

G. W. PERKINS.
MACHINE FOR FASTENING BUTTONS ON SHOES AND OTHER ARTICLES.
APPLICATION FILED APR. 15, 1910.

982,440.

Patented Jan. 24, 1911.

5 SHEETS—SHEET 1.

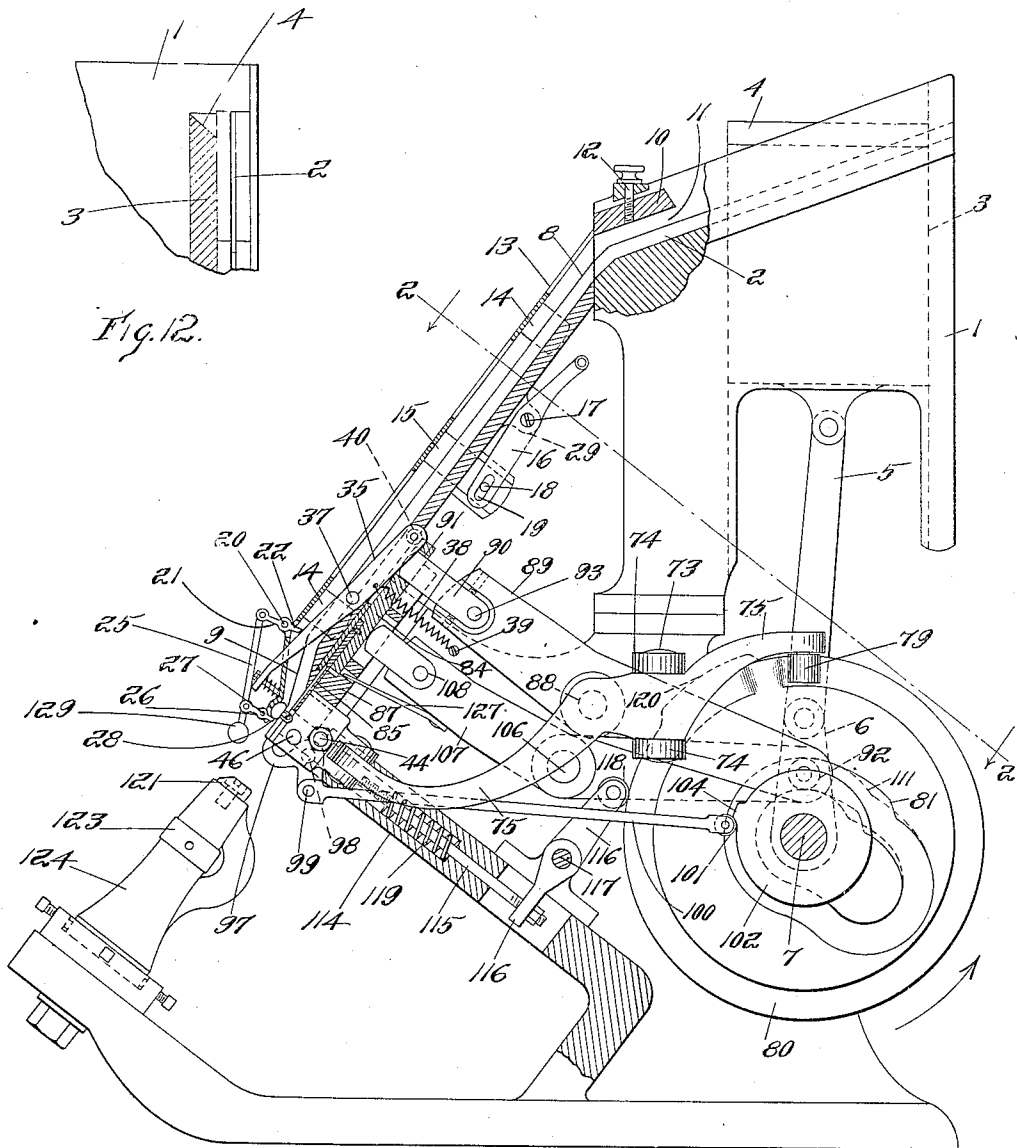


Fig. 1.

