

Apr. 3, 1923.

1,450,164

A. BATES

FASTENING INSERTING MACHINE

Filed Dec. 13, 1920

3 sheets-sheet 1

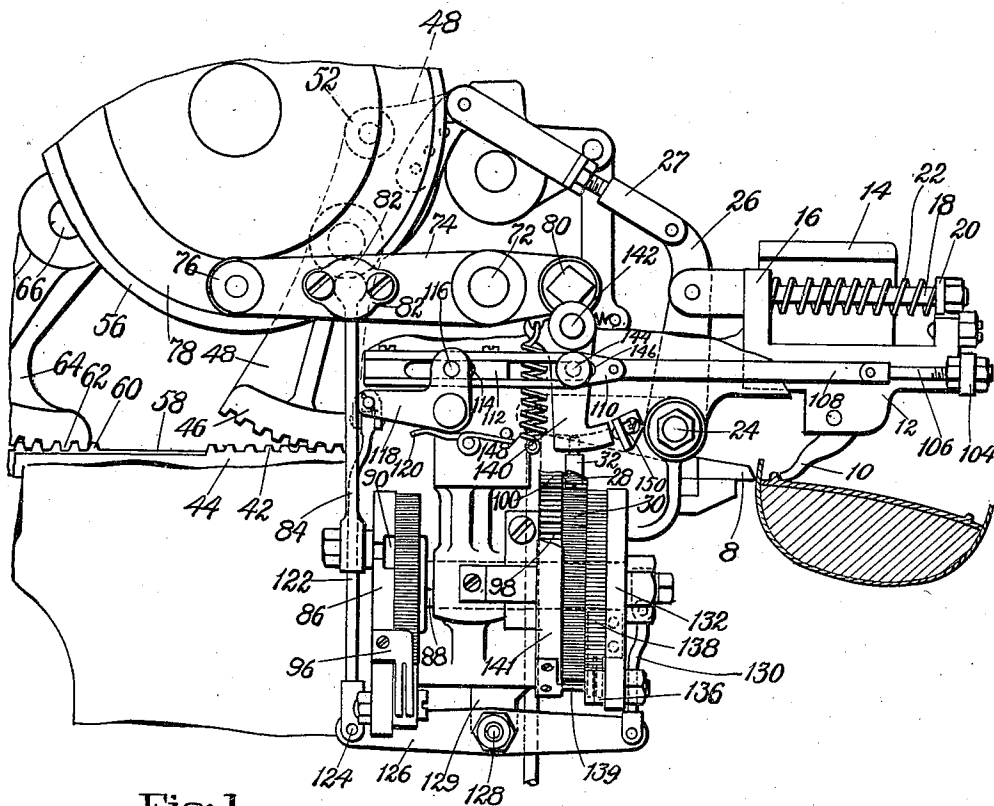


Fig. 1.

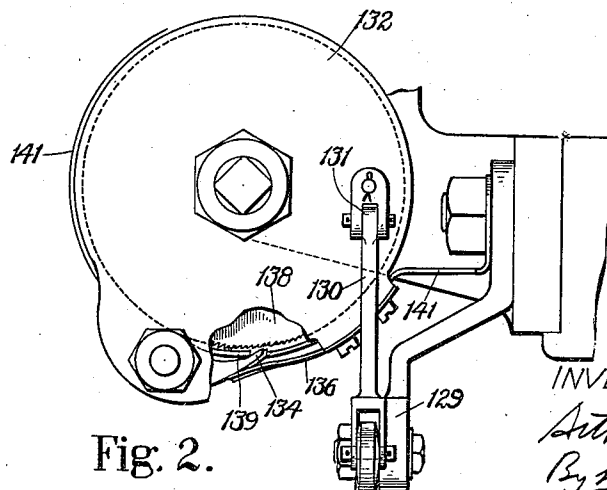


Fig. 2.

INVENTOR.

Arthur Bates
By his Attorney,
Nelson & Howard

Apr. 3, 1923.

1,450,164

A. BATES

FASTENING INSERTING MACHINE

Filed Dec. 13, 1920

3 sheets-sheet 2

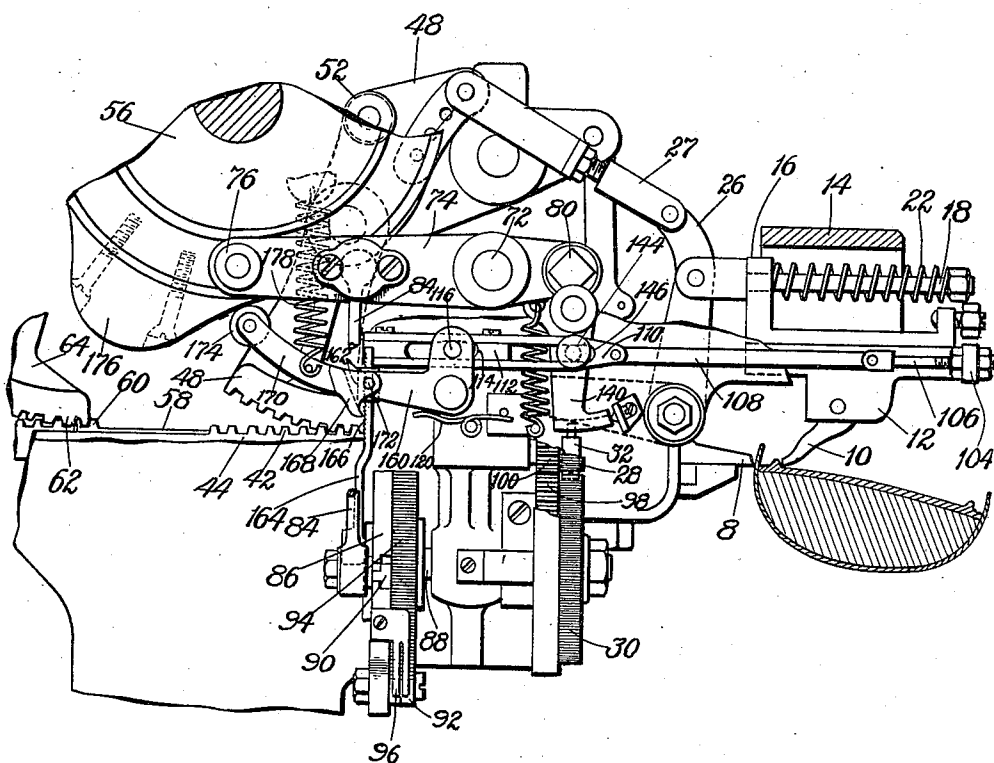


Fig. 3.

