Feb. 1, 1938. J. A. CASWELL ET AL 2,106,719

FASTENING INSERTING MACHINE

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Fig. 1.

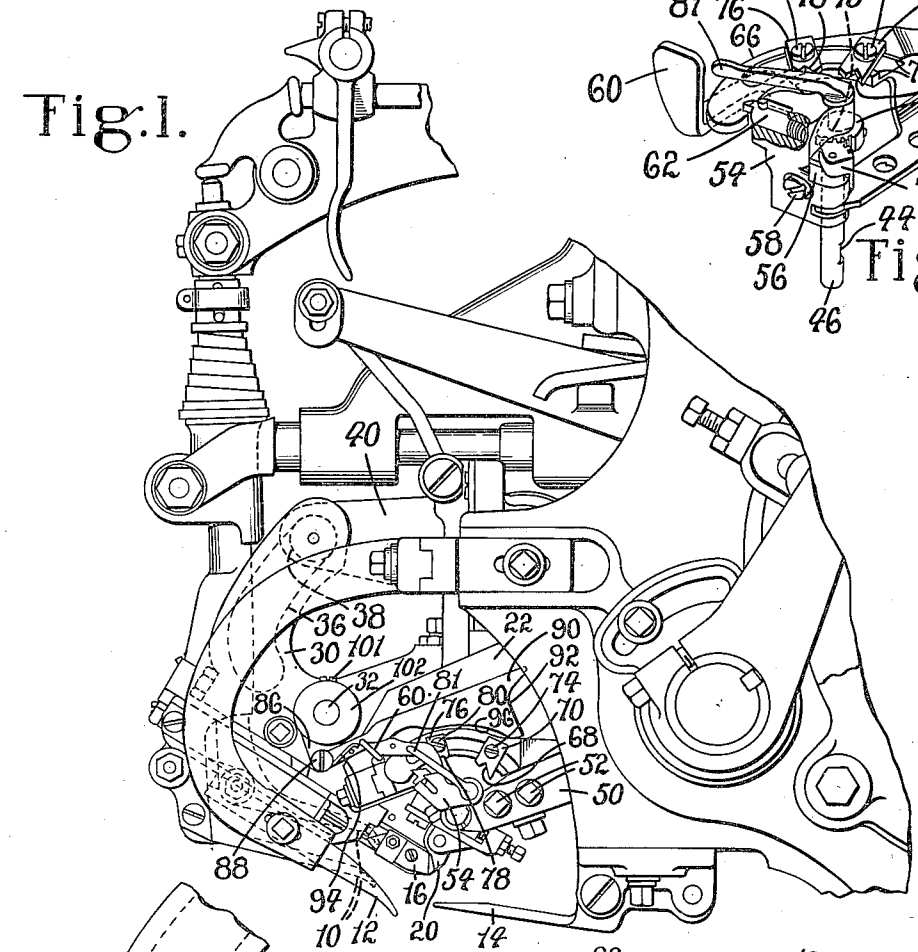

Fig. 5.

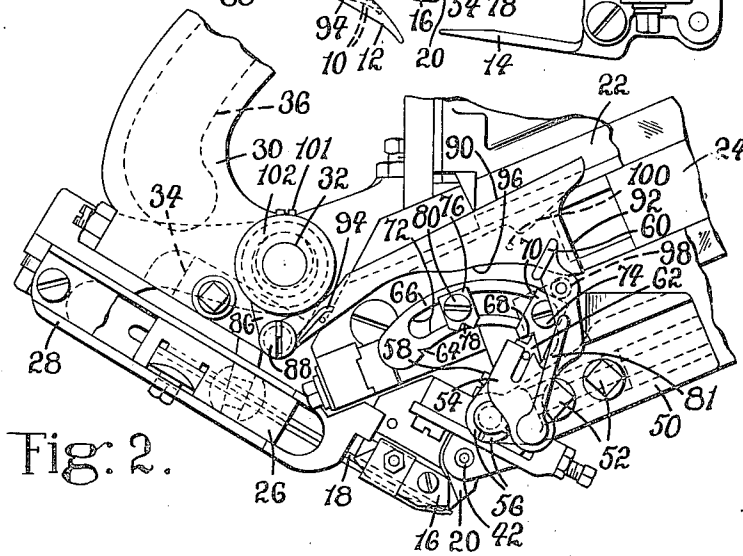

Fig. 2.

