April 28, 1931. F. N. LA CHAPELLE ET AL 1,802,900

FASTENING INSERTING MACHINE

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Fig.1.

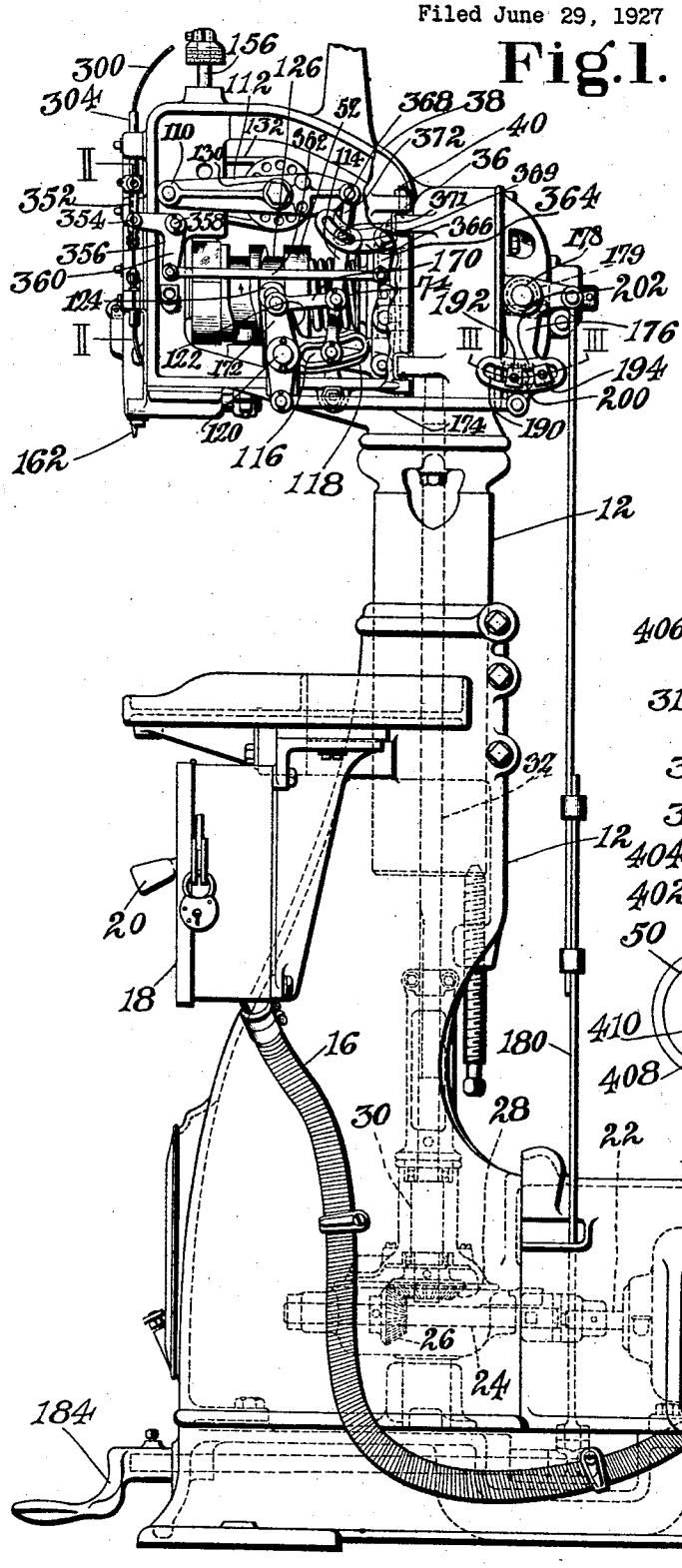


Fig.3.

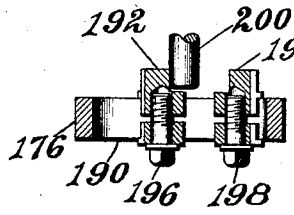
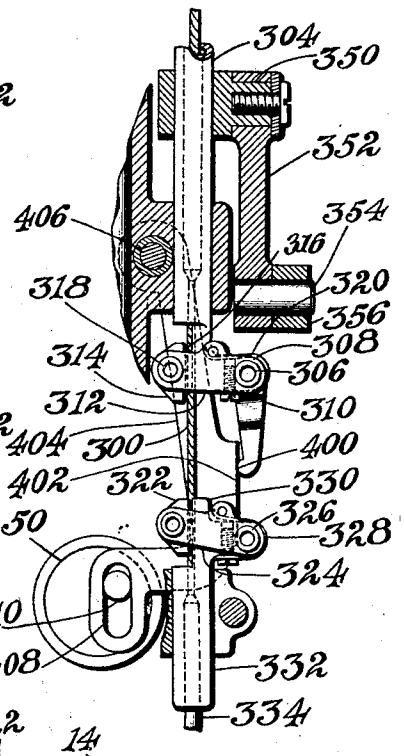


Fig.2.



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Fig. 4.

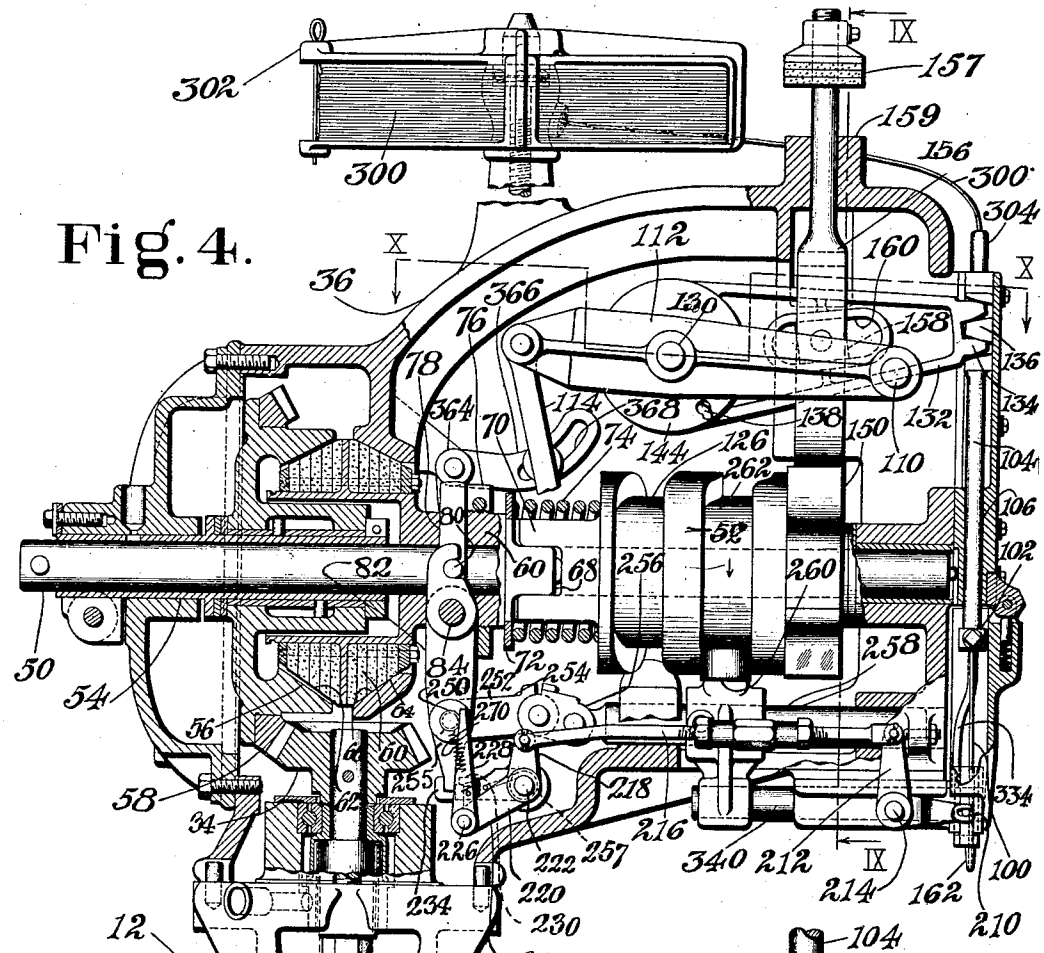


Fig. 6.

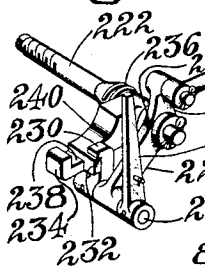


Fig. 5.

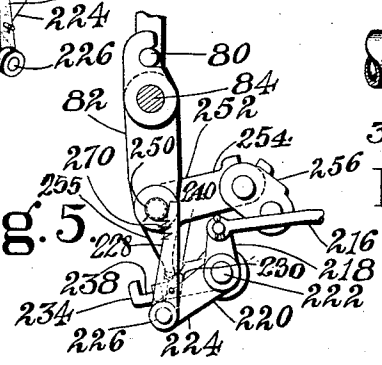
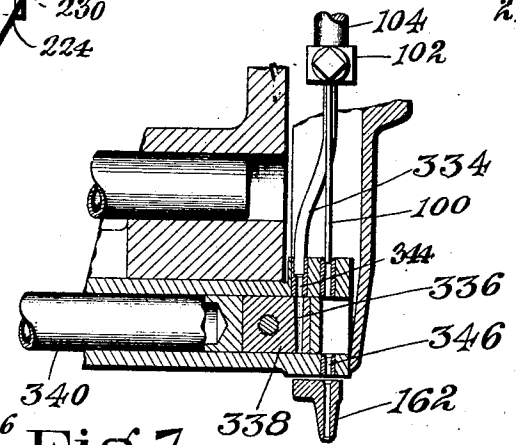


Fig. 7.



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Fig.8.

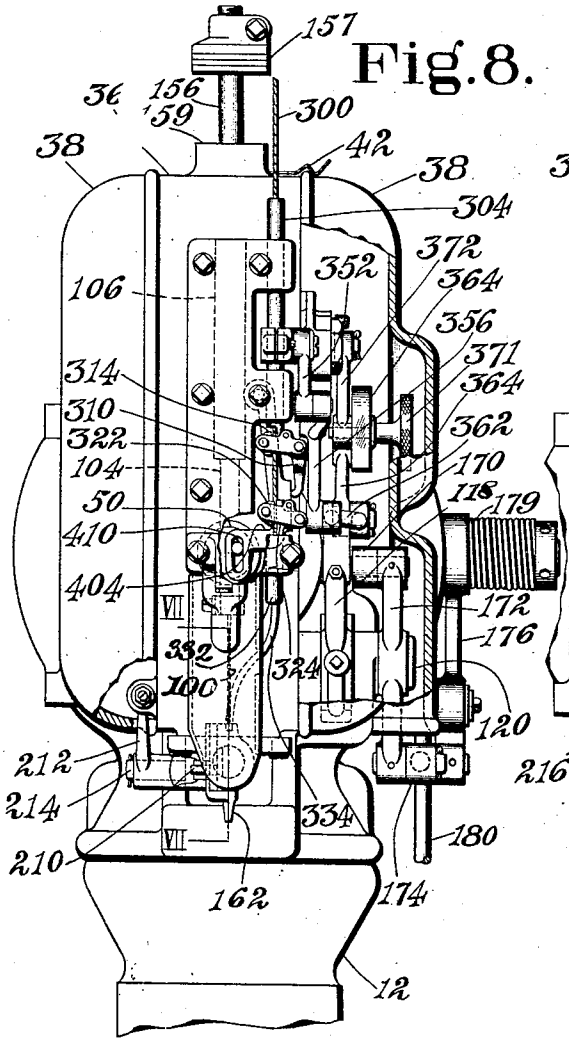


Fig.9.

