

A. L. RUSSELL.
MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.
APPLICATION FILED AUG. 8, 1907.

1,033,946.

Patented July 30, 1912.

4 SHEETS—SHEET 1.

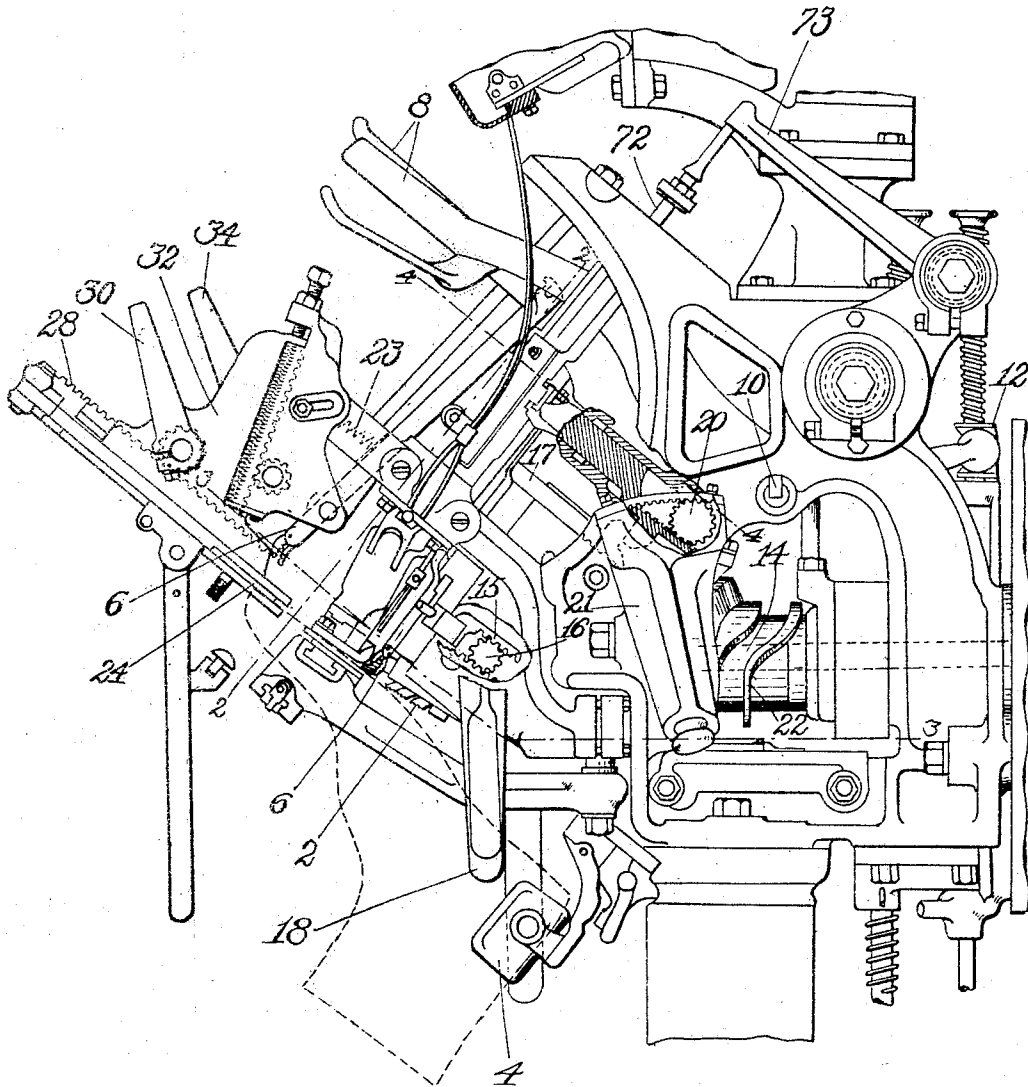


Fig. 1.

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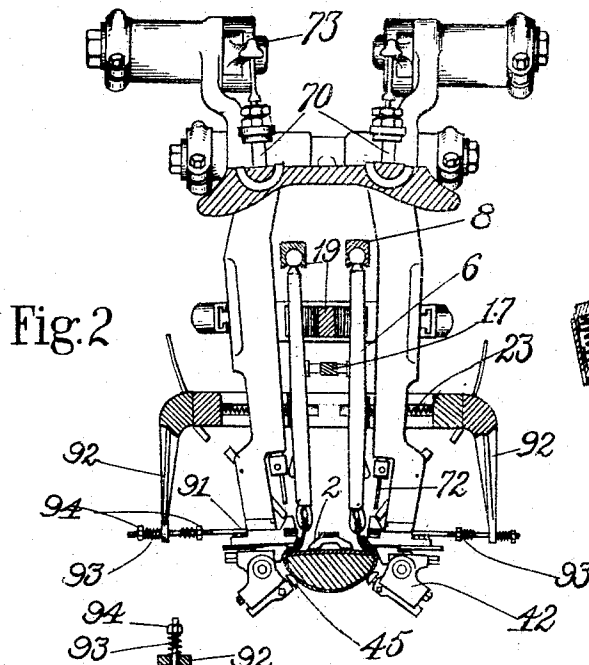


Fig. 2.

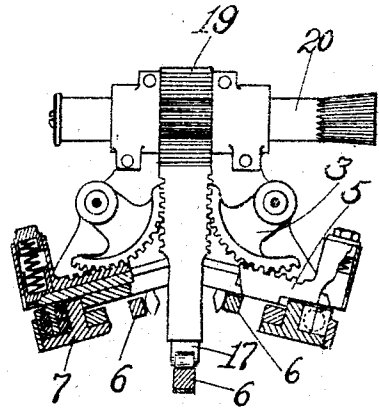


Fig. 4.