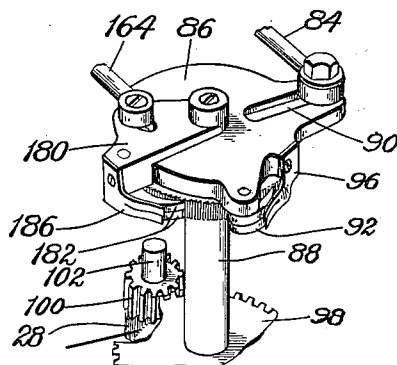


Fig. 4.

INVENTOR.

Arthur Bates
By his Attorney,
Nelson M. Howard

Apr. 3, 1923.

1,450,164

A. BATES

FASTENING INSERTING MACHINE

Filed Dec. 13, 1920

3 sheets-sheet 3

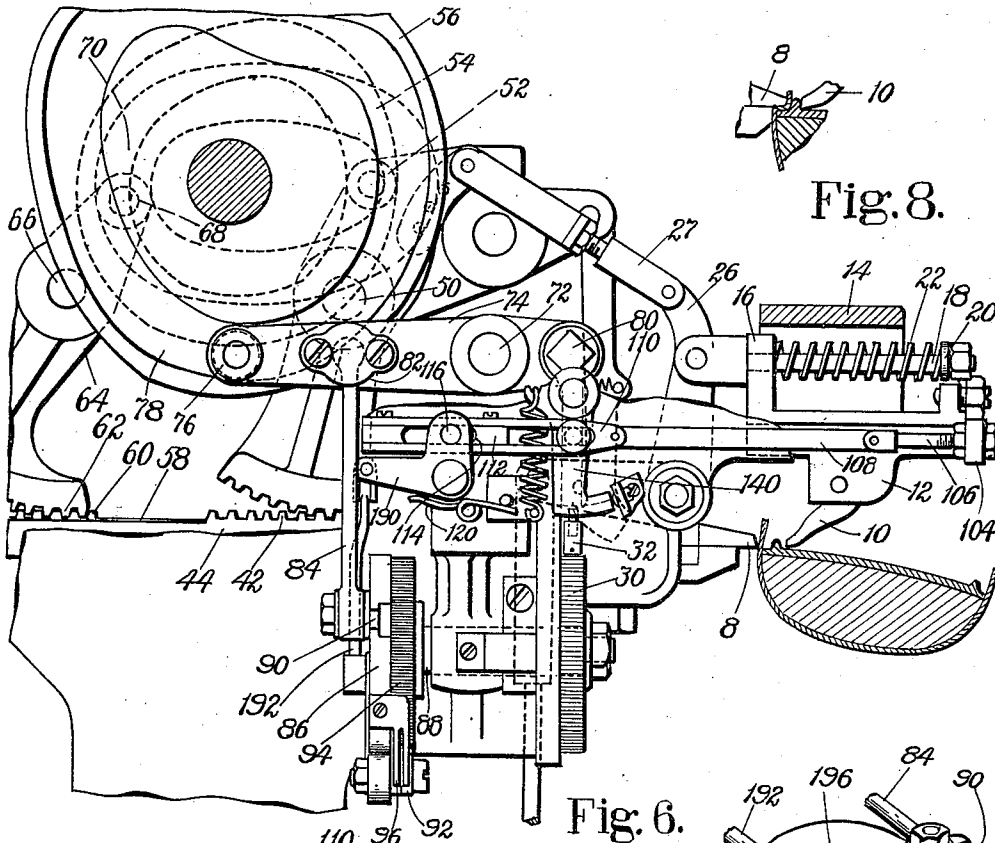
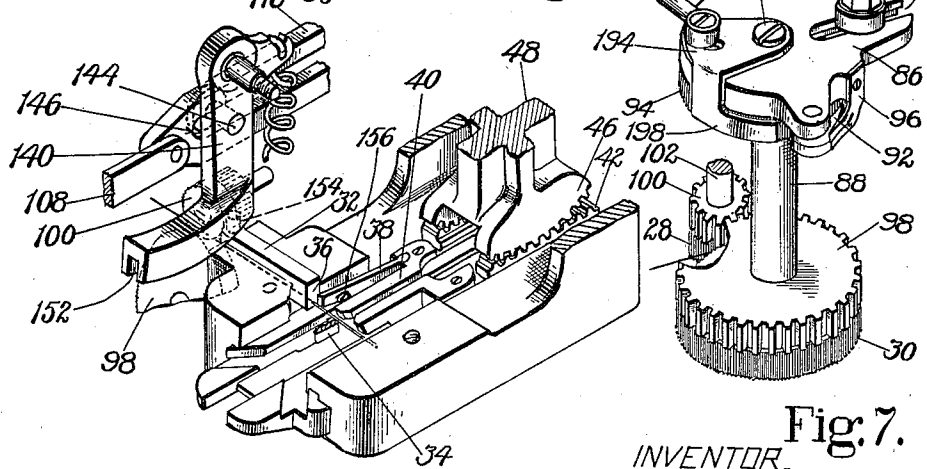


Fig. 5.

Fig. 7.
INVENTOR.

Arthur Bates
By his Attorney,
Nelson W. Howard

UNITED STATES PATENT OFFICE.

ARTHUR BATES, OF LEICESTER, ENGLAND, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FASTENING-INSERTING MACHINE.

Application filed December 13, 1920. Serial No. 430,262.

To all whom it may concern:

Be it known that I, ARTHUR BATES, a subject of the King of England, residing at Leicester, Leicestershire, England, have invented certain Improvements in Fastening-Inserting Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to fastening inserting machines and more particularly to machines for inserting fastenings to secure together shoe parts, as for instance, uppers to insoles as a preliminary to inseam sewing of uppers to the insoles of welt shoes.