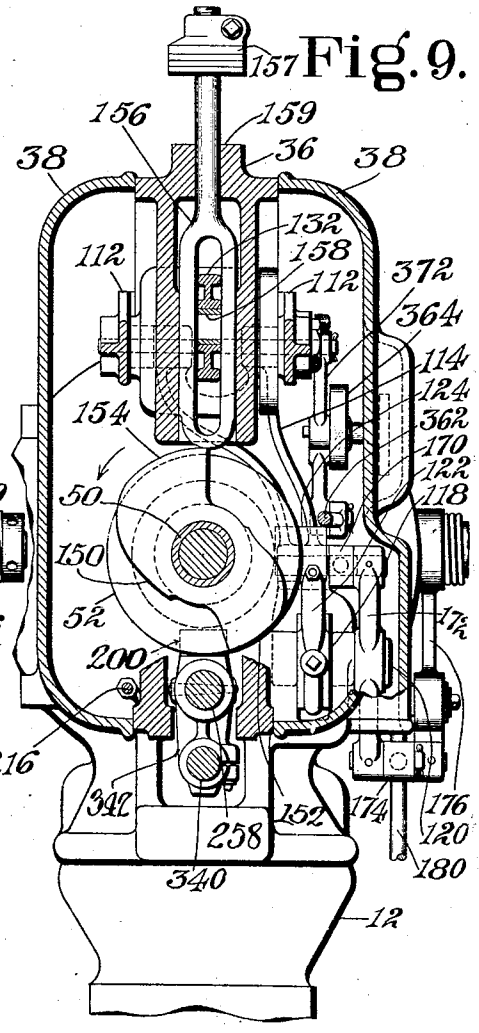
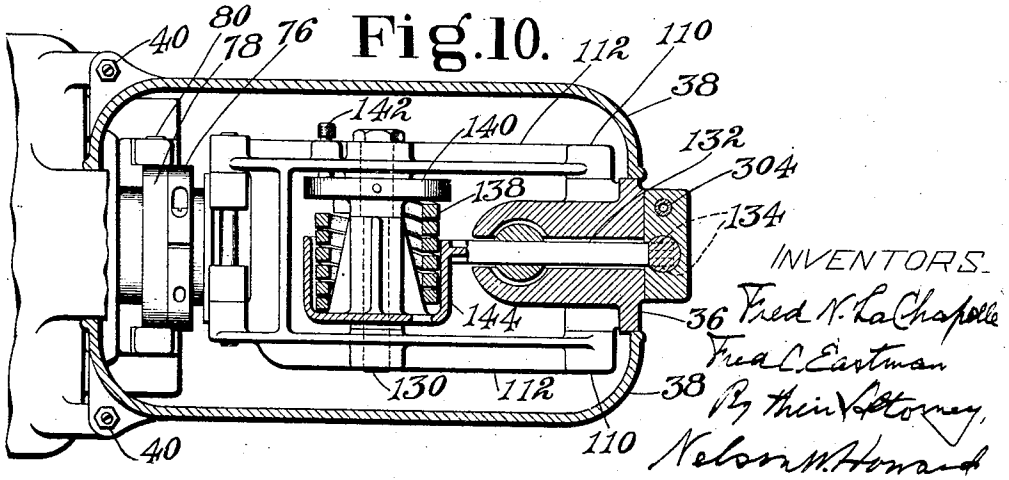


Fig.10.



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UNITED STATES PATENT OFFICE

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FASTENING-INSERTING MACHINE

Application filed June 29, 1927. Serial No. 202,416.

This invention relates to fastening inserting machines and is illustrated as embodied in a machine particularly adapted to insert paper pegs in the manufacture of boots and shoes.

The fastening together of shoe parts by means of paper pegs, as disclosed and claimed in United States Letters Patent No. 1,729,169, granted on September 24, 1929, to Fred N. La Chapelle, has proved to be so successful that it has become desirable to develop fastening inserting machines particularly adapted to the insertion of pegs of this character and therefore more satisfactory for such work than were most of the previously existing fastening inserting machines which were designed to insert metallic fastenings. It is, accordingly, an object of the present invention to provide a simple, effective, and reliable fastening inserting machine of a character well adapted to be used for the insertion of paper pegs in the manufacture of boots and shoes.

While the machine herein disclosed as embodying the present invention is by no means limited in its utility to the insertion of paper pegs of the character disclosed in said Patent No. 1,729,169, it has been developed with a view particularly to the insertion of such pegs, and more specifically to the performance of such operations as, for example, McKay sole laying (that is the preliminary attachment of the soles of McKay shoes by fastenings driven through the soles into the lasted uppers and insoles), in which mechanical means for feeding the work to and past the fastening inserting instrumentalities of the machine are not necessary and are not ordinarily used.

When inserting pegs of the character referred to, it has so far been found necessary to make in the work piece a hole of substantially the full depth to which each fastening is to be driven. In McKay sole laying, for example, such holes will extend from the surface of the channel in the tread surface of the forepart and shank of the outsole and from the heel-seat portion of the outsole substantially through the insole of the shoe. As this distance is greater in the heel-seat portion of the shoe where there is no channel than in the forepart of the shoe, it is desirable to provide simple, and readily controlled means for varying the depths of the holes formed and for presenting for insertion in the holes fastenings varying in length in accordance with the depths of the respective holes in which they are to be inserted. The illustrated machine, therefore, in accordance with a feature of the invention, is provided with means for varying the depths of the holes formed in the work, and for correspondingly varying the lengths of the fastenings inserted in the respective holes. In the preferred embodiment of the invention shown in the accompanying drawings, the depth of the holes and the length of the fastenings are determined by a controller, illustrated as a suitable manually operated treadle, connected to the operating parts of the machine in such a manner that when the treadle is in its normal position the stroke of a tool operating as an awl is such as to make holes of an unvarying (though preferably adjustable) depth and the fastenings inserted are of a corresponding length, while when the treadle is displaced the awl stroke of the tool extends deeper into the work and the fastenings supplied are correspondingly longer, the depth of the holes and the length of the fastenings, again preferably being capable of adjustment. Stated another way, the treadle is movable between two positions, illustrated as mechanically determined by a pair of adjustable stops, and connections are provided between the treadle and the hole forming and fastening supplying instrumentalities of the machine whereby when the treadle is in one of said positions holes of one predetermined depth are formed and when the treadle is in the other of said positions holes of a different predetermined depth are formed, the fastenings being supplied in either case of lengths corresponding to the depths of the holes in which they are to be inserted.

In order to simplify the construction and to keep down the number of parts of the illustrated machine, a single tool is utilized both as an awl and as a driver. This tool is given two strokes in each cycle of operation of the

machine, first an awl stroke in which it penetrates the work and forms a fastening receiving hole and second a driver stroke in which it inserts a fastening in the hole which it has previously formed in the work. In accordance with a further feature of the invention, this tool is reciprocated by a rocking lever the fulcrum of which is moved according as the tool is to operate as an awl or as a driver. In accordance with another feature of the invention other means are provided for positioning the fulcrum of this lever at the time of the awl stroke of the tool according to the desired depth of the hole to be formed in the work piece. As illustrated, these functions are performed by suitable link and lever mechanisms, the means for varying the stroke according as the tool is to act as an awl or as a driver being shown as cam operated and the means for varying the depth of the awl stroke being manually controlled.

Another feature of the invention comprises an improved feed mechanism for feeding the strip of fastening material from which the paper pegs are severed, toward severing position. As illustrated, this comprises a novel arrangement including a feed dog mounted upon a link and arranged for reciprocating movement to feed the strip of fastening material, another dog for retaining the strip against retrograde movement between feed movements, and means for disengaging the feed dog from the strip of fastening material when the machine comes to rest so that the strip of material cannot be fed forward during the adjusting of the machine or in any manner unaccompanied by the rotation of the main shaft of the machine.

A further feature of the invention comprises novel controlling mechanism arranged to cause the machine to come to rest at the end of a single cycle of operation in such condition that it can be started again with little effort on the part of the operator. The illustrated machine is provided with a nozzle trip, the nozzle being connected to the clutch of the machine by mechanism operated, when the nozzle is displaced by upward pressure of the work piece against the nozzle, to start the machine. The novel controlling mechanism includes a toggle arranged when substantially broken to permit the clutch to become operative to drive the machine, the toggle being arranged to be held by a latch in a partly broken position while the machine is at rest. This latch is connected to the nozzle of the machine so that a comparatively light pressure of the work piece against the nozzle trips the latch permitting the toggle to break sufficiently to permit the clutch to be thrown into driving position.

With the above and other objects and features in view, the invention will now be described in connection with the illustrated machine and pointed out in the accompanying claims. It should be noted, however, that while the illustrated machine comprises the best embodiment of the invention now known, the invention is clearly, in many of its aspects, capable of embodiment in other forms. It should accordingly be understood that the invention is not limited to the particular type of machine herein illustrated.

In the drawings,

Fig. 1 is a side elevation of a fastening inserting machine embodying the present invention, a reel from which fastening material is supplied and a portion of the base of the machine being broken away;

Fig. 2 is a transverse section on the line II—II of Fig. 1, and on a larger scale than Fig. 1, showing particularly the means for feeding the strip of fastening material to severing position;

Fig. 3 is a section on the line III—III of Fig. 1 on a larger scale than Fig. 1;

Fig. 4 is a longitudinal section through the head of the machine on a larger scale than Fig. 1;

Fig. 5 is a detail view of the latch mechanism of a clutch-controlling toggle, shown also in Fig. 4, illustrating that mechanism with the latch tripped and the toggle broken;

Fig. 6 is a perspective view of the latch mechanism of Fig. 4;

Fig. 7 is a longitudinal section through the nozzle of the machine on the line VII—VII of Fig. 8;

Fig. 8 is a front view of the head of the machine with parts of the covers of the head broken away;

Fig. 9 is a transverse section through the head of the machine on the line IX—IX of Fig. 4; and

Fig. 10 is a horizontal section of the head of the machine on the line X—X of Fig. 4.