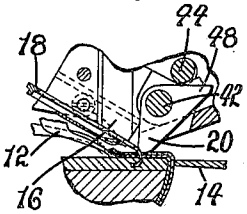

Fig. 6.

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Fig. 4.

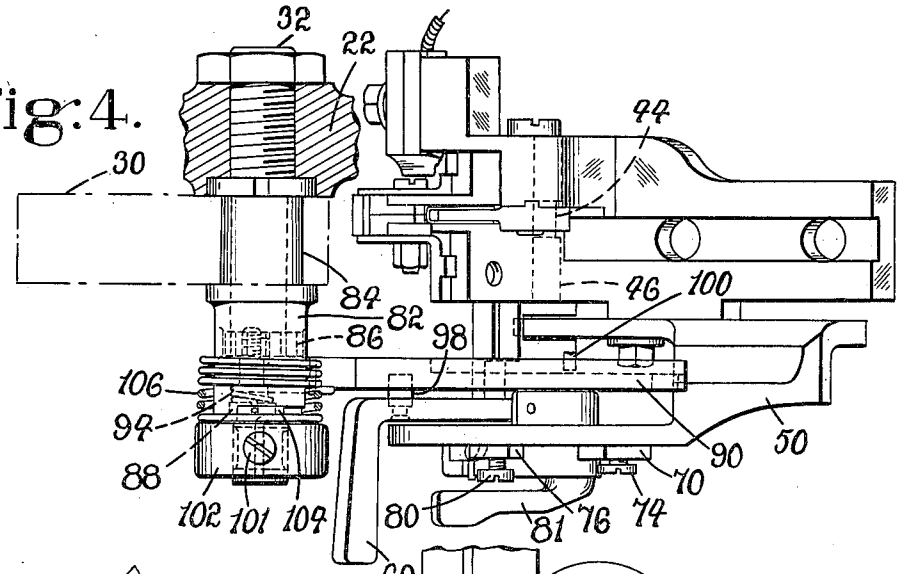
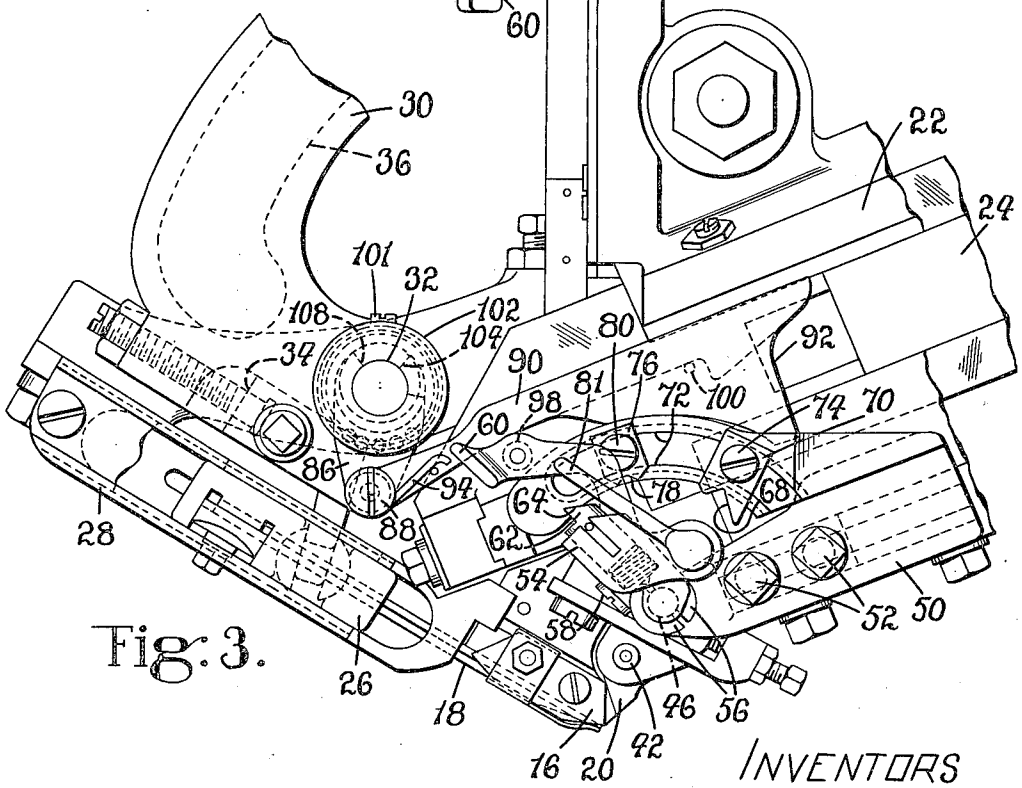