A machine commonly used for the purpose of securing the uppers to the insoles of welt shoes by means of fastenings is that known commercially as the Goodyear upper stapler which is in general of the type disclosed in United States Patent No. 1,164,784, granted December 21, 1915, on application of John W. Cosgrove. In the operation of this machine staples of a uniform length are made and inserted throughout the operation of securing uppers to insoles, the length of the staple being such that an effective clinch of the fastening is secured in the thickest portions of the work being operated upon, while in the thinner portions there is a slight excess of staple length in the clinched portions of the staple fastenings. No attempt has heretofore been made to provide a machine of this type with means for adjusting the length of fastenings in accordance with the requirements of the work, though it has been proposed to do so in other types of machines which make and drive fastenings but with very indifferent success due largely to the fact that in attempting to provide for adequate response to variations in the thickness of the work the machines became so complicated as to be prohibitive from the standpoint of expense in manufacture and maintenance and also uncertain, unreliable and inefficient in operation.

It is an object of this invention to provide an improved machine for inserting fastenings suited to the controlling characteristics of the work constructed to operate with a high degree of rapidity and efficiency, to be especially sensitive to the requirements of

the work, and at the same time free from the disadvantages which have characterized prior constructions.

It is a further object of this invention to provide an improved machine for securing uppers to insoles in the use of which the fastenings will be automatically varied in length in accordance with the requirements of the work, thus rendering the machine more readily adaptable to different kinds of work and enlarging its field of usefulness without sacrificing any of the advantages which inhere from the use of the present commercial machine.

Important features of the invention relate to a fastening inserting machine of novel organization in which the feeding means for the wire stock is operated to feed a fastening length of wire uniform in amount throughout the operations of the machine followed, under certain conditions, by correction or adjustment in accordance with the requirements of the work at the point of fastening insertion.

In another aspect the invention comprises a fastening inserting machine in which the feeding means for the wire stock is operated at the end of each cycle to feed always the same length of wire for the fastening which is to be formed and driven in the next succeeding cycle, the construction and arrangement being such that correction or adjustment in the fastening length is made at the beginning of the cycle in which the work is measured and the fastening driven. Since the greater part of the feed of the fastening stock takes place at the end of each cycle of operations of the machine and merely the corrective feed is provided for at the beginning of the cycle in which the fastening is driven, it is clear that the operator does not have to wait for a fastening at the point of fastening insertion and that the machine can be maintained at a high point of speed and efficiency.

The invention contemplates also the provision of a fastening inserting machine having both the wire feeding means and the cutting means for the wire adjusted in accordance with the requirements of the work at the point of fastening insertion, wherein the wire feed mechanism is operative to feed a certain predetermined length of wire which

is uniform throughout all the operations of the machine and which provides a fastening that is at the extreme end of the range of fastenings, as to length, for which the machine is designed, and in which corrective or

adjustive feed of the fastening stock may take place subsequently if demanded by the requirements of the work at the point of fastening insertion.

In a preferred form of the invention the wire feeding means is operated at the end of each cycle of operations to provide a fastening length of stock corresponding to the shortest fastening that the machine is designed to make and drive, provision being made to add to the fastening length at the beginning of each successive cycle should such an adjustment be necessary to suit the requirements of the work as measured at the point of fastening insertion.

Important features of the invention relate to improvements in the organization of a machine designed to insert fastenings through the uppers of shoes and into the upstanding ribs or lips of insoles to secure these parts together preliminary to inseaming operations on welt shoes in which provision is made for variations in the length of fastenings as fastening inserting operations proceed progressively along the sides of the shoes and around the toe portions thereof where the requirements of the work may vary considerably due to differences in thickness in closely adjacent portions and especially if toe stiffeners or boxes are used at the toe portions of the shoes.

Other features of novelty which contribute to the carry-out of objects of the invention hereinbefore enumerated, or of other objects of the invention which will be apparent from a consideration of the disclosure of the invention in the specification and drawings, will be pointed out in the following detailed description and included in the claims, and it will be understood that it is my intention to cover by claims in this application all that is herein disclosed of my invention.

In the drawings:—

Figure 1 is a view in side elevation and partly in section of one illustrative embodiment of the invention;

Fig. 2 is a detail view of part of the wire feeding mechanism shown in Figure 1 and looking from the right in said figure;

Fig. 3 is a view similar to Figure 1 illustrating another species of the invention;

Fig. 4 is a detail view of the wire feeding mechanism of the machine shown in Figure 3;

Fig. 5 is a detail perspective view and partly in section showing the wire cutting means and parts of the staple forming and driving devices;

Fig. 6 is a view similar to Figure 1 show-

ing still another species of the invention;

Fig. 7 is a detail view of the wire feed mechanism of the machine shown in Figure 6 and

Fig. 8 is a detail view showing the work clamped for the insertion of a fastening.

For the purposes of illustration the invention is shown embodied in a Goodyear upper stapling machine designed to secure the uppers of shoes to the upstanding lip or rib of insoles, the machine being of the type disclosed in said United States Letters Patent No. 1,164,784. It will be understood, however, that the invention is not limited to the type of machine shown in said Letters Patent but that important features of the invention may have other and various applications and uses. Referring to Figures 1, 2 and 5 of the drawings, it will be observed that the work is presented to a nozzle 8 through which fastenings are driven into the work and properly clinched by an anvil member 10. When the work is presented to the nozzle and the machine started in operation, the work is first clamped securely between the nozzle and the anvil not only to hold the work during the insertion of fastenings but to measure its thickness at the point of insertion so that fastenings of the proper length may be inserted as will be hereinafter fully described. As shown, the anvil 10 is fixedly carried by a head 12 slidable in guideways provided by a stationary portion of the frame 14. Secured to or integral with the head 12 is a projecting arm 16 through which passes a bolt or rod 18 having an abutment 20 between which and the arm 16 is a spring 22 encircling the rod 18 and providing for a yielding application of clamping pressure on the work, so that work of varying thickness may be operated on. Pivoted at 24 is a lever 26 connected to operate the anvil 10 through the rod 18 and having its upper end movably attached by adjustable link 27 to the power driven lever 48. There is thus provided an anvil automatically operated alternately to clamp and release the work and serving in connection with the nozzle 8 as a work measuring means. The timing of this part of the mechanism is such that the work is first securely clamped during the insertion of the fastening and is then released to permit of the work being repositioned for the insertion of a fastening in spaced relation to the preceding fastening. As shown, the wire stock for the fastenings is fed between corrugated feed rolls 28 and 30 (Fig. 1) through a guide block 32 (Fig. 5) and over an inside former 34. In the construction shown, the end of the guide block 32 serves also as the stationary cutter. In other words, its end 36 presents a smooth, hardened surface with which there co-operates a movable cutter 38 attached to the out-