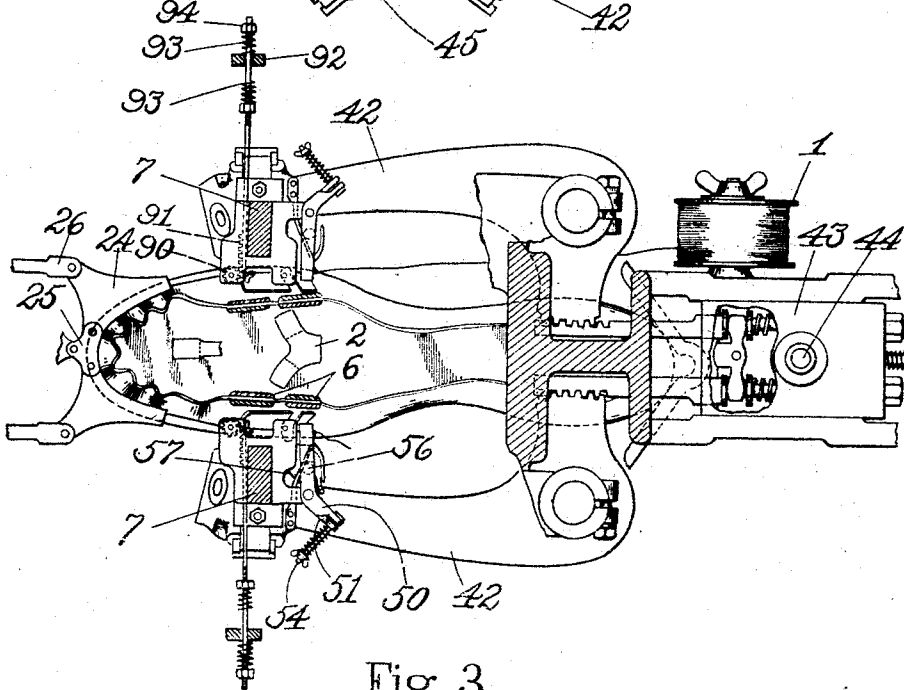


Fig. 3.

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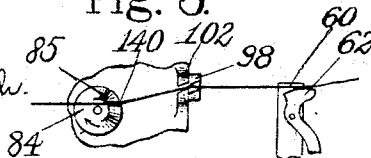


Fig. 9.

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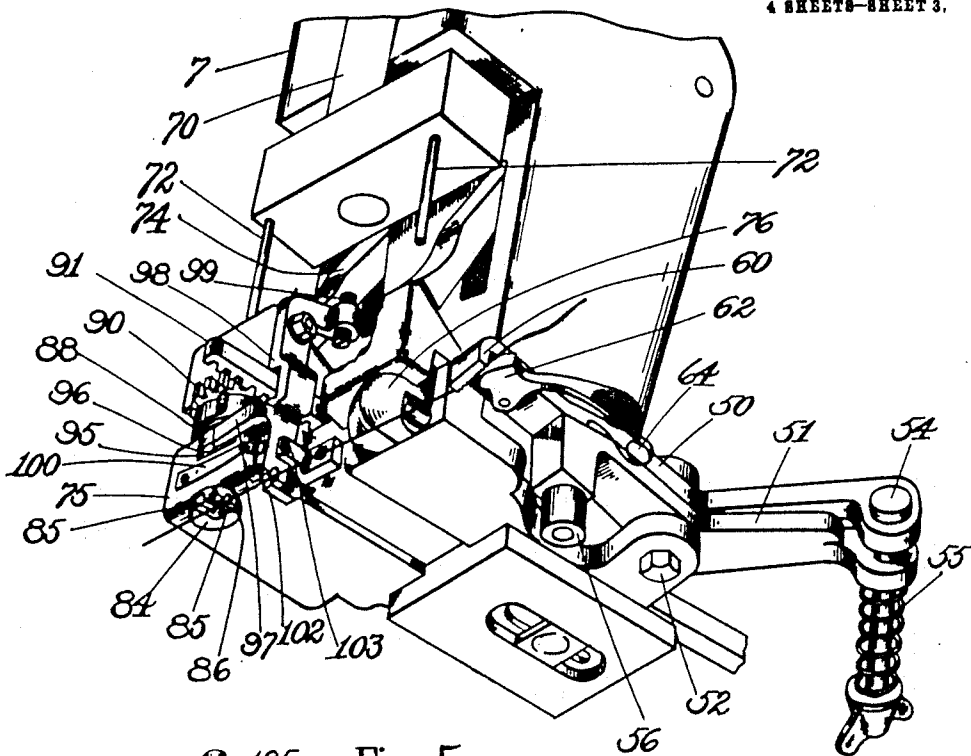


Fig. 5.

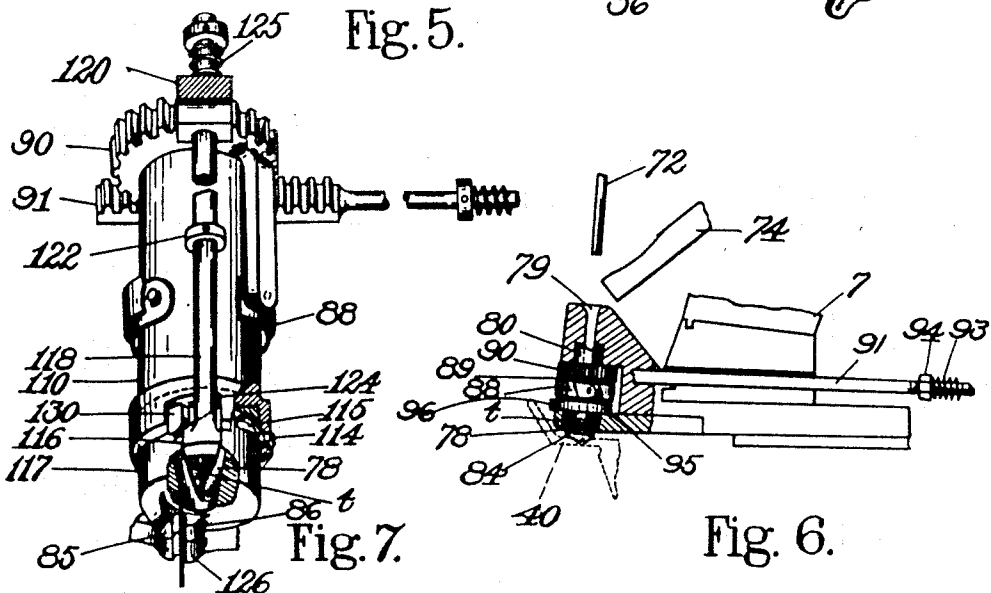


Fig. 6.

