No. 628,375. Patented July 4, 1899.

N. S. WAKEFIELD.

SHOE STAPLING MACHINE.

(Application filed Jan. 10, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 2.

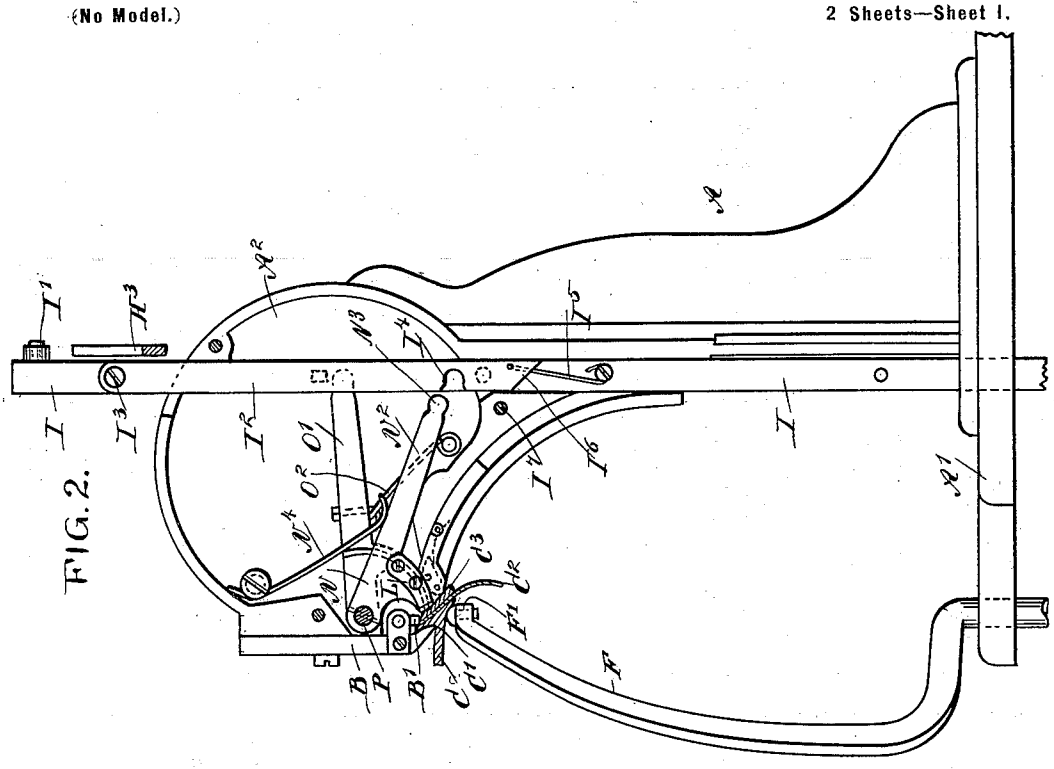
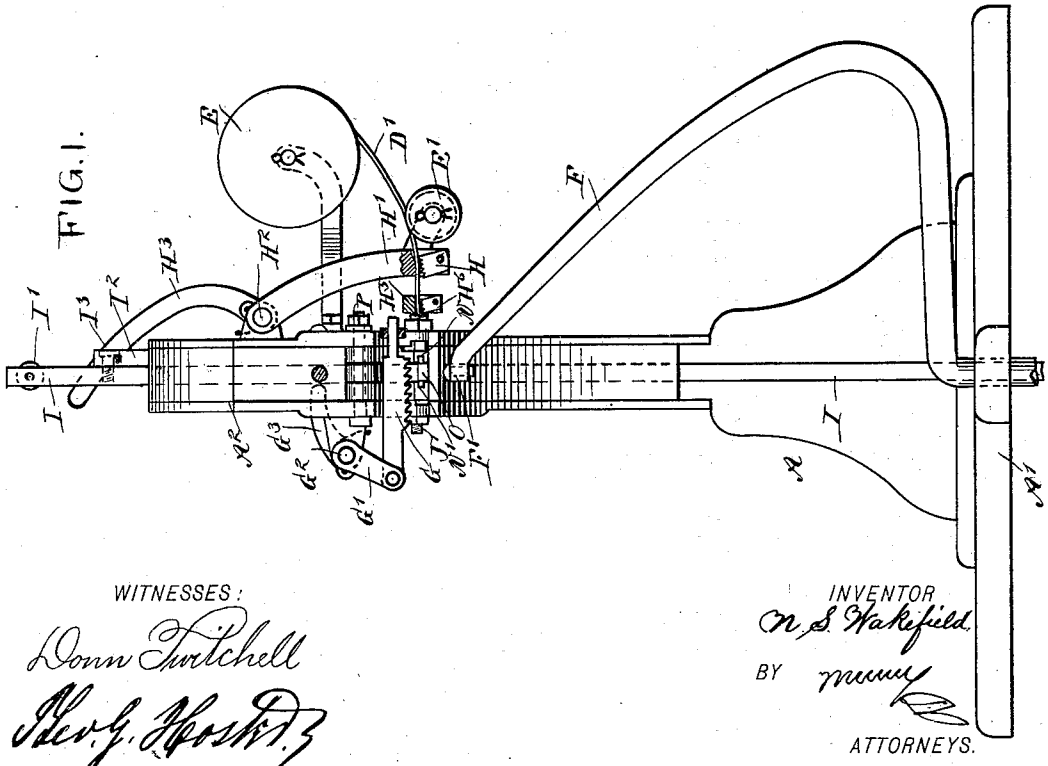