side former 40. It will be clear that after the wire has been fed in position over the inside former 34, movement of the outside former 40 in operative direction will cause the cutter 38 to sever a length of wire at the instant that the said length of wire is pressed against the inside former 34 by the forked ends of the outside former. Continued movement of the outside former will bend the wire into staple form about the inside former which is then retracted out of the path of a driver, not shown, which moves down through the outside former to drive the staple into the work presented against the end of the nozzle 8. For operating the outside former there are provided rack bars 42 integral with or securely attached to the slide 44 at the forward end of which is the outside former 40. Meshing with the rack bars are segmental gear members 46 at the lower end of a lever 48 pivoted at 50 in the machine frame and having at its upper end a roll 52 movable along the cam path 54 in the cam member 56. For operating the driver in properly timed relation to the outside former, there is provided a slide 58 to which the driver (not shown) is fixedly connected, the said slide having rack teeth 60 which are constantly in mesh with a segmental gear 62 at the lower end of lever 64 pivoted at 66 in the machine frame and having a roll 68 movable in a cam path 70 in the cam member 56. Pivoted at 72 in the frame of the machine is a lever 74 which carries at one end a roll 76 for movement along a cam path 78 in the cam member 56. Pivotally mounted at 80 to the other end of the lever is the upper end of the inside former 34 above described. Pivoted to the lever 74 intermediate of its ends by means of a universal joint furnished in part by the plate 82 is a rod 84, the lower end of which is pivotally secured to a wheel member 86 which is freely rotatable on the shaft 88, the said rod being adjustably secured to said wheel by means of a block adjustable along the slot 90. Carried by the wheel member 86 is a set of pawls, shown at 92 in Figure 7, which are held constantly pressed against the teeth of a ratchet wheel 94 by means of a spring 96. It will be clear that as the pawls are moved in operative direction by the wheel member 86 that the ratchet 94 will be rotated and with it the shaft 88 to which is secured the feed roll 30 referred to above. Fixedly attached to the shaft 88 is a gear wheel 98 which is constantly in mesh with a gear 100 (Figs. 1 and 7) on a stub shaft 102 which carries also fixedly attached thereto the small feed roll 28 which is in position to co-operate with the large feed roll 30 in securing intermittent feed of the wire stock. The operation of the mechanism thus far described consists in feeding the wire at proper intervals through the operation of the rolls

28, 30 through the guide member 32 and across the rear edge of the inside former 34, in which position the projecting wire length is severed from the wire by the co-operation of the cutters 36, 38. Practically simultaneously with the cutting of the wire it is bent in a staple form and subsequently driven into the work, all as above described. The mechanism thus far described is practically the same as that disclosed in the said Letters Patent to Cosgrove, to which reference may be had for a more detailed description of the construction and mode of operation of the said mechanism.

It is to be observed, however, that there is no provision in the machine disclosed in said Letters Patent for suiting the length of staple to the thickness of the work, as this latter characteristic varies along various portions successively presented for the insertion of fastenings. In the illustrative mechanism of Figures 1 and 2, the wire is fed by the feed rolls 28 and 30 always for the longest staple that the mechanism is designed to make and drive, the said feeding of the wire taking place at the end of each cycle of operations. Then as the work is measured at the beginning of each cycle at the point where the fastening is to be inserted, the wire fed is adjusted, when necessary, at the beginning of the cycle and in accordance with the thickness of the work by subtracting from the length fed in the preceding cycle an amount determined by the measurement of the work in the cycle in which the fastening is to be driven. In order to subtract from the length fed by the feed rolls, mechanism is provided for reversing them in their rotation and feeding back a measured amount determined by the thickness of the work. A specific embodiment of this mechanism will now be described. Secured to a projection 104 extending from the head 12 is a bolt or connecting rod 106 connected by means of a pivoted link 108 to a slotted member 110 carrying in the slotted portion thereof a block 112 which furnishes an abutment or shoulder 114 for engagement with a pin 116 in a bell crank lever 118 pivoted to the frame of the machine and held yieldingly in its position of rest by a spring 120 which operates for the purpose in a well known manner. Pivoted to the free end of the bell crank 118 by means of a universal joint is a link 122 which has its lower end pivotally connected at 124 to a lever 126 carried pivotally at 128 upon a supporting bracket 129. To the other end of the lever 126 there is pivotally attached a link 130, the upper end of which is in turn pivoted by a universal joint 131 to a wheel member 132 loosely mounted on the shaft 88. Carried by the wheel member 132 is a pair of pawls 134 constantly pressed by means of a spring 136 toward

ratchet wheel 138 securely attached to the shaft 88, the pawls being held normally out of contact by a stationary shield 139, part of a larger shield 141, so that ratchet wheel 138 and shaft 88 and feed roll 30 may be turned by ratchet wheel 94 in the normal regular feed from operation of lever 74. It will be observed that the shoulder or abutment 114 on the block 112 is not normally in contact with the pin 116 in the bell crank 118, the arrangement being such that the anvil 10 may be spaced from the nozzle 8 to permit of unobstructed introduction of the work between the anvil and the nozzle and to permit of movement of the anvil toward the nozzle to clamp the thickest work that the machine is intended to operate upon without in any way effecting movement of the bell crank 118. Under such conditions the wire will be fed for the longest staple by the operation of the rolls at the end of the preceding cycle. If, however, the work at the point where the fastening is to be driven is of a thickness which does not require the longest staple then the anvil 10 in its movement toward the nozzle 8 will measure and accurately determine the difference between the longest staple which the machine is adapted to drive and the staple which should be inserted to meet the requirements. Such measuring movement of the anvil 10 will be transmitted to the bell crank 118 through the abutment 114 striking the pin 116 as above described. Through the connections already described this movement of the bell crank 118 will cause a slight rotation of the wheel member 132 whereupon the ratchet wheel 138 is moved in the same direction and with it the shaft 88, to carry the feed rolls 28 and 30 in a direction reverse from normal whereby the length of wire which was fed at the end of the preceding cycle is fed back slightly the required distance to provide the proper staple length. It will be understood that means is provided to release the pawls 92 from the ratchet wheel 94 at the proper time so as to permit of the reverse movement of the shaft 88 and hence of the feed rolls 28 and 30. If preferred this means may be a stationary shield similar to that shown at 139 in Fig. 2, so arranged that at the end of their return or idle stroke the pawls 92 are lifted from the wheel 94.

