine, a clutch controlling the application of power to the shaft, a treadle, a plurality of links upon which the treadle is hung, connections from one of the links to the pressure member, a lever to which another link is connected, connections from the lever to the clutch, and yieldable means for resisting the movement of the lever.

14. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, an operating shaft for the machine, a clutch controlling the application of power to the shaft, a treadle, a plurality of links upon which the treadle is hung, connections from one of the links to the pressure member and from another link to the clutch, means for resisting the movement of one of the links, and means arranged to vary the force of such resistance.

15. In a heel-attaching machine, a movable nail-driving member, an opposite pressure member, an operating shaft for the machine, a clutch controlling the application of power to the shaft, a treadle, a plurality of links upon which the treadle is hung, connections from one of the links to the pressure member, a lever to which another link is connected, connections from the lever to the clutch, a spring for resisting the movement of the lever, and means arranged to vary the tension of the spring.

16. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a wheel rotatable upon the frame, a motor member, a flexible member connecting the wheel and head, and a flexible member connecting the wheel and motor member.

17. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a wheel rotatable upon the frame and having portions of different diameter, a motor member, a flexible member connecting one portion of the wheel and the head, and a flexible member connecting a portion of the wheel of greater diameter and the motor member.

18. In a heel-attaching machine, a frame, a nail-driving member movable therein, a head arranged to slide in the frame opposite the driving member, a wheel rotatable upon the frame, a casing, a spring situated in the casing and being secured to the frame, and flexible connections for the head, wheel and spring joined to said spring within the casing.

19. In a heel-attaching machine, a frame, a jack-post mounted thereon, drivers movable in the jack-post, a head movable upon the frame and having a tread pressure member co-operating with the jack-post, a spring co-operating with the head and frame and exerting its force to move the pressure member from the jack-post, and co-operat-

ing dash-pot elements carried by the head and frame.

20. In a heel-attaching machine, a frame, a work-support mounted thereon, a head movable upon the frame and having a pressure member co-operating with the support, a spring co-operating with the head and frame and exerting its force to move the pressure member from the support, and co-operating dash-pot elements carried by the head and frame and contacting to limit the movement of the head, the frame-element of the dash-pot being movable toward and from the head-element and arranged to contact therewith to variably limit its movement.

21. In a heel-attaching machine, a frame, a work-support mounted thereon, a head movable upon the frame and having a pressure member co-operating with the support, a spring co-operating with the head and frame and exerting its force to move the pressure member from the support, a cylinder carried by the head, and a piston variable in position upon the frame and operating in the cylinder.

22. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, driver-holders movable upon the carrier member, said driver-holders being arranged to hold different numbers of drivers, and means arranged to adjust said driver-holders simultaneously.

23. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, and driver-holders movable upon the carrier member, there being separate holders corresponding to the breast, the sides and the rear of a heel, that at the breast being arranged to hold a plurality of drivers.

24. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, and driver-holders movable upon the carrier member, there being separate holders corresponding to the breast, the sides and the rear of a heel, that at the breast being arranged to hold a plurality of drivers in a line parallel to said breast and the remainder being arranged to receive individual drivers.

25. In a heel-attaching machine, a work-abutment, a carrier movable toward and from the abutment, drivers arranged to slide and rock upon the carrier, guides for the drivers, and means connecting said guides and arranged to move them toward and from one another.

26. In a heel-attaching machine, a work-abutment, a carrier movable toward and from the abutment, drivers arranged to slide and rock upon the carrier, and operator-controlled means for moving the drivers toward and from one another.

27. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, a driver-holder having a cylindrical portion movable in contact with the carrier member, and operator-controlled means for causing the travel of the cylindrical portion along the carrier member.

28. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, a driver-holder movable upon the carrier member, a driver mounted to slide and rock with the holder, a guide-tube for the driver mounted to slide laterally, and means arranged to move the guide-tube bodily upon its mounting.

29. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, drivers movable upon the carrier member, guides for the drivers, said guides being arranged to move respectively in different directions, and means connected to one of the guides for moving it, said guide having provision for moving another guide.

30. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, drivers movable upon the carrier member, guides for the drivers, and means connected to one of the guides for moving it, said guide having a cam-surface co-operating with another guide.

31. In a heel-attaching machine, a work-abutment, a carrier member movable toward and from the abutment, driver-holders movable upon the carrier member, there being separate holders corresponding to the breast, the sides and the rear of a heel, driver-guides corresponding to the holders, and means arranged to move the breast driver-guide, said breast driver-guide having provision for moving the side guides.