As shown particularly in Fig. 1 the machine is provided with a column 12 made up of two telescoping and relatively adjustable sections in the base 13 of which is housed a motor 14 to which electricity is carried by a conductor housed in a conduit 16 and controlled by a switch contained in a box 18 and operated by a lever 20 projecting from the box 18. The rotor shaft 22 of the motor is coupled to a shaft 24 housed in the column 12 fast upon which is a bevel gear 26 meshing with a bevel gear 28 fast upon a shaft 30 adjustably connected to a shaft 32 arranged vertically in the column 12 of the machine and carrying at its upper end a bevel gear 34 (Fig. 4).

A head 36 is fixed upon the top of the column 12 and is provided with a pair of large doors 38 (best shown in Figs. 8, 9, and 10) illustrated as hinged at 40 (Fig. 1) and normally retained closed by a latch as shown at 42 (Fig. 8) but arranged to be opened to give access to the parts housed within.

Suitably journaled in the head of the ma-

chine is a shaft 50 (Fig. 4) having fast upon its forward end a group of cams preferably formed as a unit hereinafter designated as a cam member and indicated generally by the numeral 52. Fast upon a sleeve 54 rotatably mounted upon the shaft 50 but secured against endwise movement is a clutch member 56 to which is rigidly secured a bevel gear 58 meshing with the bevel gear 34. Slidably and rotatably mounted upon the shaft 50 is a clutch member 60 having a clutch face 62 arranged to be moved into and out of engagement with the adjacent surface of the clutch member 56 and a brake surface 64 correspondingly moved out of and into engagement with a stationary brake surface 66 formed upon the head of the machine. The forward end of the clutch member 60 is provided with a plurality of projections 68 telescoping with corresponding projections 70 formed upon the rear of the cam member 52 and thus fast upon the shaft 50. Clutch member 60 is also formed with a collar 72 forming an abutment at the rear end of a stiff coil spring 74 surrounding projections 68 and 70 and bearing at its forward end against a plane surface formed upon the rear of the cam member 52, the spring 74 thus tending to move the clutch member 60 rearwardly into power transmitting position.

Threaded upon and rigidly clamped to the clutch member 60 is a collar 76 to the rear of which is a hub 78 mounted for endwise movement relatively to the clutch member 60 and provided with a pair of pins 80 on opposite sides of the shaft 50 and engaging hooks formed at the upper end of a lever 82 fulcrumed at 84 to the head of the machine. Thus when the lever 82 is held in the position shown in Fig. 4 the spring 74 is compressed and the clutch member 60 is maintained in its forward or non-power transmitting position while when the lever 82 is rocked by mechanism hereinafter described in a counter-clockwise direction from the position of Fig. 4 to the position of Fig. 5 the clutch member 60 is moved rearwardly by the force of the spring 74 into engagement with the continually driven clutch member 56 and thus becomes effective to transmit power to the cam member 52.

The illustrated machine is provided with a single tool 100 (Figs. 4, 7 and 8) arranged to operate both as an awl and as a driver. This tool 100 is clamped at 102 to a tool carrier 104 mounted for vertical reciprocation in a guideway 106 carried by or formed in the head 36 of the machine.

The mechanism for giving the tool 100 its awl stroke and its driver stroke includes a lever 112 fulcrumed at 110 (Figs. 1, 4, and 10) to the head of the machine and having two parallel arms pivoted at their rear ends to a link 114 (Figs. 1 and 9) positioned approximately vertically and having a pivoted bearing at its lower end in a slot 116 formed in a rearwardly extending arm of a bell crank lever 118 fulcrumed at 120 to the head of the machine and having an upwardly extending arm 122 carrying a cam roll 124 positioned in a cam track 126 formed in cam member 52. Slot 116 is formed on an arc of a circle having a radius equal to the distance between the pivots of link 114 and positioned concentric with the pivotal connection between link 114 and lever 112 at the time of the driver stroke of tool 100. As means hereinafter described is provided for preventing undesired movement of the link 114 lengthwise of the slot 116, it will be seen that the rocking movement imparted to the bell crank lever 118 by the cam track 126 operates cyclically to rock the lever 112 up and down about its fulcrum 110. The form of the cam slot 126 is such as to position the lever 112 in its uppermost position early in the cycle of operation when the tool 100 is acting as an awl and to position the lever 112 in its lowermost position later in the cycle when the tool is operating as a driver.

Fulcrumed at 130 to the lever 112 is another lever 132 (Figs. 4 and 10) formed at its forward end with teeth 134 entering the openings between corresponding teeth 136 formed in the upper end of the tool carrier 104. A stiff coil spring 138 surrounds the fulcrum 130 of the lever 132 and is anchored at one end to a disk 140 adjustably secured to the lever 112, as by a pin 142. At its other end the spring 138 is secured to a housing 144 secured to or formed as part of the lever 132. As illustrated in Fig. 4 the end of the spring 138 is anchored by projecting through a hole formed in the housing 144. Thus the spring 138 tends at all times to rock the lever 132 in a clockwise direction as viewed in Fig. 4 and to urge the tool carrier 104 and the tool 100 downwardly.

At its forward end the cam member 52 is provided with a lifting cam 150 (Figs. 4 and 9) having a pair of elevated portions 152, 154. Mounted for vertical sliding movement in the head 36 of the machine is a lifting bar 156 the lower end of which bears against the cam 150 and thus serves as a lifting block. Pivoted to the lifting bar 156 is a block 158 positioned in a slot 160 formed in the lever 132. Thus as the cam member 52 rotates, the lifting bar 156 is elevated by the cam 150, the lever 132 being rocked upwardly and the spring 138 correspondingly compressed. Then when the elevated portion 152 or the elevated portion 154 of the cam 150 passes out from beneath the lower end of the lifting bar 156, the spring 138 forces the lifting bar 156 and the lifting block 158 downwardly thus rocking the forward end of the lever 132 downwardly in a clockwise direction as shown in Fig. 4, and forcing the tool carrier 104 and the tool 100 also downwardly. A

bumper 157 clamped to the upper end of the lifting bar 156 impinges upon a boss 159, thus limiting the downward stroke of the lifting bar 156. In the illustrated machine the elevated portion 152 of cam 150 passes out from beneath the lifting bar 156 when the fulcrum 130 of the lever 132 is in its uppermost position, the tool 100 then being forced downwardly through a nozzle 162 and into the work to form a fastening receiving hole. When the shaft 50 has been rotated through another 180°, and the elevated portion 154 of the cam 150 has raised the lifting bar 156 and passed out from beneath the lifting bar, the fulcrum 130 of the lever 132 has been moved to its lowermost position. Thus the downward movement of the tool carrier 104 and the tool 100 is only sufficient to drive the fastening which at that time has been brought into alinement with the throat opening of a nozzle 162 and with the tool 100. In order that the two strokes of the tool 100, though terminating at different points, may be approximately of the same length, the elevated portion 154 of the cam 150 is as shown in Fig. 9, somewhat higher than the elevated portion 152.

In order to permit the machine to be used to drive fastenings of either one of two lengths as may be desired, for example, in McKay sole laying where it is preferable to use shorter fastenings to attach the forepart of the sole than are used in the heel-seat, the machine is provided with additional mechanism which will now be described for varying the position of the lever 112 and the fulcrum 130 of the lever 132 at the time of the awl stroke of the tool 100. For this purpose link 114 is pivotally connected somewhat above its lower end to a link 170 pivoted at its other end to an approximately vertical lever 172 fulcrumed at 120 to the head of the machine and having its lower end connected by a link 174 to a bell crank lever 176 fulcrumed at 178 to the head of the machine (Figs. 1, 8 and 9) and urged in a counterclockwise direction as shown in Fig. 1 by a spring 179 (Fig. 8). The bell crank lever 176 has a rearwardly extending arm connected by an adjustable rod 180 to a controller or treadle 184 mounted in the base of the machine and arranged by its displacement to move the rod 180 downwardly thus rocking the bell crank lever 176 and the lever 172 in a clockwise direction, as viewed in Fig. 1, against the action of spring 179 and moving the lower end of the link 114 rearwardly in the slot 116 of lever 118. Thus when the operator steps upon the treadle 184 the amplitude of the rocking movement of the lever 112 about its fulcrum 110 is greater than when the treadle 184 is in its normal position. The fulcrum 130 of the lever 132 is, accordingly, raised to a greater extent at the time of the awl stroke of the tool 100 if the treadle 184 is displaced, and the forward end of the lever 132 is correspondingly lowered to a greater extent at the time of the awl stroke of tool 100 so that a deeper hole is made in the work piece presented to the nozzle 162.

In order definitely to determine the depths of the holes formed in the work according as the treadle 184 is elevated or depressed, the bell crank lever 176 is provided with a slot 190 (Figs. 1 and 3) in which is carried a pair of adjustable stops 192, 194 clamped in the desired position by screws 196, 198. A stationary pin 200 carried by the head 36 of the machine is engaged by one or the other of the stops 192, 194, and thus controls the upper position of the treadle 184 and the extent to which the treadle can be displaced. Conveniently a scale 202 is carried by the lever 176 to aid in the proper positioning of the stops 192, 194.

The illustrated machine is arranged to be started by upward displacement of the nozzle 162 accomplished by pressure of the work against the nozzle. For this purpose the nozzle 162, which is mounted for vertical sliding movement, carries a pin 210 (Figs. 4 and 8) positioned in a slot formed in the forwardly extending arm of a bell crank lever 212 fulcrumed at 214 to the head of the machine. An upwardly extending arm of the bell crank lever 212 is connected by an adjustable link 216 to the upwardly extending arm 218 of a second bell crank lever 220 (Figs. 4 and 5) fulcrumed on a short stationary shaft 222 to the head 36 of the machine. A rearwardly and downwardly extending arm 224 of the bell crank lever 220 is provided with a bearing for a short shaft 226 to which are pinned an upwardly extending finger 228 and a hook 230 positioned when the machine is at rest above a lug 232 (see particularly Fig. 6) projecting from a latch member 234 pivoted to the head of the machine at 222 and thus movable about the fulcrum of the bell crank lever 220. A spring 236 anchored at one end to the latch member 234 and at the other end to a stationary part of the machine tends to rock the latch member 234 in a clockwise direction as viewed in Figs. 4, 5, and 6. Toward its rear end the latch member 234 is provided with a notch 238 (Fig. 5), forwardly of which is an arcuate surface 240 best shown in Fig. 6. Pivoted at 250 to the lever 82 is a bell crank lever 252 having a forwardly extending arm 254 and a depending arm 255 (Fig. 5) arranged when the machine is at rest to be positioned in the notch 238 of the latch member 234. Pivoted to the forward extremity of the forwardly extending arm 254 of the bell crank lever 252 is a link 256, the bell crank lever 252 and the link 256 thus forming a toggle. The forward extremity of the link 256 is pivoted to a rod 258 (Fig. 4) mounted for sliding movement in bearings formed in the head 36 of the machine and carrying a roll

260 engaging a cam track 262 formed in the cam member 52. A spring 270 connected at one end to the fulcrum 250 and at the other end to the finger 228 tends to maintain the finger 228 in an approximately vertical position with its upper end bearing against an extension of the fulcrum 250, and tends at the same time to lift the rearwardly extending arm of the bell crank lever 220 and thus to maintain the link 216 in its forward position, and the nozzle 162 lowered. The spring 270 also tends to hold the hook 230 in position to engage the lug 232 of the latch member 234.