Means is preferably provided for adjusting the cutting mechanism in accordance with variations in the lengths of wire fed by the feeding mechanism as finally determined by the work measuring or caliper operations of the anvil and nozzle. Preferably, the wire cutting means is adjusted simultaneously with the adjustment of the wire feed at the beginning of the cycle. As shown, this adjusting means for the cutter comprises a lever or bell crank 140 pivoted

at 142 on the frame of the machine and having a pin 144 intermediate of its ends and located in the slot in the member 110, an abutment or shoulder 146 being provided on the link member 110 for co-operation with the pin 144 in a manner exactly similar to the co-operation between the shoulder or abutment 114 and the pin 116 in the bell crank 118 as above described. In the illustrative construction, the lever 140 is held by a spring 148 with its lower end in abutting contact with a stop in the form of a set screw 150 set in a bracket attached to the machine frame. It will be observed upon inspection of Figures 1 and 5 that the lower ends of the lever 140 is slotted as at 152 to provide a cam slot which receives a pin or stud 154 projecting from the wire guide 32. The construction and arrangement of this part of the cutter adjusting means is such that the wire guide 32 is moved toward or from the inside former 34 to provide for a longer or shorter staple having legs or prongs of equal length and in accordance with the adjustment of the wire feed which follows the work measuring or caliper operation above described. It is clear that if the cutting means remained always in the same position irrespective of the length of wire fed by the wire feeding means that a decrease in the length of wire fed at any given time would decrease the length of that leg of the staple on the side of the inside former 34 which faces away from the end of the wire guide 32, while the leg or prong of the staple on the side of the inside former 34 which faces the end of the wire guide 32, would remain the same length in all of the staples. Hence, the wire cutting means is adjusted each time the length of the staple wire is altered. Moreover, since the change in the length of the staple must affect both of the legs or prongs, it is clear that the adjustment of the cutting means which decides the length of only one prong is only half of the adjustment of the wire feeding means. This difference in the amount of adjustment is arranged and taken care of in the cam at the lower end of the lever 140, the construction being such that the wire guide is controlled positively and moved the proper distance in accordance with the requirement of the work.

As above stated pins 116 and 144 are not subjected to the influence of the anvil 10 during the initial movement of the anvil into work clamping position, the pins being, in the normal inoperative position of the machine, equally displaced from the forward ends of their respective slots in the link 110, but at a certain point in the advance of the anvil into work clamping position this lost motion is fully taken up and the shoulder at the end of each slot presses against the corresponding pin so that as the

anvil moves further inwardly, the combined wire guide and cutting block 32 moves axially of the wire towards the line of drive the same amount as the anvil moves and the length of wire fed in the preceding cycle is shortened by twice the amount of that movement. While the first staple formed and driven after adjustment of the wire guide and of the feed rolls will have prongs or legs of unequal length, this is considered unimportant, all subsequent staples for the given thickness of work being perfect and the differences in any case being relatively slight since the variations in the thickness of the work along each side of the shoe are ordinarily not great in amount.

As stated above the end 36 of the wire guide 32 serves as the stationary cutter during cutting operations, a movable cutter 38 co-operating therewith to sever the wire. In prior constructions the cutter 38 has usually been carried fixedly by the outside former. In the illustrative construction the cutter 38 is pivotally carried at its upper or rear end by the outside former 40 and a spring 156 is provided between the side of the former and the movable cutter 38 to hold the latter constantly in contact with the end 36 of the wire guide 32 with which it co-operates to cut the wire in every adjustable position of the latter.

In the illustrative embodiment of the second species of the invention the wire is fed the same predetermined amount at the end of each cycle of operations to make the shortest staple that the mechanism is designed to make and drive and then at the beginning of the succeeding cycle this length of wire is added to, or in other words, increased in length if a longer staple is required by the work measured at the point of insertion of the fastening. In the construction shown in Fig. 3, the mechanism for feeding the wire stock at the end of the cycle through lever 74, rod 84 and ratchet wheel 94, and the mechanism for making and driving the staple is the same as in the construction above described. Moreover, the means for adjusting the cutting devices is the same and controlled in the same way through the lever 140. There remains to be described the specific mechanism for adding to the length of the staple section when a staple longer than the minimum is required. As shown, the adjusting means for the wire feed comprises a bell crank 160 operated in the same way as the bell crank 118 of Figure 1 but having at its free end a block 162 pivoted therein on a transverse axis and perforated to receive slidably the upper end of a rod 164, which rod is provided with teeth 166 which face upwardly so as to be engaged by a pawl 168 projecting downwardly from a lever 170 pivoted to the end of the bell crank 160

at 172 and carrying a roll 174 at its free end for co-operation with a face cam 176 on the cam block 56, being held constantly in contact with the face cam 176 by a spring 178. The lower end of the rod 164 is pivotally and adjustably connected to a pawl carrier 180 which carries pawls 182 held constantly in contact with the teeth on the ratchet wheel 94 by means of a spring 186, the said ratchet being fixedly secured, as above stated, to shaft 88 upon which the feed roll 30 is also secured. It will be clear that upon downward movement of the laterally extending arm of the bell crank 160, the pawl 168 will be moved downwardly and away from the teeth on the rod 164 thus skipping some of the teeth, the number thus skipped depending on the measuring movement of the anvil after the block 112 engages with the pin 116 in bell crank 160. Subsequently cam 176 actuates the lever 170 and causes the pawl 168 to engage the proper tooth on bar 164 and force the latter downwardly so that the pawl carrier 180 will be rocked to cause rotation of the ratchet wheel 94 and of the shaft 88 and thus of the feed roll 30 to give the latter such additional feeding movement as will correspond with the increase of staple length required by the work measured at the point of insertion, if such length be over the minimum for which the mechanism is designed.

In other words, after the conclusion of the clamping movement of the anvil 10 upon the work, the raised portion of the cam 176 can operate the link 170 to swing its projection 168 against the toothed portion 166 on the rod 164 and thus, after taking up the lost motion, the anvil initiates movement of the lever 160 and the link 164 downwardly to operate the ratchet wheel 94, thereby causing an addition feed of the wire double the amount by which the work at the calipered point exceeds the minimum in thickness. Furthermore the combined wire guide and cutter 32 is moved an amount equal to the movement of the anvil after the shoulder 146 on the link 110 contacts with the pin 144 carried at the upper end of the adjusting lever 140 for the wire guide 32.