32. In a heel-attaching machine, a jack-post, a plunger operating therein, drivers movable upon the plunger, a plate carried by the jack-post and having a slot, a driver-guide movable in the slot, and a driver-guide movable upon the plate and having a slot co-operating with the guide situated in the plate slot.

33. In a heel-attaching machine, a jack-post, a plunger operating therein, drivers movable upon the plunger, a plate carried by the jack-post and having a slot, a driver-guide movable in the slot, a driver-guide movable upon the plate and having a slot co-operating with the guide situated in the plate slot, and a screw mounted upon the jack-post and engaging the slotted driver-guide.

34. In a heel-attaching machine, a work-abutment and a carrier member relatively movable toward and from one another, drivers movable upon the carrier member, guide means associated with one of the drivers, and means engaging the guiding means for

moving it and the corresponding driver laterally, said guide means having provision for moving another driver.

35. In a heel-attaching machine, a jack-post, a plunger operating therein, drivers movable upon the plunger, a driver-guide movable upon the jack-post, means for securing the guide in position, and a gage mounted upon the jack-post and fixed in position by the guide-securing means.

36. In a heel-attaching machine, a jack-post, a plunger operating therein, drivers movable upon the plunger, a plate carried by the jack-post, a guide for a driver movable upon the plate, and a gage held between the plate and jack-post.

37. In a heel-attaching machine, a jack-post, a plunger operating therein, drivers movable upon the plunger, a plate carried by the jack-post, a guide for a driver movable upon the plate, a gage held between the plate and jack-post, and means for securing the plate to the jack-post, said plate being arranged to hold the guide and gage against movement.

38. The combination with a jack post, of a flexible engaging member arranged to clamp a heel upon a jacked shoe, movable supports for the engaging member, and means for connecting the supports to cause them to move together.

39. The combination with a jack post, of a flexible engaging member arranged to clamp a heel upon a jacket shoe, movable supports for the engaging member, and gearing connecting the supports.

40. In a pressure device for heels, a jack-post, movable members arranged to co-operate with the rear and opposite sides of a heel to clamp it upon a jacked shoe, means for independently mounting the members, and connections for transmitting the movement of one member to the others.

41. In a pressure device for heels, a jack-post, separated pivoted contact members arranged to co-operate with the opposite sides of a heel and provided with teeth, an intermediate sliding contact member arranged to co-operate with the rear of the heel and having opposite teeth engaging those of the pivoted members, said members acting by their co-operation with a heel to clamp it upon a jacked shoe.

42. In a pressure device for heels, a jack-post, separated pivoted contact members arranged to co-operate with the opposite sides of a heel and provided with teeth, an intermediate sliding contact member arranged to co-operate with the rear of the heel and having opposite teeth engaging those of the pivoted members, and a flexible band mounted upon the contact members for engagement with the heel to clamp it upon a jacked shoe.

43. In a pressure device for heels, a plurality of movable supporting members, and a heel-engaging member mounted upon the supporting members, the engaging member being fixed against movement upon one of the supporting members and there being connections between the engaging member and another supporting member to transmit relative movement.

44. In a pressure device for heels, a plurality of movable supporting members, a heel-engaging member mounted upon the supporting members, the engaging member being fixed against movement upon one of the supporting members and there being connections between the engaging member and another supporting member to transmit relative movement, and connections between the supporting members to cause them to move together.

45. In a pressure device for heels, movable rear and opposite side supporting members, a flexible heel-engaging member, a friction-stud connection between the engaging member and the rear supporting member, and sliding stud connections between the engaging member and side supporting members.

46. In a pressure device for heels, a shoe-support, a strap of yieldable material arranged to embrace the rear surface of a heel on a supported shoe, and means to apply pressure to the strap at spaced points on opposite sides of the median line of the heel, and in a direction to force such heel against the heel-seat of a shoe on the support.

47. In a pressure device for heels, a shoe-support, and a head arranged to clamp a heel against a supported shoe, said head comprising a tread-engaging member and a strap for contact with the rear surface of the heel.

48. In a pressure device for heels, a shoe-support, and a head arranged to clamp a heel against a supported shoe, said head comprising a tread-engaging member and a pressure member arranged to conform, by virtue of its bodily movement, to the rear surface of the heel.

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

JOHN F. STANDISH.