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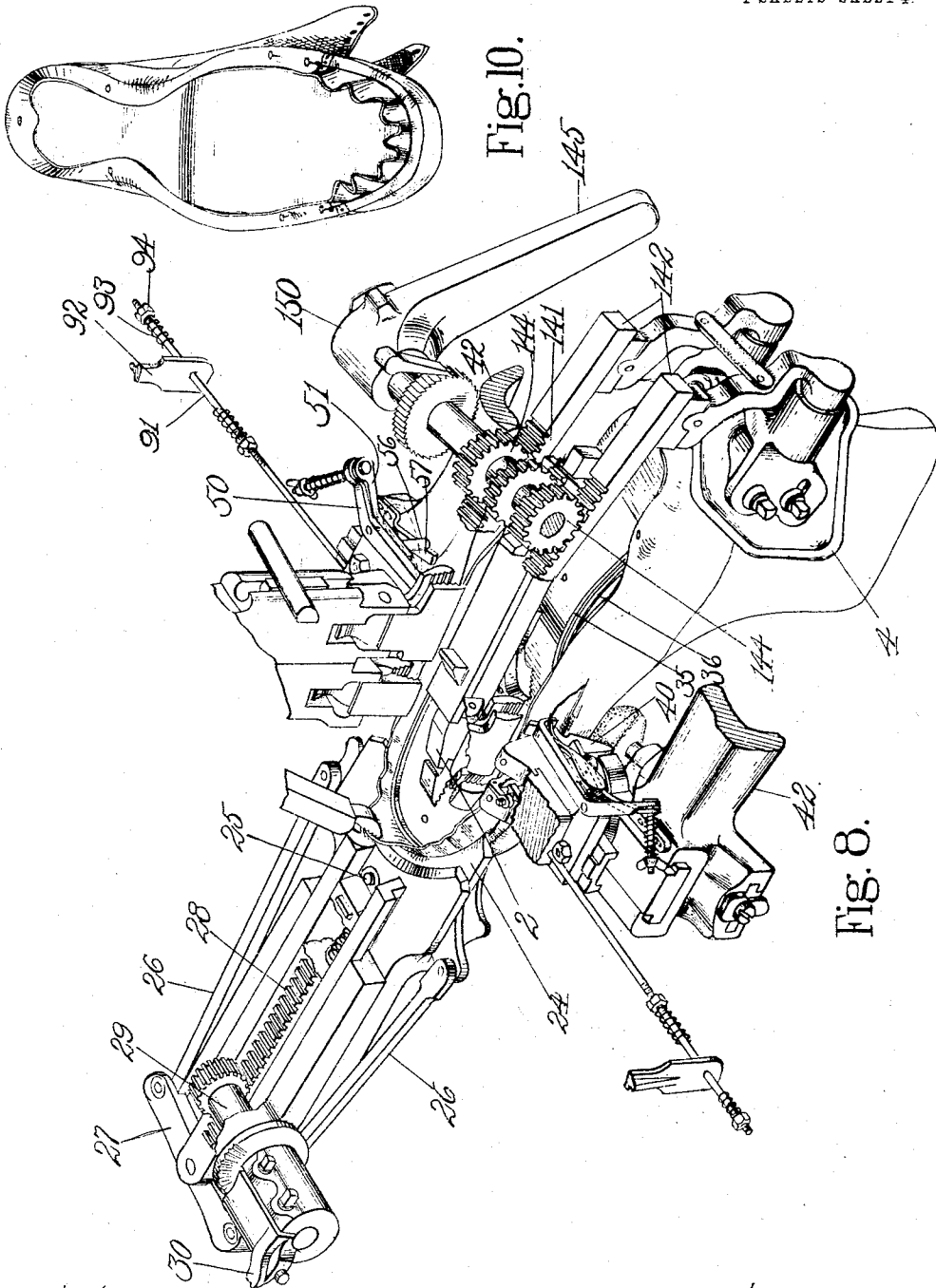
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4 SHEETS-SHEET 4.



WITNESSES:
Charles E. Grush.
James R. Hodder.

INVENTOR.
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UNITED STATES PATENT OFFICE.

ARTHUR L. RUSSELL, OF HYDE PARK, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR USE IN THE MANUFACTURE OF BOOTS AND SHOES.

1,033,946.

Specification of Letters Patent.

Patented July 30, 1912.

Application filed August 8, 1907. Serial No. 387,613.

To all whom it may concern:

Be it known that I, ARTHUR L. RUSSELL, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Use in the Manufacture of Boots and Shoes, 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 the manufacture of boots and shoes and particularly to machines employed in working an upper over a last and securing the upper in overworked position.

An object of the invention is to provide mechanism for anchoring to a shoe a binder of continuous material adapted for use in securing a portion of the shoe, as a portion of the shoe upper at the toe, in lasted position.

One important feature of the invention consists in means for manipulating a binder to secure it to a shoe. In the illustrated embodiment of the invention the binder consists of wire or similar material and while it is held under tension it is acted upon by devices which bend it about the shank of a tack sufficiently to hold the binder from pulling back to release the stock bound by it. Preferably the bending means operates automatically and, as shown, the binder is wrapped or twisted by said means about the shank of the tack in a manner to fasten it securely; but it might be merely bent around the tack by the automatically operating means to an extent to prevent it from pulling back until opportunity was given for further fastening it.

A further feature of the invention consists in the combination with means for driving a tack, of means for anchoring a binder to the driven tack. As shown, the tack is driven and the binder bent about the shank by devices which are operatively connected, so that the fastening of the binder follows the driving of the tack without intervention by the workman. Preferably the binder is bent about the shank of the tack, or the bending is commenced, while the tack is being inserted, so that the binder is frictionally engaged with and carried downwardly toward and preferably into contact with the

stock by the ingoing tack. By this arrangement there is believed to be less liability of the binder slipping back by reason of the tension of the work.

Another important feature of the invention consists in the combination with means for manipulating a strand of binder material to anchor it, of means for cutting the binder from the strand. As shown, the binder is formed from a strand of wire and while it is held under tension it is cut from the strand and its end portion is bent about a tack to anchor it. This is preferably accomplished without loosening the tension or any substantial portion of the tension with which the binder holds the stock. Preferably the binder is cut between the tack and the holding means, and this may take place during the bending operation, or after the wire has received a preliminary bend about the shank of the tack by which it is restrained from pulling back.

It is an important characteristic of this invention that the bending or twisting of the wire about the tack is performed very quickly, so that opportunity is not given for the wire to pull back between the cutting operation and the time when it will be sufficiently bent about the tack to hold it.

It is also a feature of this invention that means is provided for securing both end portions of the binder simultaneously to tacks at opposite sides of the last. The binder is preferably drawn into holding position about the forward portion of the shoe by pulling upon its opposite ends so that it may be put under the same tension at both sides of the shoe, and it is then fastened simultaneously at the two ends while the tension is maintained.