It will be understood that according to this construction the chief part or all of the sectional wire for the staple is fed at the end of the cycle and that then correction is made at the beginning of the succeeding cycle if the work requires a longer staple than the minimum size which the mechanism is designed to provide. Thus the time required in feeding the wire at the beginning of the cycle is considerably shortened and the length of time that the work is held by the machine previous to the insertion of the fastening is reduced permitting a considerable speeding up of the ma-

chine. The advantage of this construction, moreover, resides in the fact that the corrective feed is accomplished by turning the feed rolls in the same direction in which they normally turn to feed the wire.

In the third species of the invention as illustrated in the construction shown in Figure 6, the work is measured as before and the length of the staple is determined in accordance with the requirements of the work at the point where the fastening is to be inserted. However, the whole wire feeding operation is performed at one time instead of being divided into two steps as in the constructions described in the foregoing specification and in this construction, moreover, the entire feeding movement of the feed rolls takes place at the beginning of the cycle so that there is a slightly longer period of time during which the work is under the control of the machine before the insertion of the fastening. On the other hand, the mechanism which embodies this feature of the invention is simpler in construction and possibly less likely to require attention on the part of the operator or of the repair man. As shown in Figure 6 the bell crank 190 is exactly similar in its mounting and mode of operation as the bell crank 118 in Figure 1. It has pivoted to its free end by a universal joint a rod 192 which is in turn pivoted at its lower end to a shield member 194 (Fig. 7) pivoted at 196 upon the wheel member 86, the shield having a portion 198 which overlies the teeth on the ratchet wheel 94. The construction and arrangement of the shield and of its operating parts are such that the teeth on the ratchet wheel 94 are unobstructed for engagement by the pawls 92 when the longest staple is demanded by the thickness of the work. On the other hand, as the anvil 10 moves toward the nozzle 8 from a predetermined point of separation corresponding to the greatest thickness of the work which the machine is designed to operate upon, the shield 198 will be shifted downwardly toward the pawls so that the latter will ride up on the shield in moving to initial position and hence must move off of the shield before they can engage the teeth of the ratchet 94, the time occupied in contact with the shield having the effect of shortening the operative stroke of the pawls, thus lessening the length of wire fed by the feed rolls. It will be clear that the further the shield 198 is moved downwardly the shorter will be the operative stroke of the pawls and hence the shorter will be the length of wire that is fed for the staple to be driven in that cycle of operations. As in the preceding constructions, the movement of the combined wire guide and cutter corresponds exactly to the movement of the anvil subsequent to the time that the shoul-

der 146 on the link 110 comes in contact with the pin 144, while the adjustive movement of the feed rolls during the same time is twice the distance of the said movement of the anvil. It will be observed that the feed rolls, according to this construction, make but one feeding movement to obtain the staple length suitable for the work which has just been measured. However, the lengthening of the time that the work is held by the machine prior to the insertion of the fastening is considered to more than offset any other advantages possessed by this species of the invention over the constructions described earlier in the specification and hence it is preferred to use a mechanism in which the wire is fed at the end of the cycle and a correction made in minimum time at the beginning of the succeeding cycle. It will be understood, moreover, that the features of the invention which relate to the means for feeding and cutting wire stock may have other uses and applications than that herein illustrated and that the invention is limited only by the scope of the claims hereto appended.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:—

1. In a machine of the character described, a work rest, an anvil movable toward and from the work rest to clamp the work thereagainst thus measuring the work, fastening forming and driving devices comprising means for feeding wire stock and for cutting the same into lengths suitable for fastenings, a member secured to the anvil to be movable therewith and provided with operating abutments, a bell crank for adjusting the cutting means, and a second bell crank for adjusting the wire feeding means both arranged to be operated from said abutments.

2. In a machine of the character described, a nozzle through which fastenings are driven, an anvil movable for pressing work against the nozzle, fastening forming and driving devices comprising means for feeding wire stock and for cutting the same into lengths suitable for fastenings, the wire cutting means comprising a guide for the wire, one end of which constitutes a cutter, a member for moving the guide toward and from the fastening forming devices, the wire feeding means comprising feed rolls for feeding the wire through said guide, a pivoted member for controlling the extent of movement of said feed rolls, and an operating member extending from the anvil for controlling both said members whereby the feed of the wire and the operation of the cutters is adjusted.

3. In a machine of the class described, a nozzle through which fastenings are driven, an anvil movable toward and from

the nozzle for pressing the work there-
against whereby the thickness of the work
is measured, fastening forming and driving
devices, a feed for wire comprising feed
5 rolls, cutting mechanism for the wire com-
prising a movable cutter member, a pair of
levers for adjusting the cutter member and
the extent of throw of the feed rolls, and
a single member extending from the anvil
10 to said levers for operating the same.

4. In a machine of the character de-
scribed, a nozzle through which fastenings
are driven, an anvil movable for pressing
the work against the nozzle whereby the
15 thickness of the work is measured, fasten-
ing forming and driving devices, feed rolls
rotatable to feed the wire, a guide member
for guiding the wire to the fastening form-
ing and driving devices, the said guide mem-
20 ber having one end formed as a cutter for
the wire, a lever arranged positively to
operate the guide member, a lever for con-
trolling the amount of movement of the feed
rolls, and a single member connected to the
25 anvil for operating said levers.

5. In a machine of the class described,
a nozzle through which fastenings are
driven, an anvil movable for pressing the
work against the nozzle whereby the thick-
30 ness of the work is measured, fastening
forming and driving devices, means for
feeding wire stock at the end of each cycle
of operations of the machine, and means
for correcting the feed according to the
35 thickness of the work at the beginning of
each successive cycle and previous to the
cutting operation.

6. In a machine of the character de-
scribed, a member for positioning the work,
40 a member movable toward and from the
first member for co-operation therewith to
measure the work, wire feed mechanism
operative to feed always the same prede-
termined length of wire stock throughout
45 the operations of the machine, and means
for correcting the wire feed in accordance
with the thickness of the stock as measured
at the beginning of each successive cycle.

7. In a machine of the character de-
scribed, a member for positioning work,
50 a member movable toward and from the
first member for co-operation therewith in
measuring the thickness of the work, wire
feeding and cutting devices operative to
55 feed and cut a piece of wire stock of a pre-
determined length at each cycle of opera-
tions of the machine, and subsequently
operable means for adjusting the wire feed-
ing and cutting devices in accordance with
60 the requirements of the measured work
prior to the operation of the cutting devices.