The machine comes to rest with the parts which have just been described in the position shown in Fig. 4. In this position it should be observed that the toggle formed by the bell crank lever 252 and the link 256 is partly broken, and is held latched in this condition by the engagement of the lower end of the depending arm 255 of the bell crank lever 252 with the notch 238 of the latch 234. This holds the lever 82 securely in the position shown in Fig. 4 with the spring 74 under compression and the clutch member 60 in non-power transmitting position. When the nozzle 162 is displaced upwardly by the pressure of a work piece presented thereto, the bell crank lever 220 is rocked, through bell crank lever 212 and link 216, in a counterclockwise direction as viewed in Figs. 4 and 5, thus moving the hook 230 downwardly and rocking the latch member 234 in a counterclockwise direction against the action of spring 236 to an extent sufficient to release the lower end of the arm 255 of the bell crank lever 252 from the notch 238 of the latch member 234, the lower end of the arm 255 of the bell crank lever 252 moving to the right and upwardly along the arcuate surface 240 as the toggle formed by the bell crank lever 252 and the link 256 breaks completely under the pressure applied to the upper end of the lever 82 by the spring 74. Thus the clutch member 60 is moved rearwardly by the spring 74 to power-transmitting position and the machine starts. In order to stop the machine at the end of each cycle of operation, engagement of the extension of the pivot 250 with the finger 228 early in each cycle of operation rocks the finger 228 to the right, as viewed in Figs. 4 and 5, moving the hook 230 away from the lug 232 so that the latch member 234 is held depressed merely by the lower end of the depending arm 255 of the bell crank lever 252, these parts thus serving as a throw-out device to limit the operation of the machine to a single cycle. As the cam member 52 rotates, the cam roll 260 is moved forwardly carrying the rod 258 with it and straightening the toggle 252, 256, so that when later in the cycle the rod 258 is moved rearwardly by the cam 262, the lower end of the lever 82 is moved to the left to approximately the position shown in Fig. 4. At the same time the lower end of the arm 255 of lever 254 enters the notch 238 of latch member 234, which is moved upwardly by spring 236. Further movement of the rod 258 rearwardly by the action of the roll 260 and the cam 262, while the lower end of the depending arm 255 of the bell crank lever 252 is held by the latch member 234, results in rocking bell crank lever 252 somewhat (in a counterclockwise direction as viewed in Fig. 4) and thereby partly breaks the toggle, as shown in Fig. 4, as the machine comes to rest. This leaves the machine in such a condition that the force applied by the spring 74 is sufficient to complete the breaking of the toggle as soon as the latch 234 is tripped and the tripping of the latch 234 requires no greater pressure than can easily be exerted by the operator against the nozzle 162, no greater pressure, indeed, than is desirable to insure that the outsole is pressed sufficiently firmly against the lasted shoe upper and insole. With such a construction it is not necessary for the operator manually to exert the comparatively heavy pressure necessary to overcome the friction between the toggle members and pins which is comparatively large during the early part of the breaking of the toggle when the toggle members are in a straight line or substantially so. It should be noted also that by varying the extent to which the breaking movement of the toggle 252, 256 is carried before it is latched and the machine comes to rest, the force necessary to trip the latch 234 may be varied within considerable limits. In the illustrated machine such adjustment may be made by varying the position of the collar 76 which as before stated, is shown as threaded upon as well as clamped to the forwardly extending portion of the clutch member 60 or by adjusting an eccentric bushing 257 which forms the bearing of the latch member 234 on its shaft 222.

The paper twine 300 from which the fibre pegs inserted by the illustrated machine are cut is carried by a reel 302 (Fig. 4) rotatably mounted upon the head 36 of the machine. From the reel 302 the twine 300 passes through a tubular guide member 304 mounted for vertical reciprocating movement at the front of the head of the machine (Figs. 2, 4, and 8). Fulcrumed at 306 (Fig. 2) to a projecting portion 308 formed upon the lower end of the guide 304 is a small bell crank lever 310 having an arm projecting approximately horizontally and parallel to a link 312 also pivoted at 306 to the guide 304. A dog 314 (best shown in Fig. 2) having a flat face 316 arranged for engagement with the strip of fastening material 300 is pivoted at 318 to the link 312 and the bell crank lever 310. A spring 320 anchored at one end to the link 312 and the bell crank lever 310 and at the other end to the projecting portion 308 of the guide 304 tends to rock

the bell crank lever 310 and the link 312 in a clockwise direction, as viewed in Fig. 2, so that, as the guide member 304 is moved downwardly by mechanism hereinafter described, the dog 314 will grip the strip of fastening material 300, pressing the strip firmly against the lower portion of the guide member 304, that part of which is cut away (as shown in Fig. 2) to a semi-cylindrical form, and feeding the fastening material downwardly. Upward movement of the guide member 304 tends to rock the bell crank lever 310 and the link 312 in a counterclockwise direction, as viewed in Fig. 2, releasing the hold of the dog 314 against the strip of fastening material 300 so that the dog 314 can move upwardly to get a new grip upon the strip 300. To prevent retrograde movement of the strip of material 300 if the strip should stick to dog 314 during the upward movement of guide member 304, a second dog 322 is provided. This dog 322 is carried at the left end, as shown in Fig. 2 of a pair of links 324 fulcrumed at 326 to the head 36 of the machine and urged upwardly in a clockwise direction by a spring 328 anchored at one end to the links 324 and at the other end to the head 36. The dog 322 is so mounted as freely to permit downward or feeding movement of the strip of material 300 but holds that strip firmly against retrograde movement. The dog 322 co-operates with an upwardly projecting semi-cylindrical portion 330 of a stationary guide member 332 from which a tube 334 conducts the strip of fastening material 300 to an opening 336 (Fig. 7) formed in a shear member 338 secured at the forward end of a rod 340 mounted for endwise sliding movement in a guide formed in the head of the machine, and clamped, as shown at 342 in Fig. 9, to the rod 258. Cooperating with the shear member 338 is a second shear member 344 at the lower extremity of the tube 334. Thus it will be seen that early in each cycle of operation as the rod 258 is moved forwardly by the cam 262 a fibre peg will be severed from the strip of fastening material 300 and carried forward into the line of drive. As illustrated in Fig. 7 the portion of the head 36 between the nozzle 162 and the shear member 338 is provided with an opening or passageway 346 through which the fastening passes from the opening 336 in the shear member 338 to the throat opening of the nozzle 162.

The vertically movable guide member 304 is reciprocated through a path variable in accordance with the lengths of the fastenings to be inserted by a mechanism which will now be described. Pivoted at 350 to the guide member 304 is a link 352 (Figs. 1 and 2) the other end of which is pivoted at 354 to the forward end of a bell crank lever 356 fulcrumed at 358 to the head 36 of the machine and having a depending arm 360 pivoted to an approximately horizontal link 362 the rear end of which is pivoted to the depending arm of a bell crank lever 364 fulcrumed on the head 36. A forwardly extending arm 366 (Figs. 1 and 4) of the bell crank lever 364 is provided with a slot 368 in which is located a slide block 369 adjustably clamped in place by a hand screw 371 shown in Fig. 8 but broken away in Fig. 1 to show the slide block 369. A link 372 is pivoted at its lower end to the slide block 369 and at its upper end to the rear end of the lever 112. Thus it will be seen that the rocking of the lever 112 about its fulcrum 110 is operative to reciprocate the guide member 304 and the strip-engaging dog 314 carried at its lower end, and the extent of this reciprocating movement is dependent upon the extent of the rocking movement of the lever 112 so that the depression of the treadle 184 is effective not only to cause the formation of a deeper hole in the work by the awl stroke of the tool 100, but also to cause the feeding and severing of a correspondingly longer peg for insertion in the deeper hole. Adjustment of the slide block 369 in slot 368 of the lever 364 varies the relation of the length of the fastenings to the depths of the holes formed in the workpiece, for example to permit desired variations in the heading of the fastenings on the surface of the work.

Depression of the treadle 184 when the machine is at rest operates to rock the lever 112 somewhat. Thus the repeated depression of the treadle 184 might result in the feeding forward of the strip 300 of fastening inserting material to such an extent as to cause the strip of material to jam in the machine. Accordingly, the machine is provided with mechanism for releasing the engagement of the feed dog 314 upon the strip 300 of fastening material as the machine comes to rest, the dog 314 not being permitted to return to engagement with the strip 300 until the machine has actually been started again. For this purpose the depending arm of the bell crank lever 310 is formed with a surface 400 arranged for engagement with a surface 402 formed upon a lever 404 fulcrumed at 406 to the head of the machine (see particularly Fig. 2) and having its lower end bent to the left as viewed in Fig. 2, and provided with a vertical slot 408 engaging a crank pin 410 carried by the forward extremity of the shaft 50. The crank pin 410 is so located relatively to the axis of the shaft 50 that the machine comes to rest with the crank pin 410 in the position shown in Fig. 2 in which it will be seen that the surface 402 of the lever 404 has engaged the surface 400 of the bell crank lever 310, and has rocked the latter in a counter-clockwise direction sufficiently to re-

lease the dog 314 from the strip of fastening material 300.