Fig. 3.



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UNITED STATES PATENT OFFICE

2,106,719

FASTENING-INSERTING MACHINE

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Application March 1, 1937, Serial No. 128,310

14 Claims. (Cl. 1—20)

This invention relates to fastening-inserting machines and is herein illustrated as applied to a machine of the type disclosed in Letters Patent of the United States No. 1,815,295, granted on July 21, 1931, upon an application of George Goddu for driving staples to fasten shoe uppers in lasted position. It is to be understood, however, that the invention is not limited to machines of that particular type nor to machines for fastening shoe uppers.

Machines of the type shown in the above-mentioned Letters Patent comprise in their organization a driver for driving staples from a guiding nozzle through the shoe upper materials and into an insole to fasten the upper to the insole and a deflector for engaging the legs of each staple to curve different portions of the legs successively in the driving operation before the different respective portions enter the shoe, and thus to cause them to follow curved paths such as to anchor them effectively in the insole without necessarily penetrating entirely through the latter. Since the upper materials are sometimes thicker at one portion of the shoe than at other portions, such machines are provided with means for varying the position of the deflector to vary the degree or radius of curvature of the legs of the staples in operating upon such different portions of the shoe in order that the staple legs will be effectively anchored in the insole, this means comprising an eccentric controlling the deflector and an adjusting member movable by the operator to turn the eccentric quickly to different predetermined positions corresponding to the desired curvatures of the staple legs in different portions of the shoe.

It has been proposed to utilize staples driven and anchored in the manner above described as temporary fastening means in lasting shoes of that kind in which the uppers along at least a portion of the sides of the shoes are secured in lasted position by an adhesive, the staples being inserted in such manner that they may be conveniently removed after the adhesive has set without leaving any disfiguring marks such as tack holes in the inner or foot-engaging portions of the insoles. Shoes of that kind are usually lasted with staples in the shank and with cement at the forepart, and accordingly, it is desirable that the legs of the staples applied along the sides of the forepart be driven only partially into the work so that they project somewhat from the upper to facilitate the removal of the staples after the cement has set, while in lasting the shank portion of the shoe where the staples serve as permanent fastening means, the legs of the staples are, of course, driven fully into the work. One object of the invention, accordingly, is to provide in a machine of the type herein shown, means for quickly adjusting the machine to drive the staples either fully or partially into the work. For the purpose in view the invention in one important aspect provides means controlled by the deflector-adjusting member for varying the limit of driving movement of the driver. In machines of the type shown in the above-mentioned Letters Patent the fastening-inserting means is moved inwardly over the bottom of the shoe in each cycle of the machine into upper-fastening position by a forwardly movable slide on which there is a cam-operated lever for imparting operative movement to the driver after the slide has completed its forward movement. In the construction shown this lever is mounted for swinging movement on an eccentric sleeve to which there may be imparted in each cycle of the machine in response to the forward movement of the slide a turning movement to cause the lever to be swung in a direction to retract the driver and thus to determine a limit of movement thereof toward the deflector short of its normal limit. For turning the sleeve there is provided a latch connected to the sleeve and held by a spring in position to cooperate with a fixed stop in the machine. In order that the latch may be moved out of cooperative relation to the fixed stop when the staples are to be fully driven the above-mentioned adjusting member for varying the curvature of the staple legs carries a roll which, when it engages a lip on the latch, swings the latch into a position in which it will not engage the stop in the forward movement of the slide. Thus, the mechanism for varying the limit of driving movement of the driver may be rendered operative or inoperative at will by movement of the adjusting member, the lip on the latch being preferably so shaped that the latch is released to the action of the spring for engagement with the fixed stop only when the adjusting member has been moved into position to cause the staple legs to be curved on a comparatively short radius, as in operating at the forepart of a shoe.