8. In a machine of the character de-
scribed, an abutment for positioning work,
a member for pressing the work against the
65 abutment to measure the thickness of the

same, fastening forming and driving de-
vices, means for feeding the stock from
which fastenings are formed to the same
predetermined amount in each cycle of
operations, and means operable under given
70 conditions to increase the feed of the fasten-
ing stock immediately succeeding the meas-
uring operation on the work.

9. In a machine of the character de-
scribed, an abutment for positioning work,
75 a member for pressing work against the
abutment and for co-operation therewith in
measuring the thickness of the work, fasten-
ing forming and driving devices opera-
tive to insert fastenings in the work, means
80 for feeding the stock from which fastenings
are made to the same predetermined extent
in each cycle of operations of the machine,
stock cutting means, and means for correct-
ing the feed of the stock to the measured
85 thickness of the work prior to the operation
of the cutting means.

10. In a machine of the character de-
scribed, an abutment for positioning the
work, a member for pressing work against
the abutment in co-operation therewith to
measure the work, fastening forming and
driving devices for inserting fastenings into
the work, feed rolls rotatable to the same
95 extent during each cycle of operations of
the machine to feed the stock from which
fastenings were made, and means automati-
cally operable in each cycle to add to the
rotation of the feed rolls if such is demanded
100 by the requirements of the measured work.

11. In a machine of the character de-
scribed, an abutment for positioning work,
a member for pressing the work against the
abutment and for co-operation therewith in
measuring the thickness of the work, fasten-
105 ing forming and driving devices opera-
tive to insert fastenings into the work,
means for feeding the stock from which fasten-
ings are made operative to feed the stock
the same predetermined amount at each cycle
110 of operations of the machine, cutters for
the stock, and means automatically operative
to adjust the length of the stock fed in ac-
cordance with the thickness of the work and
prior to the operation of said cutters.
115

12. In a machine of the character de-
scribed, a nozzle through which fastenings
are driven, an anvil for pressing the work
against the nozzle whereby the thickness of
the work is measured, fastening forming
120 and inserting devices, means for feeding
wire stock and for cutting the same into
lengths suitable for fastenings, and a mem-
ber connected to the anvil and having a lost
motion connection with the feeding and cut-
125 ting devices for controlling the operation
of the latter in accordance with the thick-
ness of the work.

13. In a machine of the character de-
scribed, an abutment for fastening the work,
130

a member for co-operation with the abutment in measuring the thickness of the work, fastening forming and inserting devices, means for feeding stock from which fastenings are made, means for cutting the stock, and means controlled by the anvil for adjusting the feed of the stock immediately succeeding the measuring operation and prior to the operation of the cutting means.

14. A machine for inserting fastenings through the uppers of shoes and into the upstanding lips or ribs of insoles to secure these parts together, comprising fastening forming and inserting devices, a nozzle through which the fastenings are inserted, a member to co-operate with the nozzle in holding the work and in measuring it at the point of fastening insertion, means for feeding the fastening stock a predetermined uniform length at the end of each cycle of operations, and means, operative at the beginning of each successive cycle and before the cutting of the fastening stock, for correcting the length thus fed in accordance with the requirements of the work.

15. A machine for inserting fastenings through the uppers of shoes and into the upstanding lips or ribs of insoles to secure these parts together, comprising fastening forming and inserting devices, a nozzle through which the fastenings are inserted, an anvil operative to engage the lip or rib of the insole and to co-operate with the nozzle in holding the work and in measuring it at the point of fastening insertion, and means comprising feed rolls for feeding the fastening stock to provide a fastening in accordance with the requirements of the lip or rib of the insole and the upper as measured at the point of fastening insertion.

16. A machine for inserting fastenings through the uppers of shoes and into the upstanding lips or ribs of insoles to secure these parts together comprising fastening forming and inserting devices, a nozzle through which the fastenings are inserted, a member to co-operate with the nozzle in holding the work and in measuring it at the point of fastening insertion, means for cutting the fastening stock, and means for feeding a length of stock for a fastening in accordance with the requirements of the work at the point of fastening insertion.

17. A machine for inserting fastenings through the uppers of shoes and into the upstanding lips or ribs of insoles to secure these parts together comprising fastening forming and inserting devices, a nozzle through which the fastenings are inserted, an anvil operative to engage the lip or rib of the insole and to co-operate with the nozzle in holding the work and in measuring it at the point of fastening insertion, cutters for cutting the fastening stock, feed rolls for feeding a length of stock for a fastening, and connections from the anvil to adjust the feed rolls and the cutters in accordance with the requirements of the work at the point of fastening insertion so that fastenings of suitable length are provided.

18. In a machine of the character described, fastening forming and driving devices, means for feeding fastening stock to provide a piece of fastening stock of a length suitable to form a fastening of predetermined length at one end of the range of sizes which the machine is designed to make and drive, and means, operable subsequently to the stock feeding means, for adjusting the length of fastening to the thickness of the work at the point of fastening insertion.

19. In a machine of the character described, means for measuring work, fastening forming and driving devices, means operative at each cycle of operations for feeding fastening stock to provide a piece of fastening stock of a length suitable to form a fastening of predetermined length at one end of the range of sizes which the machine is designed to make and drive, and means controlled by the work measuring means, and operable subsequently to the regular feed of the fastening stock, for adjusting the length of the fastening to the thickness of the work at the point of fastening insertion.

20. In a machine of the character described, means for measuring work, fastening forming and inserting devices, means for feeding always the same predetermined length of fastening stock as a preliminary to fastening forming operations, and means automatically operative subsequently to the stock feeding means for adjusting the length of the fastening to the thickness of the measured work.

21. In a machine of the character described, fastening forming and inserting devices comprising a nozzle through which the fastenings are driven, means automatically operative to measure the thickness of the work, means for feeding always the same predetermined length of fastening stock as a preliminary to fastening forming operations, and means controlled by said measuring means for adjusting the length of the fastening to the thickness of the measured work.

22. In a machine of the character described, means for measuring work, fastening forming and driving devices, means for feeding the stock from which fastenings are formed to the same predetermined amount in each cycle of operations, and means operable for correcting or adjusting the feed of the fastening stock immediately succeeding the measuring operation on the work.