FIG. 1.



WITNESSES:

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FIG. 3.

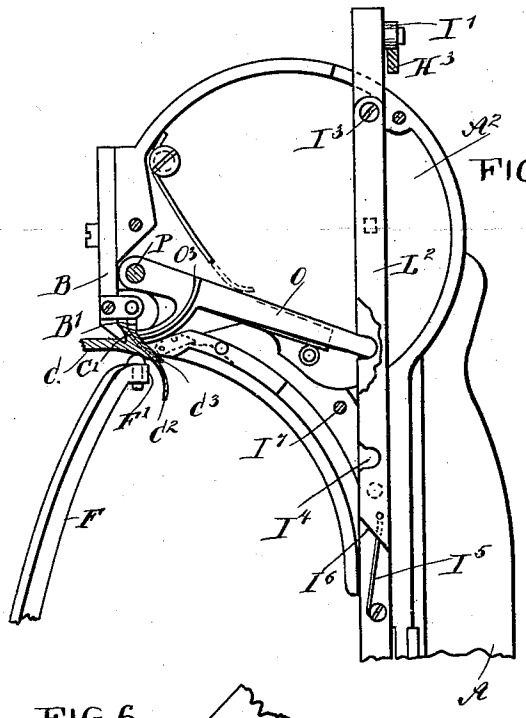


FIG. 4.

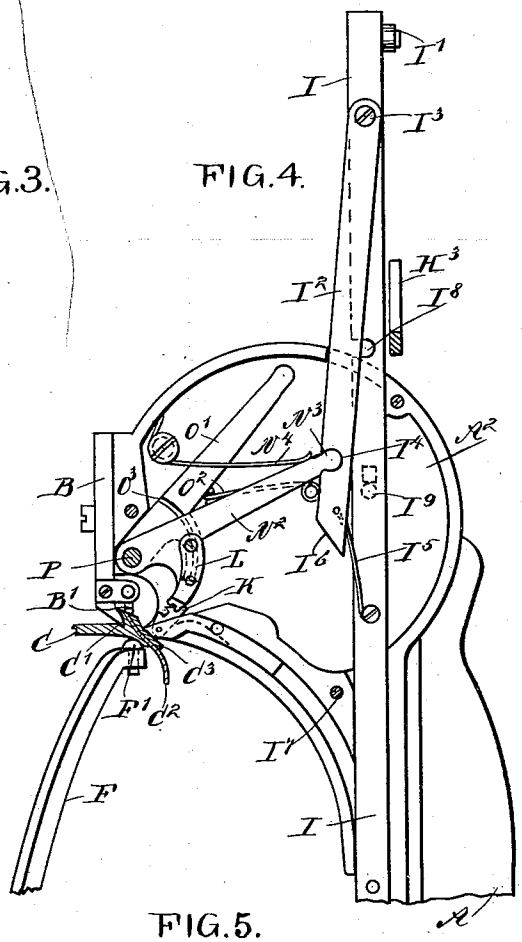


FIG. 6.