The novel features of the invention including various novel details of construction and combinations of parts will now be more particularly described by reference to the accompanying drawings and pointed out in the claims.

In the drawings,

Fig. 1 is a view in right-hand side elevation of a portion of the head of a machine in which the invention is embodied;

Fig. 2 is a view on an enlarged scale of a portion of the structure shown in Fig. 1, showing the mechanism for varying the limit of driving movement of the driver with the parts in inoperative positions;

Fig. 3 is a view similar to Fig. 2 but showing the parts for varying the limit of driving movement of the driver in operative positions;

Fig. 4 is a top plan view of the mechanism shown in Fig. 3;

Fig. 5 is a perspective view with parts broken away showing the means for varying the curvature of the staple legs detached from other portions of the machine; and

Fig. 6 is a sectional view illustrating the driving of a staple only part way in the work to facilitate its subsequent removal.

Since the general organization of a machine of the type illustrated is fully shown and described in the previously mentioned prior Letters Patent, it is only necessary to refer herein to the construction and manner of operation of certain instrumentalities which are closely associated with the work on which the machine operates. It will be understood that a machine of this type is provided with a gripper **10** (Fig. 1) which pulls the upper materials over the last and insole successively in different locations along the edge of the shoe bottom as the operator presents the shoe in positions determined by a sole rest **12** and a side gage **14**. In time relation to the pulling of the upper in each location a staple is driven from a guiding nozzle **16** by a driver **18** (Figs. 2 and 3) to fasten the upper to the insole. As the staple is driven its legs are engaged by a deflector **20** the lower end of which is positioned opposite to the end of the nozzle **16**, the deflector acting to curve different portions of the legs successively before the different respective portions enter the shoe to cause the legs to follow curved paths such as to anchor them effectively in the insole without entirely penetrating through the insole.

The driver **18**, the deflector **20** and other parts associated therewith are carried by a slide **22** mounted on a guiding member **24** for forward movement in a downwardly inclined path. In predetermined time relation to each upper pulling operation the slide **22** is moved forwardly to carry the nozzle **16** and other parts associated therewith inwardly over the shoe bottom to lay the margin of the upper over the insole, whereupon the staple is driven and the slide **22** is then retracted to its starting position. As disclosed in the previously mentioned Letters Patent No. 1,815,295 the driver **18** is secured to a driver slide **26** which is movable in a guideway formed in a bracket **28** secured to a forward extension of the slide **22**. The driver slide is operated by a lever **30** which is pivoted on a stud **32** on the forward extension of the slide **22**, the lever **30** having adjustably secured to its lower end a block **34** which is swiveled in a recess in the driver slide. Formed in the lever **30** is a cam slot **36** engaged by a roll **38** (Fig. 1) carried by an arm **40** pivotally mounted on the slide **22**. The cam slot **36** is so formed that staple driving movement is imparted to the lever **30** by upward movement of the arm **40** and driver retracting movement is imparted to the lever **30** by downward movement of the arm.

As also disclosed in the previously mentioned Letters Patent No. 1,815,295, the deflector **20** is mounted on a pivot pin **42** for turning movement to vary the distance between the portion thereof that engages the legs of the staple and the points where the legs emerge from the end of the staple nozzle **16** and thus to vary the degree or radius of curvature imparted to the legs in the driving operation, the position of the deflector being determined by an eccentric **44** (Figs. 4, 5 and 6) formed on a shaft **46** which is carried by the slide **22** and is mounted for turning movement to adjust the eccentric. By reference to Fig. 6 it will be seen that the eccentric **44** bears on an arm **48** formed on the deflector **20** and thus limits movement of the deflector about the axis of the pin **42** in a direction to increase the distance between its lower end and the outlet end of the nozzle **16** and, accordingly, to increase the radius of curvature of the staple legs. It will be understood that the arm **48** is forced against the eccentric by reason of the pressure applied to the deflector in the staple driving operation and there is sufficient friction tending to prevent the deflector from turning about its axis to cause it to maintain any position determined by the eccentric.