While the operation of the various parts of the machine has already been described, it may be helpful to consider now the operation of the machine as a whole. With the parts of the machine in the position shown in Fig. 4, the work in which fastenings are to be inserted (for example a lasted McKay shoe to which the outsole is to be preliminarily attached or "laid") is presented by the operator to the nozzle 162, the nozzle being forced upwardly by pressure applied through the work. The displacement of the nozzle 162 trips the latch 234, rocking that latch in a counter-clockwise direction to the position shown in Fig. 5, and permitting the breaking of the toggle 252, 256 under the influence of the spring 74. The spring 74 thus moves the clutch member 60 to the left, as shown in Fig. 4, into power transmitting position and the cam member 52 begins to rotate. During the early part of the cycle the lever 112 is moved to its uppermost position so that the first stroke of the tool 100 is an awl stroke, the tool 100 being driven down and passing out beyond the lower end of the nozzle 162 to form a hole in the work. At the same time the guide member 304 is moved upwardly, the dog 322, however, engaging the strip 300 and preventing retrograde movement thereof. Then the lifting bar 159 and the tool 100 are lifted by the elevated portion 154 of the lifting cam 150, the lever 112 being rocked at the same time about its fulcrum 110 to lower the fulcrum 130 of the lever 132 so that the next stroke of the tool 100 will serve as a driving stroke. At the same time the guide member 304 is moved downwardly causing the dog 314 to feed the strip of fastening material 300 an appropriate distance. The shear member 338 then moves forwardly to sever a fastening and to bring the opening 336 into alinement with the tool 100 and the opening in the nozzle 162. After this, as the elevated portion 154 of the cam 150 passes out from beneath the lifting bar 156, the spring 138 again forces the lifting bar 156 and the lever 132 downwardly to cause the driver stroke of the tool 100. As the shear member 338 moves forwardly, the toggle 252, 256 is straightened so that as the rod 258 moves rearwardly after the fastening has been driven, the lever 82 will be rocked about its fulcrum 84 compressing the spring 74 and moving the clutch member 60 into nondriving position. As the lever 82 is thus rocked, the lower end of the bell crank lever 252 is caught in the notch 238 of the latch member 234 and the continued movement of the rod 258 together with a slight additional rocking of the lever 82 are effective to start the breaking of the toggle 252, 256 so that the machine comes to rest with the toggle latched in a partly broken condition as shown in Fig. 4.

Having thus described our invention what we claim as new and desire to secure as Letters Patent of the United States is:

1. A fastening inserting machine having a tool serving as an awl and to insert fastenings, means for operating the tool to form fastening receiving holes in a work piece, means for varying the depths of the holes formed by the tool in the work piece without substantially varying the length of its work-penetrating stroke, means for supplying fastenings of lengths corresponding to the depths of the different holes in which they are to be inserted, and means for operating the tool to insert the fastenings in the holes.

2. A fastening inserting machine having a tool serving as an awl, means for operating the tool to form fastening receiving holes in a work piece, means for supplying fastenings for insertion in the holes, a manually operable controller, and connections from said controller and said tool operating means to the fastening supplying means constructed and arranged to cause a variation in the position of the controller correspondingly to vary the depth to which the tool penetrates the work piece and the length of the fastenings supplied for insertion in the holes formed by the tool in the work piece whereby each fastening supplied will be of a length corresponding to the depth of the hole into which it is to be inserted.

3. A fastening inserting machine having a tool, a spring tending to force the tool toward a work piece presented to the machine and means for moving the tool away from the work piece against the force of the spring and for thereafter releasing the tool whereby the spring forces the tool toward the work piece, said means being constructed and arranged to cause the tool alternately to act as an awl forming a fastening receiving hole in the work piece and as a driver inserting a fastening in the hole, means for varying the depths of the holes formed by the tool in the work piece, and means for presenting fastenings of lengths corresponding to the depths of the different holes for insertion by the tool.

4. A fastening inserting machine having a tool, a spring tending to force the tool toward a work piece presented to the machine and means for moving the tool away from the work piece against the force of the spring and for thereafter releasing the tool whereby the spring forces the tool toward the work piece, said means being constructed and arranged to cause the tool alternately to act as an awl forming a fastening receiving hole in the work piece and as a driver inserting a fastening in the hole, means for presenting fastenings for insertion by the tool in the holes formed by the tool in the work piece, means for varying the depths of the holes formed by the tool in the work piece com-

prising a controller and connections between the controller and the tool constructed and arranged to cause changes of position of the controller to vary the depths of the holes formed by the tool, and connections between the controller and the fastening presenting means constructed and arranged to cause changes of position of the controller correspondingly to vary the lengths of the fastenings presented for insertion in the holes.

5. A fastening inserting machine having means to form fastening receiving holes in a work piece and to drive fastenings in said holes, a manually operable controller, connections from the controller to the hole-forming means arranged so that displacement of the controller varies the depths of the holes formed in the work piece, and means correspondingly to vary the lengths of the fastenings inserted in the respective holes.

6. A fastening inserting machine having an awl, means for operating the awl to form fastening receiving holes in a work piece, a manually operated controller for varying the depths to which the awl penetrates the work piece, means for inserting fastenings in the holes formed by the awl in the work piece, and means for varying the lengths of the fastenings according to the depths of the respective holes in which they are to be inserted.

7. A fastening inserting machine having a tool serving both as an awl and as a driver, means for operating the tool to form fastening receiving holes in the work piece and to insert fastenings in the holes, a manually operable controller to vary the depth to which the tool penetrates the work piece when forming fastening receiving holes, means for presenting fastenings for insertion by the tool in the holes formed by the tool, and means for varying the lengths of the fastenings to correspond to the depths of the respective holes to which they are to be inserted.

8. A fastening inserting machine having means to form fastening receiving holes in a work piece and to insert fastenings in said holes, a controller movable from one to the other of two mechanically determined positions, adjustable means for determining said positions, and connections from the controller to the hole-forming means arranged to cause the position of the controller to vary the depths of the holes formed in the work piece.

9. A fastening inserting machine having a manually operable controller, means to form fastening receiving holes in a work piece and to drive fastenings in said holes including an awl and connections from the controller to the awl arranged so that displacement of the controller varies the depths of the holes formed in the work piece by the awl, and means correspondingly to vary the lengths of the fastenings inserted in the respective holes.

10. A fastening inserting machine having a fixed head, an awl mounted therein, means for reciprocating the awl to form fastening receiving holes in a work piece, means for inserting fastenings in the holes formed by the awl in the work piece, a manually operable controller, and connections from the controller to the awl-reciprocating means arranged when the controller is in its normal position to cause the awl to form holes of one depth in the work piece and when the controller is displaced from its normal position to form holes of a different depth in the work piece.

11. A fastening inserting machine having an awl, means for operating the awl to form fastening receiving holes in a work piece, means for inserting fastenings in the holes formed by the awl in the work piece, a controller movable from one to the other of two mechanically determined positions, and connections from the controller to the awl-operating means arranged when the controller is in one of said positions to cause the awl to form holes of a predetermined depth in the work piece and when the controller is in the other of said positions to form holes of a different predetermined depth in the work piece.

12. A fastening inserting machine having an awl, means for imparting to the awl a substantially uniform stroke to make fastening receiving holes in a work piece, means for inserting fastenings in the holes formed by the awl in the work piece, a controller capable of movement into either one of two mechanically determined positions, stops arranged to prevent movement of the controller beyond said two positions, and connections from the controller to the awl-operating means arranged when the controller is in one of said positions to cause the awl to form holes of a predetermined depth in the work piece, and when the controller is in the other of said positions to form holes of a different predetermined depth in the work piece.

13. A fastening inserting machine having an awl, means for reciprocating the awl to form fastening receiving holes in a work piece, a controller, connections from the controller to the awl-reciprocating means including a member moved from its normal position by displacement of the controller and arranged when in its normal position to cause the awl to penetrate the work piece to one predetermined depth and when the controller is displaced to cause the awl to penetrate the work piece to a different predetermined depth, and means for inserting fastenings in the holes formed by the awl in the work piece.

14. A fastening inserting machine having an awl, means for reciprocating the awl to

form fastening receiving holes in a work piece, a manually operable controller, link and lever connections from the controller to the awl-reciprocating means including a lever moved from a normal position by displacement of the controller and arranged when in said normal position to cause the awl to penetrate the work piece to a predetermined depth and when the controller is displaced to cause the awl to penetrate the work piece to a different predetermined depth, and means for inserting fastenings in said holes.

15. A fastening inserting machine having a tool acting as an awl and as a driver, means for reciprocating said tool to form fastening receiving holes in a work piece, means for varying the depth of the holes formed by the tool in the work piece, means for severing fastenings from a strip of fastening material, means for feeding the strip of material toward the severing means arranged to cause the severance of fastenings of varying lengths in accordance with the depths of the respective holes in which the fastenings are to be inserted, and means for reciprocating said tool to the fastenings in the holes formed by the tool in the work piece.

16. A fastening inserting machine having an awl, means for reciprocating the awl to form fastening receiving holes in a work piece, manually controlled means for varying the depths of the holes formed by the awl in the work piece, means for severing fastenings from a strip of fastening material, a reciprocating dog arranged to feed the strip of material step by step toward the severing means, means for controlling the length of the feeding stroke of said dog arranged to cause the severance of fastenings of varying lengths in accordance with the depths of the respective holes in which the fastenings are to be inserted, and means for inserting the fastenings in the holes formed by the awl in the work piece.

17. A fastening inserting machine having a tool acting as an awl and as a driver, means for operating the tool to form fastening receiving holes in a work piece, and for operating the tool to insert fastenings in the holes formed by the tool, means for varying the depths of the holes formed in the work piece by the tool during different cycles of operation, and means for supplying fastenings for insertion in the holes formed by the tool arranged to present for insertion in each cycle of operation a fastening corresponding in length to the depth of the particular hole in which it is to be inserted.

18. A fastening inserting machine having an awl, means for operating the awl to form fastening receiving holes in a work piece, and means to control the depths of said fastening receiving holes comprising a controller, a manually operable lever, connections between the controller and the lever arranged to cause displacement of the controller to rock the lever, and connections from the lever to the awl-operating means arranged to cause rocking of the lever to change the stroke of the awl, thereby changing the depth of the hole which it forms in the work.

19. A fastening inserting machine having an awl, means for reciprocating the awl to form fastening receiving holes in a work piece, and means to control the depths of said fastening receiving holes comprising a controller, a lever, connections between the controller and the lever arranged so that displacement of the controller rocks the lever, means for limiting rocking movements of the lever to predetermined amounts, and connections form the lever to the awl-reciprocating means arranged so that rocking of the lever changes the reciprocation of the awl thereby changing the depths of the holes which it forms in the work piece.

20. A fastening inserting machine having an awl, means for reciprocating the awl to form fastening receiving holes in a work piece, and means to control the depths of said fastening receiving holes comprising a controller, a lever, connections between the controller and the lever arranged so that displacement of the controller rocks the lever, stops carried by the lever and by a stationary part of the machine respectively arranged to limit rocking movement of the lever to a predetermined amount, and connections from the lever to the awl-reciprocating means arranged so that rocking of the lever consequent upon displacement of the controller changes the reciprocation of the awl and the depth of the holes which it forms in the work piece.

21. A fastening inserting machine having a nozzle, means rendered operative by displacement of the nozzle to cause the machine to operate through a single cycle and then to come to rest, an awl, means for reciprocating the awl through the nozzle to form a fastening receiving hole in a work piece presented to the nozzle, means for inserting a fastening in the hole formed by the awl in the work piece, a treadle, connections from the treadle to the awl-reciprocating means arranged when the treadle is in its normal position to cause the awl to form a hole in the work of one depth and when the treadle is displaced from its normal position to form a hole in the work of a different depth, and means to supply fastenings for insertion in the holes formed by the awl arranged to present for insertion fastenings corresponding in length to the depths of the particular holes in which they are to be inserted.