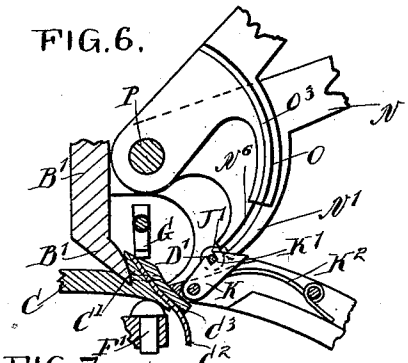


FIG. 5.

FIG. 7.

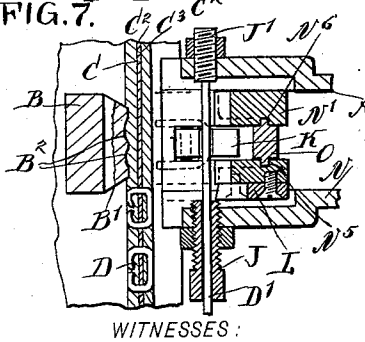
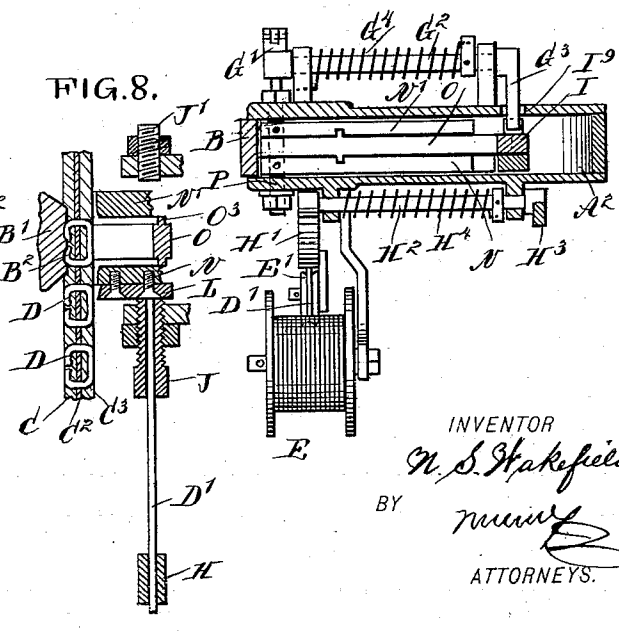


FIG. 8.



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UNITED STATES PATENT OFFICE.

NATHAN S. WAKEFIELD, OF POMONA, CALIFORNIA, ASSIGNOR TO HIMSELF, AND ARTHUR THOMPSON, OF WARNER, NEW HAMPSHIRE.

SHOE-STAPLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 628,375, dated July 4, 1899.

Application filed January 10, 1898. Serial No. 666,198. (No model.)

To all whom it may concern:

Be it known that I, NATHAN S. WAKEFIELD, of Pomona, in the county of Los Angeles and State of California, have invented a new and Improved Shoe-Stapling Machine, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved stapling-machine, more especially designed for connecting the soles of boots and shoes to the uppers of the turns or welts by means of wire, to prevent the shoe or boot from ripping and at the same time render it more flexible than when sewed with waxed thread.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the improvement, with the face-plate detached and parts in section. Fig. 2 is a side elevation of the same, with parts in section and one of the side covers of the head removed. Fig. 3 is an enlarged side elevation of part of the improvement, with parts in section and with the working parts in position for driving the wire home. Fig. 4 is a similar view of the same, with the parts in a raised position. Fig. 5 is sectional plan view of the same. Fig. 6 is a side elevation of part of the improvement, with parts in a different position. Fig. 7 is sectional plan view of the same; and Fig. 8 is a similar view of the same, with parts in a different position.

The improved shoe-stapling machine is mounted on a standard A, provided at its lower end with a base A′, adapted to be fastened to a suitable table or other support, and on the upper end of the said standard is formed a hollow head A^2, supporting at its front a face-plate B, formed at its lower end into an inwardly and downwardly extending anvil B′, adapted to pass into a channel formed in the usual manner on the inside of the sole C, near the outer edge thereof, to produce the channel-flap C′, on which is to be fastened the upper C^2 and the welt C^3 by means of wire staples D, formed from wire D′, arranged in a roll and unwinding from a spool E, carried on a suitable bracket attached to the head A^2.