The shaft **46** is supported in part by a bracket **50** (Figs. 2, 3 and 5) which is fastened by screws **52** to the slide **22**. For turning the shaft and the eccentric **44** to vary the position of the deflector **20** in such manner as to alter the curvature of the staple legs in operating upon different portions of the same shoe there is provided a device or member **54** having a split bearing portion **56** frictionally clamped to the shaft **46** by a screw **58**. Formed as a part of the member **54** is a handle **60** for turning the member and the shaft **46**. The member **54** is thus movable in opposite directions between definitely predetermined positions corresponding to the desired curvature of the staple legs in operating upon different portions of the shoe. For determining such positions of the member **54** it carries a spring-pressed latch **62** arranged to enter a notch **64** provided in the edge of an arc-shaped portion **66** of the bracket **50** and also arranged to enter a notch **68** in a member **70** which is adjustable to different positions along a guideway **72** provided in the arc-shaped portion **66** and is held in adjusted position by a set screw **74**. When the latch **62** is in the notch **64** the eccentric **44** is set to cause the legs of the staple to receive a curvature of comparatively short radius as desired in operating, for example, on the forepart of a shoe, and when the latch is in the notch **68** of the member **70**, the eccentric is set to cause the legs to receive a curvature of longer radius as may be desired in operating along the shank portion of the shoe near the heel seat, the radius of this curvature being determined by adjustment of the member **70** along the guideway **72**. In order that the radius of curvature of the staple legs may be varied as desired in operating, for example, along the shank portion of the shoe bottom near the ball line, there is provided a second member **76** having a notch **78** formed therein to receive the latch **62**, the member **76** being adjustable along the guideway **72** and being held in adjusted position by a screw **80**. The latch **62** and the notches **64**, **68** and **78** are so formed that the latch will slip out of any one of the notches in response to pressure applied by the operator's hand to the handle **60** so that the operator can move the member **54** instantly from one predetermined position to another at any time.

The illustrated machine is further provided with means which is substantially the same as that shown in United States Letters Patent No. 1,938,575, granted on December 12, 1933, upon an application of B. B. Blanchard, for addition-

ally varying the position of the deflector 20 to effect a variation in the curvature of the staple legs in operation on different shoes. For this purpose there is fixed on the outer end of the shaft 46 a segmental gear member 75 (Fig. 5) which is engaged by another segmental gear member 77 fast on a short shaft 79 mounted in a bearing in the member 54, this short shaft being provided with a hand lever 81 for turning it. It will thus be seen that by means of the hand lever 81 a turning movement of indeterminate extent may be imparted to the shaft 46 against the resistance of the friction with which the shaft is clamped to the member 54 and that the mechanism for thus turning the shaft 46 is carried by the member 54 and is movable with it to the different positions determined by the latch 62 and the notches 64, 68 and 78. While the member 54 is in any one of the predetermined positions the shaft 46 may be turned by the operator any distance desired merely in response to pressure applied by the operator's hand to the lever 81. The machine as thus far described is substantially like that shown in the above-mentioned Letters Patent.