The invention is herein shown as embodied in a pulling-over and lasting machine, and a feature of the invention is found in the combination with means for working an upper over a last, of means for manipulating a binder to anchor it to a tack or the like for securing it in position to hold the upper in overworked relation to the last. It is to be understood, however, that while the invention is herein shown as applied to a combined pulling-over and lasting machine for which the illustrated construction has been particularly arranged the invention is not limited to use with such a machine nor is it limited to use in connection with any

other machine should it be preferred to employ it independently.

These and other features of the invention, including certain details of construction and combination of parts, will be explained in the following description and will be particularly pointed out in the annexed claims.

Figure 1 is a side elevation of a machine equipped with the present improvements. Fig. 2 is a transverse section on approximately the line 2—2 in Fig. 1. Fig. 3 is a transverse section on approximately the line 3—3 in Fig. 1. Fig. 4 is a transverse section on approximately the line 4—4 in Fig. 1. Fig. 5 is a perspective view of the tack carrying arm located at the left-hand side of the machine, showing the parts which are supported by that arm, including the parts directly associated with the present invention. Fig. 6 is a vertical section through one tack block, showing the parts concerned in driving a tack and bending the binder. Fig. 7 is a perspective view of a modification. Fig. 8 is a perspective view in which appears the bottom face of a shoe in operative relation to the devices for working the upper over the last and binding it. Fig. 9 shows diagrammatically a modified arrangement. Fig. 10 is a perspective view of a shoe as it is discharged from the machine.

The machine comprises a sole rest 2 against which the shoe is presented in inverted position, as indicated in Figs. 1 and 8. Grippers 6 are arranged at opposite sides of the shoe and at the toe and are connected pivotally to levers 8 by which the gripper jaws are closed and then uplifted for pulling the upper. The levers are pivoted at 10 and each yieldingly connected, as at 12 in Fig. 1, to a slide which is actuated by a cam on the main shaft 14. The front ends of the levers are formed as handles by which any gripper may be manually moved up or down for adjusting the upper. The side grippers may also be moved forwardly or backwardly by a connection through a rack bar 15 with a shaft 16 having a handle 18. The grippers are held separated a suitable distance while the upper is being pulled by a slide 17, see Fig. 1, having inclined sides, as shown in Fig. 2. A stud on the rear end of the slide is engaged by a stud on another slide 19 which is controlled by a toothed shaft 20 and a lever 21 which engages a cam 22 on the main shaft 14. Springs 23 press the grippers inwardly to carry the upper over the last bottom when the slides are retracted. The slide 19 has rack teeth on its edges which engage toothed segments 3 that mesh with rack bars 5. The bars have operative yielding connection with arms 7 that are pivotally suspended from the machine frame to swing toward and from the sides of the shoe and

carry the tack inserting mechanisms. These parts of the machine and other parts of the pulling-over mechanism which do not appear to be necessary to describe for the purpose of explaining this invention may, except as hereinafter particularly mentioned, be substantially as in United States Letters Patent No. 663,777, granted on the application of Ronald F. McFeely, to which reference may be had for a complete understanding of the machine and its operations.

After the upper has been pulled into conformity with the general contour of the last and adjusted into the desired relation to the last it is worked into lasted position by mechanism comprising wiper plates 24, connected directly at 25 and indirectly through links 26 and bar 27 with a rack slide 28, which is engaged by a pinion on the shaft 29, that has a hand lever 30 by which the plates may be actuated for wiping the upper into lasted position over the innersole. The plates are preferably mounted in a vertically movable carrier 32 connected by a rack and pinion as indicated in Fig. 1 with a hand lever 34 by which the plates may be moved up and down. The plates also preferably have their acting edges formed and arranged to force the upper into the angle of union between the lip 35 and the feather edge 36 of the innersole. At the sides of the shoe the upper is worked into lasted position by pressers 40, which are mounted on carriers 42 that are shown in Fig. 3 as angle levers connected to a slide 43 having a stud 44 that stands in a groove of the cam block 22 on the main shaft. The carriers 42 also having cushions 45 for sustaining the last against the impact of the tack drivers.

The mechanism thus far described is substantially like that more fully explained and shown in the description and drawings of British Patent No. 12,304/03.

Means is provided at each side of the machine for supporting an end portion of a section of binding material that extends about the forward portion of a shoe, as shown in Figs. 3 and 7. Each binder support comprises, as shown in Figs. 3 and 5, a gripper or clamp formed on one arm of an angle lever made of the two members 50, 51. These members are pivoted at 52 to a projection from the rear side of the tack carrying arm and their adjacent rear arms are yieldingly connected by a rod 54 encircled by a spring 55. The front arm of the lower member, 51, carries a roll 56 adapted by its engagement with a cam or incline to transmit movement yieldingly for rocking the upper member, which carries the binder clamp, rearwardly or toward the right in Fig. 3. The incline or cam, cooperating with the roll 56, is herein shown as comprising a stiff leaf spring 57 which is secured to the carrier 42 in position to be engaged by

the roll 56 for rocking the binder support as the tack carrying arm moves toward the shoe. The clamp, which is carried by the upper member 50, comprises a rigid jaw 60
5 formed on that member and a pivoted jaw 62 which is rocked by the spring 64.

The binder, passing from the supporter on one side of the last, around the forward portion of the shoe to the supporter at the
10 other side of the last, is positioned in a predetermined relation to mechanism for driving tacks. These tack driving mechanisms, carried by the arms 7, are each shown to
15 comprise means for inserting two tacks at each side of the shoe. The mechanism illustrated in Fig. 5 includes a driver bar 70 with two drivers 72, which are actuated
20 downwardly by levers 73, Figs. 1 and 2, impelled by usual springs, and are uplifted and tripped by suitable devices which may be the same as those shown for the same
25 purpose in the Letters Patent mentioned. The tacks are delivered by conductors 74 into tack holders 75, 76. The holder 76 may be of any usual construction. The holder
30 75, which is associated with the mechanism for manipulating the binder to secure it to the tack driven from the holder, comprises spring fingers 78 between which the tack is
35 suspended after having been delivered through the opening 79, as shown in Fig. 6. The spring fingers are supported between the lower end of a tube 80 and a bending
40 device 84 which is removably secured in the tube. The bending device comprises a rotatable block, through which the tack is driven, having binder engaging means, shown as shoulders 85, between which the
45 binder is guided on its way from the clamp toward the forward end of the shoe. The shoulders 85 are so located that they position the binder in definite lateral relation to the tack driven from the supporting
50 fingers. The shoulders are also so located in the rear of the tack that when the bending device is turned the end portion of the binder will be bent about the shank of the tack and, if the turning movement is continued far enough, will be wrapped or
55 twisted about the tack as shown in Fig. 10. The outer side of that shoulder 85 which is in advance as the device rotates may advantageously be beveled, as at 86, to insure that the shoulders shall ride over the binder as they meet it in their rotary movement.