The under side of the sole C rests on the head F′ of a horn F, mounted to turn in suitable bearings on the base A′, the said head F′ being located directly under the anvil B′ and serving to hold the sole in proper position relatively to the anvil B′ and to a feed-bar G, fitted to slide longitudinally in suitable bearings in the head A^2, the lower edge of said feed-bar being serrated to engage the top edges of the welt C^3 and the upper C^2, as plainly indicated in Fig. 6. The bar G receives a sliding motion, as hereinafter more fully described.

The wire D′ after leaving the spool E passes over a grooved straightening-pulley E′ to a wire-feed consisting of a serrated clamping-pawl H, fulcrumed in a clamping-arm H′, against which the wire is pressed by the said pawl, as will be readily understood by reference to Fig. 1. The pawl H is adapted to pass over the wire to the right without gripping the same; but when moving from the right to the left the pawl grips the wire against the arm H′, so as to draw the same over the pulley E′ from the spool E.

The arm H′ is secured on a shaft H^2, extending transversely, and journaled on one side of the head A^2 and on the said shaft is secured a curved arm H^3, extending upwardly and adapted to be engaged by a friction-roller I′, held on the upper end of a bar I, fitted to slide in suitable bearings in the head A^2 and the standard A to connect with a treadle mechanism or other device for imparting a vertical sliding motion to the said bar. When the bar I moves downward, the friction-roller I′ finally engages the arm H^2, so as to impart a swinging motion thereto to swing the arm H′ to the right, the pawl H gliding over the wire D′, and when the bar I moves upward and the friction-roller I′ releases the arm H^3 then a spring H^4, coiled on the shaft H^2 and connected therewith, returns the said shaft and the arms H′ and H^3 to their former normal position—that is, the arm H′ swings to

the left and by the pawl H carries along the wire D′, so as to feed the same forward into the head A^2 of the machine to form a staple, as hereinafter more fully described. The wire in advance of the arm H′ passes through a holding-arm H^5, likewise provided with a serrated pawl H^6 for holding the wire in place after the feed of the wire by the pawl H and its arm H′ and during the formation of the staple. The extreme forward end of the wire passes through a tube J into the head A^2 of the machine up to a stop J′ in the form of a screw, adjustably held in the left side of the head A^2, as is plainly indicated in Figs. 7 and 8. The piece of wire extending from the inner end of the tube J to the said stop J′ is used to form a staple driven through the welt C^3, the upper C^2, and the channel-flap C′ against the anvil B′, so that the latter turns the ends of the staple toward each other to securely clench the same against the flap C′ in the channel, as plainly indicated in Figs. 7 and 8, the inner edge of the anvil being formed for this purpose with suitable recesses B^2, as plainly indicated in said Figs. 7 and 8. The wire D′ after having been fed into the head A^2 up to the stop J′ passes into a recess K′, formed in a former K, around which the ends of the wire are bent to form the staple, as indicated in dotted lines in Fig. 7, the said former K also holding the wire in place during the time the cutter L cuts off the wire from the piece in the tube J previous to forming the staple.

The cutter L is secured to one side of a segmental plunger N, operating on one side of the former K and in conjunction with a second plunger N′, similar to the plunger N and operating on the opposite side of the former. Between the plungers N and N′ is arranged a pusher O for forcing the staple out of the plungers N N′ and the former K and through the welt C^3, the upper C^2, and the channel-flap C′ to unite the several parts with each other, as hereinafter more fully described.