For purposes of this invention the illustrated machine is provided with means controlled by the deflector-adjusting means for varying the limit of movement of the driver toward the deflector. This means comprises a sleeve 82 (Fig. 4) which is rotatably mounted on the stud 32 and has a reduced end portion 84 which forms a bearing for the driver slide operating lever 30, this portion of the sleeve being eccentric to the axis of the stud 32. Formed on the sleeve 82 is a depending arm 86 to which there is pivotally connected by means of a shouldered screw 88 a rearwardly extending latch 90. Formed on the latch is a downwardly extending lip 92 and coiled about the shouldered portion of the screw 88 is a spring 94 which tends to swing the latch 90 downwardly and to hold it when the parts are in the positions shown in Fig. 2 with the curved edge 96 of the lip 92 in engagement with a stop 98, illustrated as a roll, carried by the handle 60. It will be understood that with the parts in the positions shown in Fig. 2 the latch 62 is in engagement with the notch 68 and the eccentric 44 is set to cause the legs of the staple to receive a curvature of comparatively long radius. Movement of the handle 60 from the position shown in Fig. 2 to the position shown in Fig. 3 moves the roll 98 out of engagement with the lip 92, thereby releasing the latch 90 to the action of the spring 94 which swings the latch downwardly into engagement with a fixed stop 100 illustrated as a pin projecting from the guiding member 24. With the parts in the positions shown in Fig. 3, as the slide 22 is moved forwardly in each cycle of the machine the sleeve 82 is rotated on the stud 32 because of the engagement of the pin 100 with the latch 90, and by reason of the eccentricity of the portion 84 of the sleeve a swinging movement is imparted to the lever 30 about the axis of the roll 38 in a direction to impart to the slide 26 a movement to the left to retract the driver. This determines a limit of movement of the driver 18 toward the deflector 20 short of its normal limit, so that the legs of the stable are not driven fully into the work to permit the staple to be removed readily by engaging its crossbar with a suitable staple-removing tool. Secured to the outer end portion of the stud 32 by a set screw 101 is a collar 102 provided with a projection 104. The sleeve 82 is recessed to receive the projection 104, and coiled about the sleeve is a spring 106 which tends to rotate the sleeve in a clockwise direction (Figs. 2 and 3) and to hold the sleeve with a shoulder 108 thereon in engagement with the projection 104 on the collar 102. It will be evident that the extent of turning movement imparted to the sleeve 82 to swing the lever 30 in the direction to move the slide 26 to the left and thereby to alter the position of the driver 18 at the end of its driving movement may be varied by loosening the screw 101 and moving the collar 102 relatively to the stud 32 to vary the initial position of the latch 90 relatively to the fixed stop 100, thus varying the time in the forward movement of the slide 22 when the latch engages the fixed stop.

By reference to Figs. 2 and 3 it will be seen that the length of the lip 92 is such that the roll 98 is moved out of engagement with the lip when the handle 60 has been swung far enough to the left to move the latch 62 into engagement with the notch 64 and to set the eccentric 44 to cause the legs of the staple to receive a curvature of comparatively short radius. Thus, the mechanism for varying the limit of movement of the driver toward the deflector is operative when the parts are in the positions shown in Fig. 3, this mechanism being rendered inoperative by movement of the handle 60 to the right (Figs. 2 and 3) to move the latch 62 into engagement with either of the notches 78 or 68. It will be evident that as the handle 60 is thus swung to the right the roll 98 by engagement with the curved edge 96 of the lip 92 swings the latch 90 against the resistance of the spring 94 into a position in which it will not engage the stop 100 in the forward movement of the slide 22. It will be understood that with the latch 62 in engagement with any one of the notches 64, 68 and 78 the position of the deflector may be additionally varied by movement of the hand lever 81.

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

1. In a fastening-inserting machine, the combination with a driver for driving staples, a deflector for engaging the legs of each staple to curve different portions of the legs successively in the driving operation before the different respective portions enter the work to cause them to follow curved paths in the work, and means for varying the position of the deflector to vary the curvature of the staple legs, of mechanism controlled by said last-named means for varying the limit of driving movement of the driver.

2. In a fastening-inserting machine, the combination with a staple-guiding nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, and means for varying the position of the deflector to vary the curvature of the staple legs, of mechanism controlled by said last-named means for varying the limit of movement of the driver toward the deflector.

3. In a fastening-inserting machine, the combination with a driver for driving staples, and deflecting means for engaging the legs of each staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the

work, of mechanism for varying the limit of driving movement of the driver, and a member movable by the operator to adjust said deflecting means to determine variably for different staples the curvature of the legs and for also controlling said mechanism.

4. In a fastening-inserting machine, the combination with a driver for driving staples, deflecting means for engaging the legs of each staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, and a device movable by the operator into any one of a number of different predetermined positions to determine variably for different staples the degree of curvature of the legs, of mechanism arranged to be rendered operative by the movement of said device into one of said positions for determining a limit of driving movement of the driver short of its normal limit.

5. A fastening-inserting machine having, in combination, a staple nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a device movable by the operator to different positions for adjusting said deflector to vary the curvature of the staple legs, means for predetermining different positions of said device, means for determining a limit of driving movement of said driver short of its normal limit, and means controlled by said device for rendering said last-named means operative only when said device has been moved into one of said predetermined positions.