The tube 80 is loosely mounted in the tack block to rotate freely, being supported at its lower end by a projection from the block as
60 appears in Fig. 6. The tube is embraced by a strong flat spiral spring 88, the inner end of which is secured to it while the outer end is secured to a depending arm 89 of a pinion 90 that turns freely upon the tube
65 in the direction to twist the wire around the shank of the tack. The pinion 90 is suit-

ably supported and is engaged by a rack bar 91, as shown in Figs. 2, 3, and 5, for winding up the spring. This movement of the rack bar to wind the spring takes place during the movement of the tack carrying arms
70 7 toward the shoe in each operation of the machine and is effected by a fixed stop 92 depending from the machine frame and embracing the rear end of the bar, as appears in Figs. 2 and 3. A spring 93 is interposed
75 between the stop 92 and an adjustable nut 94 on the stem of the rack bar. The tube also carries a collar 95 which is rigidly secured to it and has a recess 96 that is engaged by a pawl or tripping device 97 on
80 a swinging lever 98, which is pivoted to the tack block 75 and has an adjustable contact piece 99 that stands in the path of the driver head. A spring 100 holds the tripping device in position to engage the recess
85 in the collar. The arrangement is such that as an arm 7 is moved inwardly by the mechanism shown in Fig. 4 the rack bar 91 is actuated to turn the pinion and wind up the spring which is restrained from turning
90 by the engagement of the pawl 97 in the recess 96 in the collar 95. The parts thus reach their operative position over the shoe with the spring 88 under tension ready to actuate the bending device when the tripping
95 device 97 is withdrawn from the recess in the collar 95. When the drivers descend the lever 98 is rocked to withdraw the tripping device and allow the spring to rotate the tube and bending device in the direction to bend the binder around the tack.
100 The tripping takes place during the descent of the driver at a time determined by the adjustment of the contact piece 99 and preferably the binder will be bent about the tack
105 as the latter is going into the stock so that the binder is carried down against the stock by the tack. The binder extends through a notch or guide in a fixed shear blade 102, located in the rear of the bending device,
110 and through a notch in the lower end of the lever 98 which serves as a movable shear blade. The movable blade is guided between the fixed blade and a plate 103 to prevent it from being forced away from the
115 fixed blade by the pressure of the spring 88. The notches in the blades permit the movement of the lever 98 to free the tripping device from the bending means at the same time or before the binder is cut. Preferably the bending means will be set free
120 first and will begin to turn and bend the binder somewhat before the binder is severed from the end portion of the strand which is held in the clamp. The arrangement shown provides for a very quick movement of the bending device by its strong
125 spring when it has been set free so that the binder will be sufficiently bent about the tack to hold it against backward movement 130

before the holding tension on the binder will have been lost.

In the use of the invention as embodied in the construction illustrated in the main figures, a shoe comprising an innersole, or a sole, and upper materials assembled on a last is presented in the position shown in Fig. 1 with the innersole against the sole rest 2 and the heel end against the heel rest 4, and the edge portion of the upper between the jaws of the grippers. The machine is started by mechanism which may be the same as that shown in United States Letters Patent No. 791,986, and is arranged to stop the machine automatically at predetermined periods in its cycle of operation. During the first actuation of the machine the grippers seize and pull the upper into conformity with the general shape of the last. During the following rest in the machine's operation the workman adjusts the upper by moving the grippers manually through the handle 18 and the levers 8 as may be necessary to position it properly upon the last. The machine may then be restarted whereupon the grippers will carry the upper over the last bottom and the pressers will be closed over the sides of the shoe as in Fig. 3. The workman will then use the lasting plates to work the upper of the toe portion of the shoe into lasted position, as shown in Figs. 3 and 8. The binder clamp located near the reel 1 will then be opened to permit the strand of binding material to be drawn through it and passed about the forward portion of the shoe, as in Fig. 8, the lasting plates being raised slightly by the hand lever 34 to permit the binder to enter the seat formed for it by the lasting plates in the upper adjacent to the angle of union between the lip and feather edge of the innersole. The free end of the binder will be drawn into the clamp on the second side of the shoe which will be closed by its spring 64 when the binder has been positioned without slack about the forward portion of the shoe. The machine may then be started again and the tack carrying arms 7 with the parts supported by them will be moved inwardly to the position shown in Figs. 2 and 3, carrying the binder into position over the shoe bottom at the sides of the shoe. Preferably, the arms 7 are so guided in the frame of the machine during their inward movement, as will be understood from Fig. 4, that they move rearwardly as well as inwardly and thus pull the binder backwardly from the toe end of the shoe. This gradual pulling of the binder takes place during the entire inward movement of the arms by which the binder is carried into holding position at the sides of the shoe. Also in the last portion of this inward movement of the arms 7 with the binder clamps the rolls 56 of the angle levers engage the inclines

57 and are rocked to retract the clamps for drawing the binder tightly into its place for holding the upper in overworked position in the angle of union between the feather edge 36 and the lip or shoulder 35 of the sole or innersole. The inclines 57 being formed by springs yieldingly effect the tightening of the binder and if the lasting plates 34 are advanced to press the binder into its holding position or seat it the spring inclines expand to take up any of the binder that may thus be forced rearwardly. During the inward movement of the arms 7 the stops 92 detain the rack bars and the pinions traveling over the bars wind up the springs 88 while the bending devices are held from turning by the pawls or tripping devices 97. As the drivers descend to insert the tacks from the tack holders each driver head strikes a contact piece on the adjacent lever 98 and turns that lever to withdraw the tripping device 97 from the recess in the collar 95 to permit the spring 88 to rotate the bending device 84. In this rotation the binder is acted upon by one of the projections 85 and bent about the shank of the tack as a fulcrum. The movement of the lever 98 also causes the binder to be cut from its end portion, or the end portion of the strand, which is held in the clamp. Preferably the cutting does not take place until after the release of the bender so that there is no interval during which the binder might slip back to relax its hold upon the upper. The extent to which the binder is bent about the tack may vary. It should always be bent enough to hold it until opportunity is given, when the shoe has been discharged from the machine, for example, to secure it further. Preferably, however, the binder is wrapped or twisted about the shank of the tack through an angle of about 270 degrees more or less, as shown in Fig. 10. If the bending takes place during the insertion of the tack the binder is carried down close to the upper by the ingoing tack and is held more securely. When the driver rises the tripping device 97 is returned by its spring 100 toward position to engage in the recess in the collar 95. In the outward movement of the arm 7 a spring 93 and nut on the rack bar 91 engage against the stop formed by the depending arm 92 and the pinion 90 together with the spring 88 and the bending device are turned backwardly until the pawl 97 engages in the recess in the collar 95. The spring 93 yields after the rotation of the parts is checked by the pawl 97.