23. In a machine of the character described, a member for positioning work, a member for co-operation with the first member

ber in measuring the thickness of the work, fastening forming and inserting devices, means for feeding the stock from which fastenings are made to the same predetermined amount in each cycle of operations, and subsequently operable means for adjusting the feed of the fastening stock to provide a fastening suitable to the controlling characteristics of the work at the point of insertion of the fastening.

24. In a machine of the character described, wire cutting means comprising a block for guiding the wire provided with a hardened end surface to serve as a cutter, means controlled by the work for adjusting the combined guide block and cutter, and a second cutter held constantly in contact with the cutter end of the block so as to move therewith during adjustment and reciprocable across the end of the block to cut the wire.

25. In a machine of the character described, a member against which the work is positioned, a second member movable to clamp the work against the first member and to co-operate therewith in work measuring operations, fastening forming and driving devices, a block for guiding fastening wire stock to said devices, a lever for adjusting the block toward and from said devices, a pivoted member for co-operating with the end of the block to cut the wire stock, and connections between one of the work measuring members and said lever for operating the latter to cause adjustment of the combined wire guiding and cutting block.

26. In a machine of the character described, fastening forming and driving devices comprising a nozzle through which fastenings are driven, an anvil movable to clamp the work against the nozzle and in co-operation therewith to measure the thickness of the work, a guide block for the fastening wire stock having a surface which serves as a cutter for the stock, a cutter carried by the fastening forming and driving devices for co-operation with the end surface of the block, a lever having a cam surface for adjusting the block toward and from the fastening forming and driving devices, and a lost motion connection between the lever and the anvil so arranged that after a predetermined movement of the anvil the latter causes operation of the lever to adjust the combined wire guide and cutter block.

27. In a machine of the character described, fastening forming and inserting mechanism comprising a nozzle through which fastenings are driven, an automatically operated anvil for co-operation with the nozzle in clamping the work and in measuring the latter, feed mechanism operative to feed the same predetermined length

of fastening stock in each cycle of operations, and means for correcting the length of fastening stock fed should such correction be necessary to suit the requirements of the work at the point of fastening insertion.

28. In a machine of the character described, automatically operative work measuring means, fastening inserting and driving devices comprising means for feeding the same predetermined length of fastening stock in each cycle of operations of the machine, and subsequently operable means for correcting the length of fastening stock in accordance with the requirements of the measured work.

29. In a machine of the character described, fastening forming and inserting mechanism comprising a nozzle through which fastenings are driven, an automatically operating member for co-operating with the nozzle in measuring the work progressively with the fastening inserting operations, means for feeding fastening stock to the same predetermined amount in each cycle of operations, and means for correcting the length of fastening stock fed by the feeding means subsequently to the measuring of the work.

30. In a machine of the character described, fastening forming and inserting means comprising a nozzle through which fastenings are driven, an anvil for co-operation with the nozzle in clinching the fastenings in the work and for measuring the work at the point of fastening insertion, means for automatically operating the anvil, means for feeding always the same length of fastening stock at the end of each cycle of operations of the machine, and means operable at the beginning of each successive cycle for correcting the length of fastening stock in accordance with the requirements of the work at the point of fastening insertion.

31. In a machine of the character described, fastening forming and inserting means comprising a wire feed mechanism, a wire severing mechanism, and a mechanism comprising parts between which there is movement to caliper the work and operative to control the wire feed and wire severing mechanisms, the construction and arrangement being such that a portion only of the movement of the calipering parts is effective to determine the length of the fastening.

32. A machine for inserting fastenings through the uppers of shoes and into the upstanding lips or ribs of insoles to secure these parts together comprising fastening forming and inserting means, an anvil operating in an invariable path and co-operating with said means to set the fastening, and a mechanism comprising said anvil and another part be-

tween which there is movement to caliper the work that fastenings may be formed and inserted in accordance with the requirements of the work, the construction and arrangement being such that a portion only of the movement between the work caliper-
 5 ing members is effective to determine the length of the fastening.

33. In a machine of the character described, fastening forming and inserting means comprising a fastening forming member, a cutter adjustable to various positions in accordance with work controlled changes in the character of the fastening, and a second
 10 cutter mounted on the fastening forming member and co-operative with the first mentioned cutter in all of the adjustments of the latter for severing lengths of fastening stock.

34. In a machine of the character described, fastening forming and driving means comprising a cutter adjustable in accordance with the requirements of the work at the point of fastening insertion, and a second
 20 cutter held yieldingly in operative relation to the first mentioned cutter to follow the latter in its adjustments.

35. In a machine of the character described, fastening forming and inserting means comprising fastening stock feeding mechanism operative to feed in each cycle of
 30 operations always the same predetermined length of fastening stock and subsequently operable means for varying the length of the individual fastening in accordance with requirements of the work at the point of insertion of the fastening.

36. In a stapling machine for stapling together by relatively fine wire staples the upper and the channel lip or rib of the sole of
 40 a boot or shoe on a last, staple forming and driving mechanism, means for measuring the combined thickness of the edge portion of the upper and the channel lip or rib at the point of insertion of a staple, and connections between the measuring means and

the staple forming and driving mechanism for determining the length of the staple so that the staples are suited to the variations in the thickness of the parts being secured along each side of the boot or shoe. 50

37. In a stapling machine for stapling together by relatively fine wire staples the upper and the channel lip or rib of the sole of a boot or shoe on a last, staple forming and driving mechanism, and means for
 55 measuring the combined thickness of the edge of the upper and the channel lip or rib progressively with the insertion of staples arranged to control the staple forming and driving mechanism so as to suit the length
 60 of the staples to the measured thickness of the parts being secured along each side of the boot or shoe.

38. In a machine of the character described, means for forming and driving
 65 staples comprising an outside former for bending wire lengths into staple form, a cutter for severing a length of wire for a staple mounted on the staple former to sever the wire in the course of the advance of the
 70 staple former, and a cooperating cutting block automatically adjustable in accordance with changes in the thickness of the work, the arrangement being such that the first
 75 mentioned cutter maintains operative relation with respect to the cutter block in all the positions of adjustment of the latter.

39. In a machine of the character described, staple forming and driving mechanism comprising a cutter block, means for
 80 adjusting the cutter block in accordance with variations in the thickness of the work, and a cutter arranged to be yieldingly held in operative relation to the cutter block to follow the latter in all its various positions
 85 of adjustment.

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

ARTHUR BATES.