The plungers N N′ are secured on a shaft P, mounted to turn in suitable bearings in the head A^2, and on the said shaft is loosely fulcrumed the pusher O. The plunger N is provided with an arm N^2, adapted to be actuated by an arm I^2, fulcrumed at I^3 to the sliding bar I. For this purpose the arm N^2 is formed at its free end with a head N^3, adapted to engage a notch I^4, formed in the arm I^2, at the time the sliding bar I is in an uppermost position, and the arm I^2 is pressed forward by a spring I^5, attached to the bar I. A spring N^4 presses on the arm N^2, so as to hold the same firmly in engagement with the said arm I^2 until the latter is caused to swing rearwardly by coming, with its lower beveled end I^6, in engagement with a fixed stop I^7, secured to the standard A. (See Fig. 2.) The bar I is then nearing a lowermost position. The pusher O is likewise provided with an arm O′, adapted to engage a notch I^8, formed in the forward edge of the bar I; but the said arm is connected by a link-spring O^2 with the arm N^2, the said link-spring having one end secured to the arm N^2 and the other end hooked to a pin on the under side of the arm O′, (see Fig. 4,) so as to hold the arms O′ and N^2 normally in an angular position relatively to each other, as indicated in Fig. 4; but when the arm N^2 is swung downward by the action of the downwardly-moving arm I^2, carried on the sliding bar I, then the arm O′ is swung in a like direction by the action of the link O^2, and the free end of the arm O′ is finally moved in engagement with the notch I^8, so that the downwardly-moving bar I positively actuates the arm O′ to impart a downward swinging motion to the pusher O. (See Figs. 2 and 3.)

On the sides of the segmental pusher O are formed ribs O^3, engaging correspondingly-shaped segmental recesses N^5 and N^6 in the adjacent faces of the plungers N N′, which latter on their downward movement engage the ends of the wire D′ cut off by the cutter L and extending between the inner end of the tube J and the stop-pin J′, so that the said plungers force the ends of the piece of wire against the sides of the former K to form the staple, the side bars of which extend in the recesses N^5 N^6 of the plungers N N′ and are consequently segmental in form.

The pusher O on its downward movement moves first in engagement with the outer beveled end of the pivoted former K, so as to swing the same downwardly against the tension of its spring K^2 to cause the said former to move out of engagement with the middle portion of the staple D, now held by its side bars in the segmental recesses N^5 N^6 of the plungers N N′. Upon a further downward movement of the pusher O the lower end thereof comes in contact with the middle portion of the staple and its ribs come in contact with the side bars to push the staple forward and the side bars thereof out of the recesses and to force the staple through the welt, the upper, and the channel-flap to unite the several parts with each other, the outer ends of the staple moving against the curved faces B^2 of the anvil B′ to cause the side bars to bend over in the channel-flap toward each other and close the loop or link now formed for holding the several parts together. (See Figs. 7 and 8.) When this operation has been completed, the operator causes the bar I to slide upward to return the several parts to their previous position, it being understood that during this upward movement of the bar I the feed G is actuated to shift the sole C over the head F′ of the horn F and bring a new place in alinement with the plungers and pusher for receiving a second staple D upon repeating the operation previously described.

In order to impart the desired movement to the feed G, I secure one outer end of the feed G to a link G′, secured on the forward end of a transversely-extending shaft G^2, journaled in suitable bearings in the side of the

head A^2 opposite to the shaft H^2, as shown in Figs. 1 and 5. On the rear end of the shaft G^2 is secured an arm G^3, adapted to be engaged by a pin I^9 upon the return movement of the bar I, so as to impart an upward swinging motion to the arm G^3 to turn the shaft G^2 and to cause the link G′ to push the feed G from the left to the right to feed the sole C, the upper C^2, and the welt C^3 over the horn F to the right, for the purpose previously mentioned.

On the shaft G^2 is secured one end of a spring G^4, attached at its other end to one of the bearings of the said shaft, so as to return the feed G during the downward movement of the bar I. During the first downward movement of the bar I the feed G for the wire D′ is moved to take a new grip on the wire near the spool E, and when the bar I moves upward the spring H^4 returns the feed and pushes the end of the wire up against the stop J′, as previously described. During the next downward movement of the bar I a swinging motion is given by the arm I^2 to the arm N^2, and consequently to the two segmental plungers N N′, so that the cutter L first cuts off the wire at the inner end of the tube J and then the plungers engage the ends of the wire on opposite sides of the former K, so as to bend the wire into staple form and at the same time give a segmental shape to the side bars of the staple. Upon a further downward movement of the bar I the pusher O engages the middle portion of the staple and the side arms to push the staple out of the plungers N N′, which now rest against the welt C^3 and cause the side bars of the said staple to pass through the welt C^3, the upper C^2, and the channel-flap C′ and come in contact with the curved or recessed parts of the anvil B′ to bend the side bars toward each other, so as to clench the staple in the channel of the insole and securely unite the several parts with each other. During the return stroke of the bar I the plungers N N′ and the pusher O are returned to their former position, while the feed G is actuated also to move the end of the wire D′ into the head A^2 against the stop J′. The above-described operation is then repeated.