In Fig. 7 there is shown a slightly modified construction in which the tube 110, which is directly connected to the spring 88 and through the spring with the pinion 90 and rack bar 91, is arranged to have a movement relative to the bending device 117 during the first part of the unwinding of the

spring 88. By this arrangement the bending device is actuated by an impact to inaugurate its turning movement. To this end the tube receives the upper end of the bending device and is provided with a pin 114 which projects into a slot 115 in the bending device and forms the connection for holding the two parts together and the means through which the tube turns the bender. A pawl or tripping device 116 engages the tube to hold it from rotation when the spring 88 is being wound up. The tripping device is carried on a rod 118 that is vertically movable in fixed guides, not shown, and slides in a block 120 that may be attached to the driver bar. The rod also has a stop 122 in the form of an adjustable collar for engagement by the block 120 to force the rod downwardly and the tripping device out of its recess 124 in the lower edge of the tube. The block 120 acts through a spring 125 to raise the tripping device when the driver rises and hold the device yieldingly against the lower edge of the tube when it is not in the recess 124. One of the projections 85 of the bending device 112 forms a shear blade cooperating with a fixed cutter 126 to sever the wire while bending it. In the use of this embodiment of the invention the tripping device is forced out of the recess during the descent of the driver. This permits the spring 88 to turn the tube 110 which is free to move and meets with no resistance until the pin 114 has traversed the slot 115. The tube thus has opportunity to attain considerable velocity under the influence of the unwinding spring and with its momentum sets the bending device quickly into motion. This arrangement provides that the bending device shall act with an impact or blow first to cut the binder and then to bend it about the tack stem. The tube is provided with a stop 130 which by contacting with the tripping device may prevent the bender from making more than a single rotation. This stop also serves, when the bender during the outward movement of the arm 7, is reversely rotated into position for the tripping device to enter the recess 124, to cooperate with the inclined face of the tripping device in forcing the bending device into the relation to the tube shown in Fig. 7 in which the pin 114 occupies the right hand end of the slot 115. In Fig. 9 is shown a modified arrangement of the bending device with relation to the binder and the cutting devices by which the binder in its course toward the cutter device is sharply bent about the outer edge of the shoulder 85 against which the binder is carried in bending it about the tack. By this arrangement a bend in the nature of a hook is formed at 140 which will by its engagement with the shoulder 85 after the binder is cut from the strand, assist in hold-

ing the binder from slipping back until it has been sufficiently bent about the shank of the tack to hold it.

Means may be provided for moving the shoe with relation to the binder for tightening the binder about the forward portion of the shoe into holding engagement with the upper. As shown, the sole rest, see Fig. 8, and the heel rest are connected through racks 141, 142 and pinion 144 with a hand lever 145 by which the rests may be moved forwardly. This actuating mechanism of the machine, to which the present improvements are shown as applied, is fully illustrated and described in said British Patent No. 12,304/03.

The binding material herein shown is wire and it is anchored by bending it about a tack. For convenience the term "wire" or "wire binder" is used in many of the claims but it is to be understood that where the context permits any suitable continuous material is to be covered by the term; likewise it is to be understood that "bending" the binder about a "tack" is to include any suitable manipulation of the binding material to anchor or fasten it to a tack or other projection on the work.

Separate means are herein shown for working the upper over the last and for positioning the binder. Lasting devices, such as wipers, arranged to carry a binder have previously been proposed and it is obvious that many of the features of this invention can be employed in connection with combined overworking and binder carrying means. It will, therefore, be understood that the protection sought by the claims at the end of this specification is not limited to separate overworking and binder carrying means except as the prior art may require.

Having explained the nature of the invention and fully described one embodiment thereof and the manner in which it may be used, I claim as new and desire to secure by Letters Patent of the United States:—

1. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for fastening to a tack carried by the shoe a binder in position to hold the upper in overworked relation to the last.

2. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for tightening a binder into position to hold the upper in overworked position, and means for fastening the binder to a tack carried by the shoe.

3. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for holding a wire binder under tension about the overworked upper and fas-

tening it about a tack for holding the upper in overworked position.

4. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for twisting the end of a binder about a tack in position to hold the upper in overworked relation to the last.

5. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for forcing a binder into position to hold the upper in overworked relation to the last, and means for automatically manipulating the binder to fasten it in securing position.

6. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for tightening a binder into position to hold the upper in overworked relation to the last and means for twisting the binder about a tack to secure it.

7. In a machine of the class described, the combination with means for working an upper over the forward portion of a last, of means for bending an end portion of a binder about a tack to anchor the binder to the shoe.

8. In a machine of the class described, the combination with means for working an upper over the forward portion of a last into position to be held by a binder, of means for bending the opposite end portions of the binder simultaneously about tacks at the sides of the shoe to secure the binder in holding position.

9. In a machine of the class described, the combination with means for working an upper over the forward portion of a last into position to be held by a binder, of automatically operating means for bending the binder about a tack.

10. In a machine of the class described, the combination with means for working an upper over the forward portion of a last into position to be held by a binder, of automatically operating means for bending the opposite end portions of the binder about tacks at opposite sides of the shoe.

11. In a machine for use in the manufacture of shoes, means for holding a binder under tension, and means constructed and arranged for bending the binder about the shank of a tack in the shoe bottom to anchor the binder.

12. In a machine of the class described, means for working an upper over a last into position to be secured by a binder and independent means for manipulating the binder about the shank of a tack in the shoe bottom to anchor the binder.