6. A fastening-inserting machine having, in combination, shoe-positioning means, fastening-inserting mechanism comprising a staple nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a slide movable forwardly to carry said fastening-inserting mechanism inwardly over the bottom of the shoe, means for varying the position of the deflector to vary the curvature of the staple legs, and mechanism controlled by said last-named means for imparting to said driver in response to the forward movement of the slide a movement in a direction opposite to the direction of its driving movement to vary the limit of movement of said driver toward the deflector.

7. In a fastening-inserting machine, the combination with a driver for driving staples, means for imparting to the driver a staple-driving movement of predetermined extent, and means for engaging the legs of each staple to curve different portions of the legs successively in the driving operation before the different respective portions enter the work to cause them to follow curved paths in the work, of mechanism for varying the position of the driver in each cycle of the machine prior to its staple-driving movement to vary the limit of driving movement of the driver, and means for rendering said mechanism operative or inoperative at will.

8. In a fastening-inserting machine, the combination with a driver for driving staples, means for imparting to the driver a staple-driving movement of predetermined extent, and means for engaging the legs of each staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, of mechanism for imparting to the driver in each cycle of the machine prior to its driving movement a movement of predetermined extent in a direction opposite to the direction of its driving movement to determine the limit of driving movement of the driver, and operator-controlled means for rendering said mechanism inoperative.

9. In a fastening-inserting machine, the combination with a driver for driving staples, a deflector for engaging the legs of each staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, and means for operating the driver comprising a lever and cam means for swinging the lever through a predetermined angle, of mechanism under the control of the operator for imparting to said lever in each cycle of the machine independently of said cam means a swinging movement to vary the position of the driver and thereby to vary the limit of driving movement of the driver.

10. In a fastening-inserting machine, the combination with a driver for driving staples, a deflector for engaging the legs of each staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a lever arranged to operate said driver and having a cam slot therein, and an arm provided with a roll engaging said lever in its cam slot for operating the lever, of mechanism arranged to be rendered operative at will for imparting to said lever in each cycle of the machine a swinging movement about the axis of said roll in a direction to retract the driver and thus to vary the limit of its driving movement.

11. A fastening-inserting machine having, in combination, a staple nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a pivoted lever connected to said driver for operating it, and mechanism arranged to be rendered operative or inoperative at will for imparting to said lever in each cycle of the machine a swinging movement in a direction to retract said driver to vary the limit of its driving movement, said mechanism being adjustable to determine the extent of swinging movement imparted to said lever and thereby to determine the position of the driver relatively to the deflector at the end of its driving movement.

12. A fastening-inserting machine having, in combination, fastening-inserting mechanism comprising a staple nozzle, a driver for driving a staple from said nozzle, and a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, means for moving said fastening-inserting mechanism toward the work, mechanism operative in response to such movement of the fastening-inserting mechanism for varying the position of the driver to vary the limit of its driving movement, and means for rendering said last-named mechanism operative or inoperative at will.

13. A fastening-inserting machine having, in combination, shoe-positioning means, fastening-inserting mechanism comprising a staple nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a slide movable forwardly to carry said fastening-inserting mechanism inwardly over the bottom of the shoe, a lever on said slide for operating the driver, an eccentric on which said lever is mounted for swinging movement, means for turning said eccentric in response to the forward movement of the slide to vary the axis of swinging movement of said lever and thus to vary the limit of driving movement of the driver, and means for rendering said last-named means operative or inoperative at will.

14. A fastening-inserting machine having, in combination, shoe-positioning means, fastening-inserting mechanism comprising a staple nozzle, a driver for driving a staple from said nozzle, a deflector opposite to the outlet end of said nozzle for engaging the legs of the staple in the driving operation and for curving them prior to and during their entrance into the work to cause them to follow curved paths in the work, a slide movable forwardly to carry said fastening-inserting mechanism inwardly over the bottom of the shoe, a lever on said slide for operating the driver, an eccentric on which said lever is mounted for swinging movement, a latch for turning said eccentric in response to the forward movement of said slide to vary the axis of swinging movement of said lever and thus to vary the limit of driving movement of the driver, a fixed stop for operating said latch, a spring for holding the latch in position to cooperate with said stop, and a member movable by the operator at will to effect relative movement of said latch and stop out of cooperative relation.

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