22. A fastening inserting machine having an awl, a lever connected at one end to said awl and having at its other end a movable fulcrum, means engaging the lever between its ends arranged to rock the lever about its ful-

crum and thereby to reciprocate the awl, and manually controlled means for moving the fulcrum relatively to the lever to vary the path of reciprocation of the awl and thus to vary the depths of the holes formed in a work piece by the awl.

23. A machine for operating upon shoe parts having an operating tool, a lever connected at one end to said tool and having at its other end a movable fulcrum, means engaging the lever between its ends arranged to rock the lever about its fulcrum and thereby to cause the tool to operate upon a shoe part, and means for moving the fulcrum back and forth relatively to the lever once during each cycle of operation of the machine thereby giving the tool strokes alternately of two kinds.

24. A fastening inserting machine having an awl, a lever connected to said awl and having a movable fulcrum, cam mechanism for rocking the lever about its fulcrum thereby to reciprocate the awl, and manually controlled means for moving the fulcrum transversely of the lever to vary the path of reciprocation of the awl and thus to vary the depth of the holes formed in a work piece by the awl.

25. A machine for operating upon shoe parts having an operating tool, a lever connected to the tool, means for rocking the lever about its fulcrum to cause the tool to operate upon a shoe part, means for controlling the stroke of the tool comprising a second lever to which the first lever is fulcrumed, and means for rocking the second lever about its fulcrum thereby moving the fulcrum of the first lever and changing the operating stroke of the tool.

26. A machine for operating on shoe parts having an operating tool, a lever connected to the tool, means for rocking the lever about its fulcrum to cause the tool to operate on a shoe part, means for controlling the length of the stroke of the tool comprising a second lever to which the first lever is fulcrumed, and power-operated means constructed and arranged cyclically to rock the second lever about its fulcrum thereby moving the fulcrum of the first lever and changing the operating stroke of the tool so as to cause it to act alternately as an awl and as a driver.

27. A fastening inserting machine having a tool acting as an awl to form fastening receiving holes in a work piece, and as a driver to insert fastenings in said holes, a lever connected to the tool and having a movable fulcrum, means for rocking the lever about its fulcrum thereby reciprocating the tool and forming fastening receiving holes in the work piece, means for moving the fulcrum of the lever from one position to another thereby changing the path of reciprocation of the tool and varying the depths of the fastening receiving holes formed in the work, and means for presenting to the tool fastenings varying in length in accordance with the depths of the holes formed by the tool in which the respective fastenings are to be inserted by the tool.

28. A fastening inserting machine having a tool acting as an awl and as a driver, a carrier for the tool, a lever engaging the tool carrier and arranged to be rocked about its fulcrum thereby reciprocating the tool carrier and causing the tool to form fastening receiving openings in a work piece, means for varying the position of the fulcrum of the lever thereby varying the rocking movement of the lever and the stroke of the tool carrier and the tool and correspondingly varying the depths of the holes formed in the work piece by the tool, and means for presenting fastenings to the tool arranged to present fastenings for insertion by the tool of a plurality of different lengths corresponding to the depths of the different holes formed by the tool in the work piece.

29. A fastening inserting machine having an awl, a lever connected to the awl, means for rocking the lever about its fulcrum to cause the lever to move the awl toward and to penetrate a work piece to form fastening receiving holes in the work piece, and means for controlling the depths of the holes formed in the work piece by the awl comprising a second lever to which the first lever is fulcrumed, and means for rocking the second lever about its fulcrum thereby moving the fulcrum of the first lever and changing the depth to which the awl is forced into the work piece.

30. A fastening inserting machine having an awl, a lever connected to the awl, means for rocking the lever about its fulcrum to cause the lever to move the awl toward and to penetrate a work piece to form fastening receiving holes in the work piece, and means for controlling the depths of the holes formed in the work piece by the awl comprising a second lever to which the first lever is fulcrumed and a third lever connected to the second lever and arranged by its rocking to rock the second lever about its fulcrum thereby moving the fulcrum of the first lever and changing the depth to which the awl is forced into the work piece.

31. A fastening inserting machine having an awl arranged to form fastening receiving holes in a work piece, means for inserting fastenings in said holes, a lever connected to the awl and having a movable fulcrum, means for rocking the lever about its fulcrum thereby reciprocating the awl and forming fastening receiving holes in the work piece, and a second lever arranged to be rocked and thereby to move the fulcrum of the first lever, thus changing the path of reciprocation of the awl and varying the depth of the fastening receiving holes formed in the work, means for presenting to the fastening inserting means fastenings of a length varying in accordance with the depths of the holes formed

by the awl in which the respective fastenings are to be inserted and a manually operable controller arranged to control the rocking of the second lever whereby the length of the various fastenings is controlled manually.

32. A fastening inserting machine having an awl, operating means therefor comprising two levers, a link connecting the two levers and adjustably connected to one of them through an arcuate slot formed in said lever, means for rocking the slotted lever and thereby through said link, rocking the other lever, and means for varying the position of said link relatively to the slotted lever by moving its point of connection to that lever along said arcuate slot, said slot being so formed that in one extreme position of the slotted lever it is concentric with the point of connection of the link to the other lever whereby the variation of the rocking movement transmitted by the link from the slotted lever to the other lever is all at one end of the path of rocking movement of said other lever.

33. A fastening inserting machine having means to form fastening receiving holes in a work piece and to insert fastenings in said holes, a controller movable from one to the other of two definite positions, adjustable means for determining said positions, connections from the controller to the hole-forming means arranged to cause the position of the controller to vary the depths of the holes formed in the work piece, and means correspondingly to vary the lengths of the fastenings inserted in the respective holes.

34. A fastening inserting machine having a movable nozzle, a single tool acting both as an awl and as a driver reciprocable through the nozzle, a cooperating lifting cam and spring constructed and arranged to reciprocate said tool, a clutch, and connections from the nozzle to the clutch arranged by displacement of the nozzle to cause the clutch to transmit power to the machine thereby operating said tool.

35. A fastening inserting machine having a single tool acting both as an awl and as a driver, a cooperating lifting cam and spring arranged to reciprocate said tool, and means for varying the awl stroke of the tool arranged to vary the depths of the holes formed in the work piece by the tool without varying the length of the driver stroke of the tool.

36. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, means for imparting to said tool an awl stroke to form a fastening receiving hole in a work piece and a driver stroke to drive a fastening in said hole, a controller, and connections from the controller to said awl stroke imparting means arranged so that displacement of the controller varies the depth of the hole made in the work by the awl stroke of said tool.

37. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, means for imparting to the tool an awl stroke to form a fastening receiving hole in the work piece and for giving the tool a driver stroke to drive a fastening in said hole, a controller readily displaceable by the operator without interfering with the operation of the machine, and connections from the controller to the tool operating means arranged when the controller is in its normal position to cause the tool to form holes in the work of one depth and, when the controller is displaced from its normal position, to form holes in the work of a different depth.

38. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, means for imparting to said tool an awl stroke to form a fastening receiving hole in a work piece and a driver stroke to drive a fastening in said hole, a treadle, and connections from the treadle to said means arranged to change the depth of the hole made in the work by the awl stroke of the tool when the treadle is depressed.

39. A fastening inserting machine having a throat member, a single tool reciprocable therethrough arranged to act both as an awl and as a driver, means for giving the tool an awl stroke to form a fastening receiving hole in the work piece and for giving the tool a driver stroke to drive a fastening in said hole, a controller readily displaceable by the operator without interfering with the operation of the machine, connections from the controller to the tool operating means arranged when the controller is in its normal position to cause the tool to form holes in the work of one depth and, when the controller is displaced from its normal position, to form holes in the work of a different depth, and means for supplying to the throat member fastenings corresponding in length to the depths of the holes formed in the work by said tool.

40. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier and arranged to be rocked about a movable fulcrum, means for rocking the lever about its fulcrum thereby reciprocating the tool carrier, and means for moving the fulcrum of the lever from one position to another thereby changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver.

41. A fastening inserting machine having a carrier, a tool secured to said carrier and arranged to operate both as an awl and as a driver, a lever connected at one end to said carrier and having at its other end a movable fulcrum, means engaging the lever between its ends to rock the lever about its fulcrum and thereby to reciprocate the tool carrier,

and means for moving the fulcrum of the lever transversely of the lever in each cycle of operation of the machine to change the path of reciprocation of the tool carrier and the tool carried thereby according as the tool is acting as an awl or as a driver.

42. A fastening inserting machine having a tool carrier, a tool secured thereto arranged to act both as an awl and as a driver, means for reciprocating the tool twice in each cycle of operation of the machine, a lever connected at one end to said carrier, means for rocking said lever about its fulcrum, and means for moving the fulcrum of the lever to vary the stroke of the carrier of the tool according as the tool is to act as an awl or as a driver.

43. A fastening inserting machine having a tool carrier, a tool secured thereto arranged to act both as an awl and as a driver, a lever connected at one end to said carrier, cam mechanism arranged to rock said lever about its fulcrum, and means for moving the fulcrum of the lever to vary the stroke of the carrier and the tool according as the tool is to act as an awl or as a driver.

44. A fastening inserting machine having a tool carrier, a tool secured thereto arranged to act both as an awl and as a driver, a lever connected at one end to said carrier and fulcrumed at its other end, cam mechanism arranged to rock said lever about its fulcrum, and cam operated means for moving the fulcrum of the lever to vary the stroke of the carrier and the tool.

45. A fastening inserting machine having a tool carrier, a tool secured thereto and arranged to act both as an awl and as a driver, a lever connected at one end to said carrier and having a fulcrum at its other end, a lifting cam, a lifting block cooperating therewith, connections from the lifting block to the median portion of the lever, a spring tending to force the lever toward the lifting cam and thus forcing the carrier and the tool carried thereby toward the work when the lifting block rides off a high portion of the lifting cam, and means for moving the fulcrum of the lever transversely of the lever to vary the stroke of the carrier and the tool.

46. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, means for rocking the first lever about its fulcrum thereby reciprocating the tool carrier, and means for rocking the second lever thereby moving the fulcrum of the first lever from one position to another and changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver.

47. A fastening inserting machine having a carrier, a tool secured to said carrier and arranged to operate both as an awl and as a driver, a lever connected at one end to said carrier, a second lever to which the first lever is fulcrumed, means engaging the first lever between its ends to rock the lever about its fulcrum and thereby to reciprocate the tool carrier, and means for rocking the second lever thereby moving the fulcrum of the first lever transversely of the first lever to vary the path of reciprocation of the tool carrier and the tool carried thereby.

48. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to operate both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, cam mechanism arranged to rock the first lever about its fulcrum thereby reciprocating the tool carrier, and cam mechanism for rocking the second lever about its fulcrum thereby moving the fulcrum of the first lever and changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver.

49. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to operate both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, mechanism including an open cam and a spring arranged to rock the first lever about its fulcrum thereby reciprocating the tool carrier, and mechanism including a closed cam for rocking the second about its fulcrum thereby moving the fulcrum of the first lever and changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver.

50. A fastening inserting machine having a tool carrier, a tool secured thereto and arranged to act both as an awl and as a driver, a lever connected at one end to said carrier, a second lever to which the first lever is fulcrumed, a lifting cam, a lifting block cooperating therewith, connections from the lifting block to the median portion of the first lever, a spring tending to force the first lever toward the lifting cam and thus forcing the carrier and the tool carried thereby toward the work when the lifting block rides off a high portion of the lifting cam, and means for rocking the second lever thereby moving the fulcrum of the first lever transversely of the first lever to vary the stroke of the carrier and the tool.

51. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, a third lever, means for rocking said third lever in a fixed path, and connections between the third lever and the second lever arranged to rock the second lever and thereby to move the fulcrum of the first lever and thus change the path of reciprocation of the

tool carrier according as the tool is to serve as an awl or as a driver.

52. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, means for giving said tool an awl stroke to form a fastening receiving hole in a work piece and a driver stroke to drive a fastening in said hole, a treadle, connections between the treadle and the tool operating means whereby displacement of the treadle varies the depth of the holes made by the awl strokes of said tool, means for bringing a fastening into the line of drive when said tool is about to act as a driver, and means arranged to present fastenings of different lengths in accordance with the depth of the holes formed by the tool for the different fastenings.

53. A fastening inserting machine having a tool carrier, a tool carried thereby arranged to act both as an awl and as a driver, a lever engaging the tool carrier and arranged to be rocked about its fulcrum thereby reciprocating the tool carrier, means for cyclically varying the position of the fulcrum of the lever according as the tool is to operate as an awl or as a driver, and other means for varying the position of the fulcrum of the lever arranged thereby to vary the depths of the holes made in the work by the awl stroke of the tool.

54. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, means for giving said tool an awl stroke to form a fastening receiving hole in a work piece and a driver stroke to drive a fastening in said hole, said means including a lever the position of which at the time the tool is moved into engagement with the work piece determines the extent of the movement (if any) of the tool beneath the surface of the work, and means for rocking said lever about its fulcrum including another lever, a cam arranged to rock said last-named lever, a link connecting said levers, and means for varying the point of connection of said link to the second lever thereby varying the extent of rocking movement of the first lever.

55. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, a lever arranged for rocking movements thereby giving said tool an awl stroke to form a fastening receiving hole in a work piece and then a driver stroke to drive a fastening in said hole, a second lever to which the first lever is fulcrumed, the position of which second lever at the time the tool is given its awl stroke determines the depth of the hole formed by the tool in the work piece, and means for rocking said second lever about its fulcrum including a bell-crank lever, a cam arranged to rock said bell-crank lever, a link connecting said second and said bell-crank levers, and means for varying the point of connection of said link to said bell-crank lever thereby varying the extent of the rocking movements of the second lever and the depths of the holes formed by said tool in the work piece.

56. A fastening inserting machine having a single tool arranged to act both as an awl and as a driver, a cam, a lever rocked by said cam to give said tool an awl stroke to form a fastening receiving hole in the work piece and a driver stroke to drive a fastening in said hole, means for varying the depths of the holes made by the awl stroke of said tool, means for severing a fastening from a strip of fastening material and for bringing the severed fastening into the line of drive when said tool is about to act as a driver, and means arranged to determine the length of each fastening in accordance with the depth of the hole formed by the tool for that fastening.

57. A fastening inserting machine having a tool carrier, a tool secured thereto arranged to act both as an awl and as a driver, a lever connected at one end to said carrier and fulcrumed at its other end, cam mechanism arranged to rock said lever about its fulcrum, means for moving the fulcrum of the lever to vary the stroke of the carrier according as the tool is to act as an awl or as a driver, other means for varying the position of the fulcrum of the lever arranged thereby to vary the depths of the holes made in the work by the awl strokes of the tool, means for presenting fastenings for insertion by the driver in the holes formed by the tool in the work, and means for varying the lengths of said fastenings in accordance with the depths of the respective holes in which they are to be inserted.

58. A fastening inserting machine having a nozzle, a tool carrier, a tool secured thereto and arranged for reciprocation through said nozzle, said tool acting both as an awl and as a driver, a lever connected at one end to said carrier and fulcrumed at its other end, cam mechanism arranged to rock said lever about its fulcrum, means for moving the fulcrum of the lever to vary the stroke of the carrier according as the tool is to act as an awl or as a driver, other means for varying the position of the fulcrum of the lever arranged thereby to vary the depths of the holes made in the work by the awl strokes of the tool, means for presenting fastenings for insertion by the driver in the holes formed by the tool in the work, means for varying the lengths of said fastenings in accordance with the depths of the respective holes in which they are to be inserted, and means rendered operative by the displacement of the nozzle to cause the machine to operate through a single cycle and then to come to rest.

59. A fastening inserting machine having

a tool arranged to act both as an awl and as a driver, a lever connected to the tool and arranged to be rocked about its fulcrum thereby reciprocating the tool, means for cyclically varying the position of the fulcrum of the lever according as the tool is to operate as an awl or as a driver, other means for varying the position of the fulcrum of the lever at the time of the awl stroke of the tool arranged thereby to vary the depths of the holes made in the work piece by the awl strokes of the tool, means for presenting fastenings to be inserted by the tool in the holes formed in the work, and means for varying the lengths of the fastenings in accordance with the depths of the respective holes in which they are to be inserted.

60. A fastening inserting machine having a tool arranged to act both as an awl and as a driver, a lever connected to the tool and arranged to be rocked about its fulcrum thereby reciprocating the tool, means for cyclically varying the position of the fulcrum of the lever according as the tool is to operate as an awl or as a driver, other means for varying the position of the fulcrum of the lever at the time of the awl stroke of the tool arranged thereby to vary the depth of the hole made in the work piece by the awl stroke of the tool, means for severing fastenings from a strip of fastening material, means for presenting the severed fastenings to the tool to be inserted in the holes formed in the work, and means for feeding to the severing means lengths of fastening material corresponding to the depths of the holes in which the respective fastenings are to be inserted.

61. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, means for rocking the first lever about its fulcrum thereby reciprocating the tool carrier, means for rocking the second lever thereby moving the fulcrum of the first lever from one position to another and changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver, and other manually controlled means for rocking the second lever, thereby moving the fulcrum of the first lever when the tool is to act as an awl and changing the path of reciprocation of the tool carrier to vary the depths of the holes formed in the work by the tool.

62. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, means for rocking the first lever about its fulcrum thereby reciprocating the tool carrier, means for rocking the second lever about its fulcrum thereby moving the fulcrum of the first lever from one position to another and changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver, other means for rocking the second lever, thereby moving the fulcrum of the first lever when the tool is to act as an awl and changing the path of reciprocation of the tool carrier to vary the depths of the holes formed in the work by the tool, means for presenting fastenings for insertion by the tool in the holes formed in the work piece, and means for varying the lengths of the fastenings presented to the tool in accordance with the depths of the respective holes in which they are to be inserted.

63. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, a bell-crank lever, means for rocking said bell-crank lever in a fixed path, and a link and slot connection between the bell-crank lever and the second lever arranged to rock the second lever and thereby to move the fulcrum of the first lever and thus change the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver, said connection being adjustable to vary the depths of the holes made in the work piece by the awl strokes of the tool.

64. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, a third lever, a cam arranged to rock the third lever about its fulcrum, a link connecting the second and third levers whereby rocking of the third lever rocks the second lever and moves the fulcrum of the first lever fron one position to another thus changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver, a fourth lever, and a connection from the fourth lever to the link connecting the second and third levers arranged to cause rocking of the fourth lever to vary the extent of the rocking imparted by the third lever to the second lever at the time of the awl stroke of the tool and thus varying the awl stroke of the tool to cause the awl to form fastening receiving holes of different depths in the work piece.

65. A fastening inserting machine having a tool carrier, a tool secured to said carrier and arranged to act both as an awl and as a driver, a lever connected to said carrier, a second lever to which the first lever is fulcrumed, a third lever, a cam arranged to rock the third lever about its fulcrum, a link pivoted to the second lever and connected to a slot in the third lever whereby rocking of the third le-

ver rocks the second lever and moves the fulcrum of the first lever from one position to another thus changing the path of reciprocation of the tool carrier according as the tool is to serve as an awl or as a driver, a fourth lever, and a second link connecting the fourth lever to the link connecting the second and third levers and arranged to cause rocking of the fourth lever to vary the point of connection of the first link and the third lever, thereby varying the extent of the rocking imparted by the third lever to the second lever at the time of the awl stroke of the tool and thus varying the awl stroke of the tool to cause the awl to form fastening receiving holes of different depths in the work piece.

66. A fastening inserting machine having means for severing fastenings from a strip of fastening material, means for inserting the severed fastenings, means for feeding the strip of material toward the severing means, and means for releasing the feeding means from the strip of fastening material when the machine comes to rest.

67. A fastening inserting machine having means for severing fastenings from a strip of fastening material, means for inserting the severed fastenings, means for feeding the strip of material toward the severing means, means for releasing the feeding means from the strip of fastening material when the machine comes to rest, an eccentric, and connections from the eccentric to the feeding means constructed and arranged to release the feeding means from the strip of fastening material when the machine comes to rest.

68. A fastening inserting machine having means for severing fastenings from a strip of fastening material, means for inserting said fastenings in a work piece, means for feeding said strip of material toward the severing means, a lever, and means for rocking the lever as the machine comes to rest to cause the lever to move the feeding means into inoperative relation to the strip of fastening material.

69. A fastening inserting machine having, in combination, fastening inserting means, means for severing fastenings from a strip of fastening material and for presenting the severed fastenings to the inserting means, means for feeding the strip of fastening material toward fastening severing position comprising a reciprocable member, a link carried by said member, a dog carried by said link and having a flat strip-engaging face, means for rocking the link into a position to cause the dog effectively to grip the strip against the reciprocable member as the reciprocable member is moved in the direction of the strip feed and to release the strip during return movement of the reciprocable member, and means for holding the dog out of engagement with the fastening material while the machine is at rest.

70. A fastening inserting machine having means for severing fastenings from a strip of fastening material, means for feeding said strip of material toward the severing means comprising a reciprocable member, a strip-engaging dog, a lever fulcrumed to the reciprocable member and carrying the dog, means urging the lever into position to cause the dog to grip the strip during movement of the guide in the direction of feed and to permit the dog to release the strip during return movement of the guide, and means for rocking the lever to move the dog out of engagement with the strip when the machine comes to rest.