13. In a machine of the class described, means for pulling a binder of wire into posi-

tion to hold an upper in lasted relation, automatically operating means for bending the binder about a tack to anchor the binder while maintaining the tension on the binder.

14. In a machine of the class described, means for driving a tack, and means for bending a wire about the tack to anchor it.

15. In a machine of the class described, the combination with tack driving means, of wire twisting means for anchoring a wire to the tack.

16. In a machine of the class described, means for driving a tack, and a holder for a binder of wire, said machine having provision for automatically bending the wire about the tack to secure the wire.

17. In a machine of the class described, the combination with means for holding a binder under tension, of means constructed and arranged to twist the binder about a tack while the binder is continued under tension.

18. In a machine of the class described, the combination with means for holding a binder under tension about the forward portion of a shoe, of means for driving a tack and means constructed and arranged to bend the end portion of the binder about the tack.

19. In a machine of the class described, the combination with means for holding the end portion of a binder and putting the binder under tension about the forward portion of a shoe, of means for driving tacks at opposite sides of the shoe, and means constructed and arranged to twist the ends of the binder about the tacks while the binder is continued under tension.

20. In a machine of the class described, the combination with means for holding a binder, of means for relatively moving the holder and a shoe for positioning the binder about the forward portion of the shoe to secure the upper in overworked position, and means for moving the binder relatively to tacks at opposite sides of the shoe to bend the binder around the tacks.

21. In a machine of the class described, the combination with means for holding a binder, of means for relatively moving the holder and a shoe for positioning the binder about the forward portion of a shoe to secure the upper in overworked position, means for driving tacks at opposite sides of the shoe and means for relatively moving the shoe and the binder to bend the ends of the binder about the tacks.

22. In a machine of the class described, the combination with means for driving a tack, of means for severing a binder from a strand of binder material, and means for bending the binder about the tack.

23. In a machine of the class described, the combination with means for positioning a binder about the forward portion of a

shoe, of means for driving a tack, means for severing the binder from a strand of continuous material, and means for bending the end portion of the binder about the tack to anchor it.

24. In a machine of the class described, the combination with means for driving tacks at opposite sides of a shoe, of means for holding the ends of a binder extending about the forward portion of the shoe, means for relatively actuating the holding means and the shoe to tighten the binder into position to hold the overworked upper, means for severing the binder from a strand of binding material, and means for bending the end portions of the binder about the tacks to anchor the binder.

25. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising binder supporting means, and automatically operating means to bend the end portion of the binder about a tack to secure the binder in holding position.

26. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising binder supporting means, and automatically operating means to bend the end portions of the binder about tacks at opposite sides of shoe to secure the binder in holding position.

27. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising binder supporting means, means for driving tacks at opposite sides of the shoe, and automatically operating means for bending the end portions of the binder about the respective tacks simultaneously to secure the binder in holding position.

28. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means, and means associated with the tack driving means for supporting the binder in predetermined relation to the tack driving means.

29. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means including a tack block and means for positioning the binder in predetermined relation upon the tack block.

30. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means, and means for supporting the binder in position relatively to the driv-

ing means to have a tack inserted at the side of the binder, and means for bending the binder about the tack to anchor it.

31. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means movable over the shoe bottom, a binder support movable with the tack driving means, and means for moving the support relatively to a driven tack to bend the binder about the tack.

32. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means movable over the shoe bottom, a binder support movable with the tack driving means, and means for actuating the support relatively to the driven tack to manipulate the binder for anchoring it to the tack.

33. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means movable over the shoe bottom, a binder support movable with the tack driving means and arranged to position the binder with relation to the tack to be driven.

34. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means, and means for supporting the binder relatively to the driving means in position to have a tack inserted at the side of the binder, and automatically operating means for bending the binder about the tack to anchor it.

35. In a machine of the class described, mechanism for applying a binder to hold an upper in overworked position about the forward portion of a shoe, comprising tack driving means at opposite sides of the shoe, and means for positioning the binder with relation to the driving means for the tacks to be driven adjacent to the end portions of the binder, said machine having provision for bending the end portions of the binder about the tacks.

36. In a machine of the class described, means for pulling simultaneously upon opposite ends of a binder extending about the forward portion of a shoe to bind the upper in overworked position, of means for driving tacks, and means for fastening the binder to the tacks.

37. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and means for fastening the binder to the tack.

38. In a machine of the class described,

means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and automatically operating means for fastening the binder to the tack.

39. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and means for twisting the wire about the tack.

40. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, means for cutting the binder from a strand and means for bending the binder about the tack.

41. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and means constructed and arranged to bend the binder about the shank of the ingoing tack.

42. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and means constructed and arranged to fasten the binder to the tack while the binder is maintained under tension.

43. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and means for bending the binder about the shank of the tack, and means arranged relatively to the bending means to free the binder from the pulling means after it has been partially bent about the tack.

44. In a machine of the class described, means for pulling upon a binder extending about the forward portion of a shoe, means for driving a tack, and bending and cutting means constructed and arranged to cut the binder from the strand in the pulling means while the end portion of the binder is being bent around the tack.

45. In a machine of the class described, mechanism for securing an upper in over-worked position about the forward portion of a shoe, comprising means for supporting a binder, means for forcing the binder into holding position, and means for bending the end portions of the binder about tacks at the opposite sides of the shoe.

46. In a machine of the class described, mechanism for securing an upper in over-worked position about the forward portion of a shoe, comprising means for supporting a binder, means for automatically forcing the binder into holding position, and means for automatically bending the end portions of the binder about tacks at the opposite sides of the shoe.

47. In a machine of the class described, mechanism for securing an upper in over-

worked position about the forward portion of a shoe, comprising means for supporting a binder, means for forcing the binder into holding position, means for automatically driving tacks at opposite sides of the shoe, and means for bending the end portions of the binder about the tacks to secure the binder in holding position.

48. In a machine of the class described, the combination with tack driving means, of binder bending means comprising a rotatable bending device having a shoulder engaging the binder to bend it about a tack, means for turning said device to bend the binder, and means for actuating the driving means to insert the tack.

49. In a machine of the class described, the combination with tack driving means of binder bending means movable with relation to the driving means after the tack enters the work to bend the binder about the tack.

50. In a machine of the class described, the combination with tack driving means, of binder bending means constructed and arranged for movement to bend the binder about the tack during the latter part of the insertion of the tack into the work.

51. In a machine of the class described, the combination with tack driving means, of binder bending means constructed and arranged for movement to bend the binder about the tack and means for automatically actuating the bending means.