From the foregoing it is evident that the machine may be used for other purposes besides stitching shoes—for instance, in harness-work, stitching binding on rugs and carpets, and other heavy fabrics.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A shoe-stapling machine provided with a pair of segmental oscillating plungers for forming a piece of wire into a curved staple and for abutting against the welt while the staple is driven through the welt, the upper and the channel-flap of the sole, and an oscillating pusher or driver operating between the said plungers and engaging the middle portion of the staple to drive the side bars of the staple through the welt, the upper and the channel-flap, substantially as described.

2. A shoe-stapling machine, comprising a pair of oscillating plungers having segmental grooves, a pivoted former having a slot or groove for supporting a piece of wire at the middle portion, the former being arranged between the said plungers with the ends of the wire in the path of the said segmental grooves, to cause the plunger to bend the wire into a staple with the curved side bars thereof in the segmental grooves, and a pusher or driver oscillating between the plungers and following the same to swing the former out of position for releasing the staple and for forcing the side bars of the staple out of the plungers and through the parts to be united, substantially as shown and described.

3. A shoe-stapling machine, comprising a pair of oscillating plungers having segmental grooves, a pivoted former having a slot or groove for supporting a piece of wire at the middle portion, the former being arranged between the said plungers with the ends of the wire in the path of the said segmental grooves, to cause the plungers to bend the wire into a staple with the curved side bars thereof in the segmental grooves, and a pusher or driver oscillating between the plungers and following the same to swing the former out of position for releasing the staple and for forcing the side bars of the staple out of the plungers and through the parts to be united, the said pusher being formed on its sides with ribs in engagement with the said segmental grooves in the plungers, substantially as shown and described.

4. A shoe-stapling machine provided with a slidable bar, an arm fulcrumed thereon, plungers for carrying the staple adapted to be actuated from the said arm to abut against the welt, and a pusher actuated from the said arm subsequent to the movement given to the plungers to force the staple from the plungers and into the parts to be united, substantially as shown and described.

5. A shoe-stapling machine provided with a slidable bar, an arm fulcrumed thereon, plungers for carrying the staple adapted to be actuated from said arm to abut against the welt, a pusher actuated from the said arm subsequent to the movement given to the plungers to force the staple from the plungers and into the parts to be united, and an anvil opposite the plungers and pusher to clench the staple, substantially as shown and described.

6. A stapling-machine, provided with a slidable bar, an arm fulcrumed thereon, plungers mounted to swing and adapted to be actuated from the said arm, a pusher mounted to swing between the said plungers, and adapted to be actuated from the said bar after the plungers are released from the said arm, and a spring-pressed pivoted former on which the staple is formed by the said plungers, the former be-

ing adapted to be engaged by the said pusher to release the staple, substantially as shown and described.

7. A stapling-machine, provided with a slidable bar, an arm fulcrumed thereon, plungers mounted to swing and adapted to be actuated from the said arm, a pusher mounted to swing between the said plungers, and adapted to be actuated from the said bar after the plungers are released from the said arm, a spring-pressed pivoted former on which the staple is formed by the said plungers, the former being adapted to be engaged by the said plunger to release the staple, and a knife carried by one of the said plungers, to cut the wire in the former to the desired length, substantially as shown and described.

8. A stapling-machine, provided with a slidable bar, an arm fulcrumed thereon, plungers mounted to swing and adapted to be actuated from the said arm, a pusher mounted to swing between the said plungers, and adapted to be actuated from the said bar after the plungers are released from the said arm, a spring-pressed pivoted former on which the staple is formed by the said plungers, the former being adapted to be engaged by the said pusher to release the staple, and a feed mechanism controlled by said bar for feeding the wire to said former upon the return movement of the said plungers and pusher, substantially as shown and described.

NATHAN S. WAKEFIELD.

Witnesses:
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J. H. PARKER.