71. A fastening inserting machine having means for severing fastenings from a strip of fastening material, means for feeding said strip of material toward the severing means comprising a guide for the strip of material, means for reciprocating said guide, a strip-engaging dog, a lever fulcrumed to the guide and carrying the dog, a spring urging the lever into position to cause the dog to grip the strip during movement of the guide in the direction of feed and to permit the dog to release the strip during retrograde movement of the guide, a second dog arranged to grip the strip and prevent retrograde movement of the strip during retrograde movement of the first dog, and means for rocking the lever to move the first dog out of engagement with the strip when the machine comes to rest.

72. A fastening inserting machine having strip feeding means comprising a reciprocable member, a lever fulcrumed thereto, a strip-engaging dog fulcrumed to the lever, a second lever suitably fulcrumed to the machine, and means for rocking said second lever about its fulcrum, the two levers being positioned for intermittent engagement during the operation of the machine and arranged to cause the dog to be moved out of engagement with the strip when the parts are in the position they have when the machine comes to rest.

73. A fastening inserting machine having strip feeding means comprising a reciprocable member, a bell-crank lever fulcrumed thereon, a strip-engaging dog carried by the lever, means tending to move the lever into position to cause the dog to grip the strip during the work feeding movement of the reciprocable member and to release the dog during the return movement of said member, and a lever fulcrumed to a relatively stationary part of the machine and formed to engage the bell crank lever while the machine is at rest thereby holding the bell crank lever in such position that the dog is disengaged from the strip.

74. A fastening inserting machine having strip feeding means comprising a reciprocable member, a lever fulcrumed thereto, a

strip-engaging dog fulcrumed to said lever, a second lever suitably fulcrumed to the machine, and a crank pin having a slot connection with the second lever and arranged to rock the second lever about its fulcrum, the two levers being arranged for intermittent engagement during the operation of the machine whereby the dog carried by the first lever is moved out of effective engagement with the strip when the parts are in the position they have when the machine comes to rest.

75. A machine for operating on shoe parts having a clutch member movable into and out of power transmitting position, mechanism for moving the clutch member into and out of power transmitting position comprising a toggle and means for moving the clutch member out of power transmitting position and for partly breaking the toggle at the end of the first cycle of operation after the machine is started, and means for retaining the toggle in said partly broken condition until the machine is again started.

76. A machine for operating on shoe parts having a clutch member movable into and out of power transmitting position, mechanism for moving the clutch member comprising a toggle, means for breaking the toggle and for moving the clutch member into power transmitting position, and means for straightening the toggle and for thereafter moving the straightened toggle to force the clutch member out of power transmitting position at the end of the first cycle of operation after the clutch is moved into power transmitting position, means for partly breaking the toggle as the clutch member is forced out of power transmitting position, and means for holding the toggle in said partly broken position while the clutch member is out of power transmitting position.

77. A fastening inserting machine having a clutch member movable into and out of power transmitting position, mechanism for moving the clutch member comprising a toggle, means for breaking the toggle to permit movement of the clutch member into power transmitting position and for thereafter straightening the toggle and means for moving the straightened toggle to force the clutch member out of power transmitting position and for partly breaking the toggle as the clutch member moves out of power transmitting position, means for holding the toggle in said partly broken position while the clutch member is out of power transmitting position, a nozzle arranged to be displaced by a work piece presented thereto, a fastening inserting driver reciprocable through the nozzle, and connections between the nozzle and the toggle-controlling means arranged to release the toggle from its partly broken condition when the nozzle is displaced thereby permitting the completion of the breaking of the toggle and movement of the clutch into power-transmitting position.

78. A fastening inserting machine having a clutch member movable into and out of power transmitting position, mechanism for moving the clutch member comprising a toggle arranged to be partly broken as the clutch member is moved out of power transmitting position, means for retaining the toggle in said partly broken condition while the clutch member is out of power transmitting position, a nozzle arranged to be displaced by a work piece presented thereto, a fastening-inserting driver reciprocable through the nozzle, and connections between the nozzle and the toggle-retaining means arranged to release the toggle when the nozzle is displaced thereby permitting the completion of the breaking of the toggle and movement of the clutch into power transmitting position.

79. A fastening inserting machine having a clutch member, a lever arranged by rocking movement to control the position of the clutch member, toggle mechanism arranged to rock the lever thereby moving the clutch to and from power transmitting position, said mechanism being arranged to come to rest with the toggle in a partly broken condition, means for retaining the toggle in said partly broken condition while the machine is at rest, a nozzle arranged to be displaced by a work piece presented thereto, and connections between the nozzle and the toggle-retaining means arranged to release the toggle when the nozzle is displaced thereby permitting the completion of the breaking of the toggle and movement of the clutch member into power transmitting position.

80. A fastening inserting machine, having a clutch member, controlling mechanism therefor including a toggle, a latch arranged to hold the toggle in a partly broken condition while the clutch member is out of power transmitting position, a nozzle arranged to be displaced by a work piece presented thereto, and connections between the nozzle and the latch arranged to trip the latch when the nozzle is displaced, thereby permitting the completion of the breaking of the toggle and movement of the clutch member into power-transmitting position.

81. A fastening inserting machine having a movable clutch member, a lever connected thereto, toggle mechanism arranged to rock the lever thereby moving the clutch to and from power-transmitting position, said mechanism being arranged to come to rest with the toggle in a partly broken condition, a latch arranged to hold the toggle in said partly broken condition while the machine is at rest, a nozzle arranged to be displaced by a work piece presented thereto, a fastening-inserting driver reciprocable through the nozzle, and connections between the nozzle and the latch arranged to trip the latch when

the nozzle is displaced thereby permitting complete breaking of the toggle and movement of the clutch into power-transmitting position.

82. A fastening inserting machine having a clutch member, a lever arranged by rocking movement to control the position of the clutch member, a toggle member fulcrumed to said clutch lever, a second toggle member pivoted to the first, means for controlling the toggle arranged, at the end of each cycle of operation, to put the toggle in a partly broken condition, a latch arranged to engage one of the toggle members at the end of each cycle of operation to latch the toggle in a partly broken condition, means for tripping the latch to permit the completion of the breaking of the toggle and the rocking of the clutch lever to cause the starting of the machine, and means for returning the latch to toggle engaging position before the end of the first cycle of operation when the machine is started, thereby causing the toggle to be latched in partly broken condition at the end of that cycle.

83. A fastening inserting machine having a clutch member, a clutch controlling toggle, connections from the toggle to the clutch member, toggle-controlling mechanism arranged to hold the toggle in partly broken condition when the clutch is out of power transmitting position and arranged when the toggle is released to permit breaking of the toggle thereby permitting movement of the clutch into power transmitting position, said toggle controlling mechanism including means for thereafter straightening the toggle and causing the straightened toggle to act as a thrust transmitting member to force the clutch out of power transmitting position, a nozzle arranged to be displaced by a work piece presented thereto, a fastening inserting driver reciprocable through the nozzle, and connections between the nozzle and the toggle controlling mechanism arranged to release the toggle and to permit it to break when the nozzle is displaced thereby permitting the movement of the clutch into power transmitting position.

84. A machine for operating on shoe parts having a clutch member, a clutch controlling toggle, connections from the toggle to the clutch member, toggle-controlling mechanism arranged to hold the toggle in partly broken condition when the clutch is out of power transmitting position and arranged when the toggle is released to permit breaking of the toggle thereby permitting movement of the clutch member into power transmitting position, said toggle controlling mechanism including means for thereafter straightening the toggle and causing the straightened toggle to act as a thrust transmitting member to force the clutch out of power transmitting position, and a throwout device arranged to cause the toggle to move the clutch member out of power transmitting position at the end of the first cycle of operation after the machine is started.

85. A fastening inserting machine having a clutch member, a lever movable about its fulcrum to control the position of the clutch member, a toggle connected at one end to said lever, a rod connected to the other end of the toggle and mounted for sliding movement, a roll carried by the rod, a cam engaging the roll and operating to slide the rod thereby alternately straightening and breaking the toggle and arranged to start the breaking of the toggle shortly before the machine comes to rest, a latch arranged to engage the toggle as the machine comes to rest and to latch the toggle in a partly broken condition, and means for tripping the latch when the machine is again to be started.

86. A fastening inserting machine having a movable clutch member, a spring tending to move said clutch member into power-transmitting position, a lever, toggle mechanism arranged to rock the lever thereby compressing the spring and moving the clutch member out of power-transmitting position, a latch arranged to hold the toggle in a partly broken condition while the machine is at rest, a nozzle arranged to be displaced by a work piece presented thereto, and connections between the nozzle and the latch arranged to trip the latch when the nozzle is displaced thereby permitting the spring to complete the breaking of the toggle and to move the clutch member into power-transmitting position.

87. A fastening inserting machine having a clutch member, a lever arranged by rocking movement to control the position of the clutch member, a toggle member comprising a bell crank lever fulcrumed to said clutch lever, a second toggle member pivoted to the first, a rod mounted for sliding movement and pivoted to the second toggle member, means for reciprocating said rod, thereby making and breaking the toggle, arranged at the end of each cycle of operation, to put the toggle in a partly broken condition, a latch arranged to engage the bell crank lever at the end of each cycle of operation to latch the toggle in a partly broken condition, and means for tripping the latch to permit the completion of the breaking of the toggle and the rocking of the clutch lever to cause the starting of the machine.

88. A fastening inserting machine having a clutch member, a lever arranged for rocking movement about its fulcrum thereby controlling the position of the clutch member, a toggle connected to the lever and arranged to be partly broken as the machine comes to rest, a pivoted latch member arranged to engage the toggle thereby holding the toggle in partly broken condition while the machine is at rest, a lug upon the latch member, a second lever, means arranged to rock the second

lever when the machine is to be started, a hook connected to the second lever and engaging the lug of the latch member to rock the latch member out of engagement with the toggle when the second lever is rocked to stop the machine, and a throwout device operative to permit the latch to return to toggle-engaging position before the end of the first cycle of operation after the machine has been started whereby the toggle is engaged by the latch at the end of that cycle of operation and the machine is brought to rest with the toggle partly broken.

89. A machine for operating upon shoe parts having, in combination, a clutch movable into and out of power transmitting position, toggle mechanism for controlling the clutch including a toggle, and means for holding the toggle in partly broken position while the clutch is out of power transmitting position, the relative position of the toggle members while in said partly broken condition being capable of adjustment by movement of one of the parts of said mechanism.

90. A fastening inserting machine having a clutch arranged to transmit power to the operating instrumentalities of the machine, a movably mounted nozzle, connections between the nozzle and the clutch arranged to cause displacement of the nozzle to render the clutch operative to transmit power to the operating instrumentalities of the machine, an awl operating through the nozzle to form fastening receiving holes in a work piece presented thereto, and a cooperating lifting cam and spring for reciprocating said awl.

In testimony whereof we have signed our names to this specification.

FRED N. LA CHAPELLE.
FRED C. EASTMAN.