52. In a machine of the class described, the combination with tack driving means, of binder bending means constructed and arranged for movement to bend the binder about the tack, and means arranged to be set into operation by the driving means to actuate the bending means.

53. In a machine of the class described, the combination with tack driving means, of binder bending means constructed and arranged for movement to bend the binder about the tack, and actuating mechanism therefor comprising a spring, means for putting the spring under tension and means for releasing the spring to permit it to actuate the bender at a predetermined time with relation to the operation of the driving means.

54. In a machine of the class described, the combination with tack driving means, of binder bending means comprising a rotatable bending device having a shoulder for positioning the binder in predetermined lateral relation to the tack to be driven and means for turning the device to bend the binder about the driven tack.

55. In a machine of the class described, the combination with tack driving means, of binder bending means arranged in axial alignment with the tack driving means.

56. In a machine of the class described, 13

automatically operating mechanisms for driving a tack and bending a binder about the shank of the tack.

57. In a machine of the class described, automatically operating mechanisms for driving a tack, positioning a binder about a shoe and bending the binder about the tack.

58. In a machine of the class described, automatically operating mechanisms for driving a tack, cutting a binder from a strand of binder material and bending the binder about the driven tack.

59. In a machine of the class described, automatically operating mechanisms for driving a tack, tightening a binder about a shoe and manipulating the binder to fasten it to the driven tack.

60. In a machine of the class described, means for bending a binder about a tack comprising a rotary bending device having provision for being positioned in axial alignment with a tack, and means for actuating said device to bend the binder about the shank of the tack.

61. In a machine of the class described, means for cutting a binder from a strand of continuous material and bending the binder about a tack, comprising a rotary bending device having a cutter and means for turning said device about the shank of the tack.

62. In a machine of the class described, the combination with tack driving means, of a rotatable member in axial alignment with the driving means, a fixed blade, and means carried by said rotatable member to cooperate with the fixed blade to cut the binder from a strand and to bend the binder about a tack inserted by the driving means.

63. In a machine of the class described, a rotatable sleeve having on its end face a shoulder having a cutting edge, and means to rotate said sleeve to cut a binder from a strand and bend the binder about a tack.

64. In a machine of the class described, the combination with means for bending a binder about a tack, of means for actuating the bender to wrap the binder about a tack, means for returning the bender to binder receiving position, and means for locking the bender in receiving position.

65. In a machine of the class described, the combination with means for bending a binder about a tack, of a spring to rotate the bender, means for returning the bender to binder receiving position, and means for locking the bender.

66. In a machine of the class described, means for bending a binder comprising a bending device having means for engaging the binder, a spring for actuating said device, and a lost motion connection between the spring and device to permit the spring to act by impact in starting the bending device.

67. In a machine of the class described,

means for bending a binder, comprising a rotatable bending device having means for engaging the binder, a spring for turning the device, a rotatable member intermediate the bending device and the spring and connected to the spring, and a pin and slot connection between the rotatable member and the bending device to permit said member to act by impact in starting the bender.

68. In a machine of the class described, means for cutting a binder from a strand of binder material, said means comprising a cutter, a spring for actuating the cutter, and a lost motion connection between the cutter and the spring whereby the cutter is actuated by impact to cut the binder.

69. In a machine of the class described, means for cutting a binder from a strand of binder material, said means comprising a rotatable cutter, a spring for turning the cutter, a rotatable member intermediate the spring and the cutter, and a pin and slot connection between said member and the cutter whereby the cutter is actuated by impact.

70. In a machine of the class described, means for cutting a binder from a strand of binding material and bending the binder about a tack, said means comprising a device having provision for cutting the binder from the strand and bending it, a spring for actuating said device, and a lost motion connection between the spring and the device whereby the latter is actuated by impact.

71. In a machine of the class described, means for cutting a binder from a strand of binding material and bending the binder about a tack, said means comprising a rotatable member having a cutter edge and means for engaging the binder to bend it, a rotatable sleeve located between the member and the spring, and a pin and slot connection between the member and the sleeve, said parts being constructed and arranged to cause the member to act by impact to cut the binder and then to bend it about the shank of the tack.

72. In a machine of the class described, means for holding a binder under tension, and automatically operating mechanism for manipulating the binder to secure it to a shoe.

73. In a machine of the class described, mechanism for manipulating a binder to anchor it to a tack projecting from a shoe and means for relatively positioning said mechanism and the shoe.

74. The combination with means for cutting from a strand of continuous material, a binder adapted to hold an upper in over-worked position upon a last, of means for manipulating the binder to anchor it to the shoe.

75. The combination with means for cutting a binder from a strand of continuous

material, of means for driving a tack and means for manipulating the binder to anchor it to the tack.

76. The combination with means for driving a tack, of means for manipulating the binder to anchor it to the tack.

77. An apparatus of the class described having, in combination, means including a driver acting by impact for inserting a tack and means movable angularly for automatically wrapping a wire around the tack.

78. An apparatus of the class described having, in combination, means to anchor a wire to the stem of a tack and mechanism for actuating said means angularly around the tack in the wire anchoring operation.

79. An apparatus of the class described having, in combination, means for holding a wire adjacent to the path of an ingoing tack, a driver to insert the tack, and connections from the driver to said means for effecting a wrapping of the wire around the tack.

80. An apparatus of the class described having, in combination, a tack driver, a wire bending sleeve, means for turning it independently of the driver, and a wire engaging device carried by said sleeve.

81. An apparatus of the class described having in combination, means for bending a wire around a tack to anchor the wire, and means acting progressively and with in-

creasing force as it travels over the work for pressing the wire down toward the surface of the work during the bending operation.

82. An apparatus of the class described having, in combination, means for bending a wire around a tack to anchor the wire including a wire engaging device and having separate from that device an inclined surface on the bender arranged to press the wire down toward the surface of the work as the bender is rotated.

83. An apparatus of the class described having, in combination, a tacker, a wire bender, and operating means for said tacker and bender arranged to cause the wire bending operation to be completed substantially coincidently with the tack driving operation.

84. An apparatus of the class described having, in combination, a wire bending device movable to carry a wire around a tack, and a wire cutter arranged in the path of the end portion of the wire which is being carried around the tack and operating to sever the wire from the strand.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR L. RUSSELL.

Witnesses:

JAMES R. HODDER,
ELIZABETH C. COUPE.