Witnesses:
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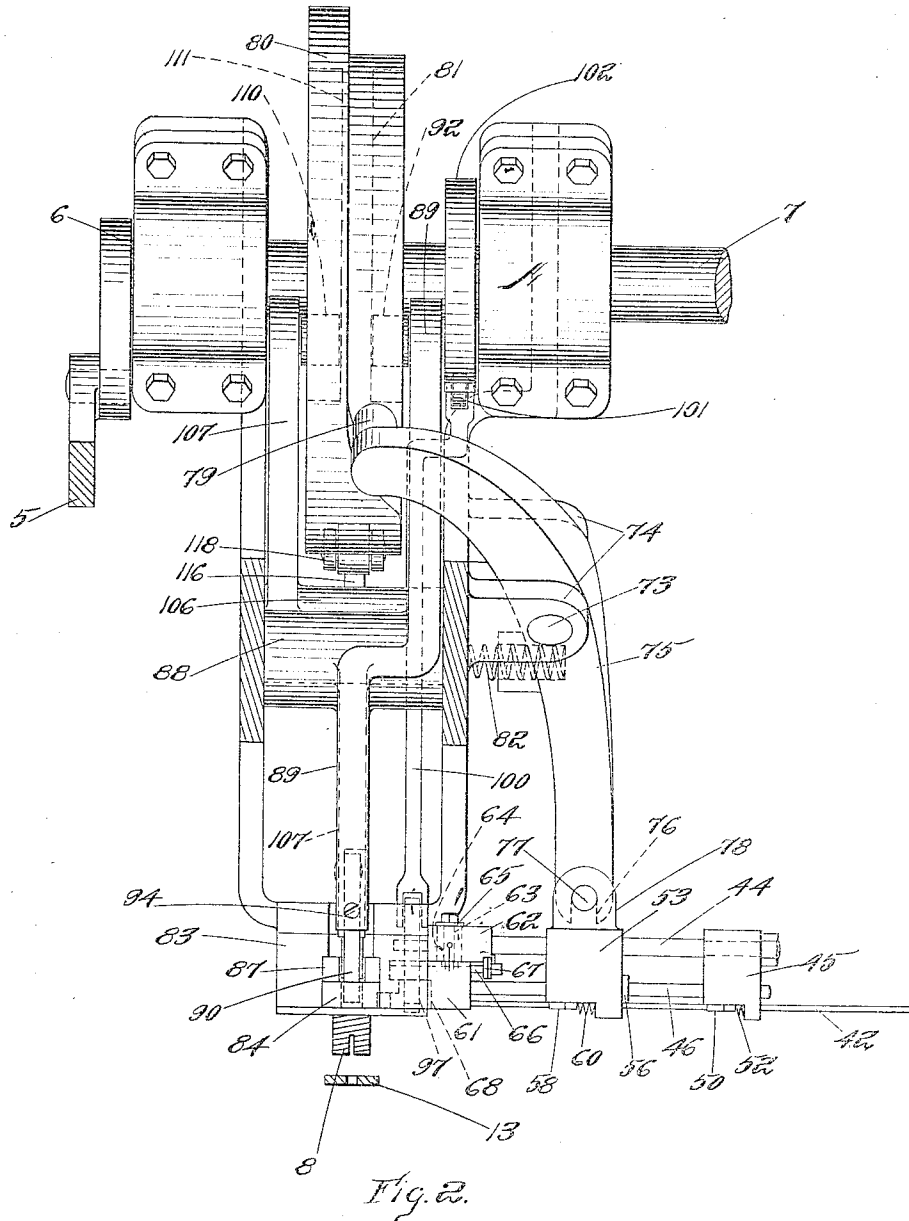
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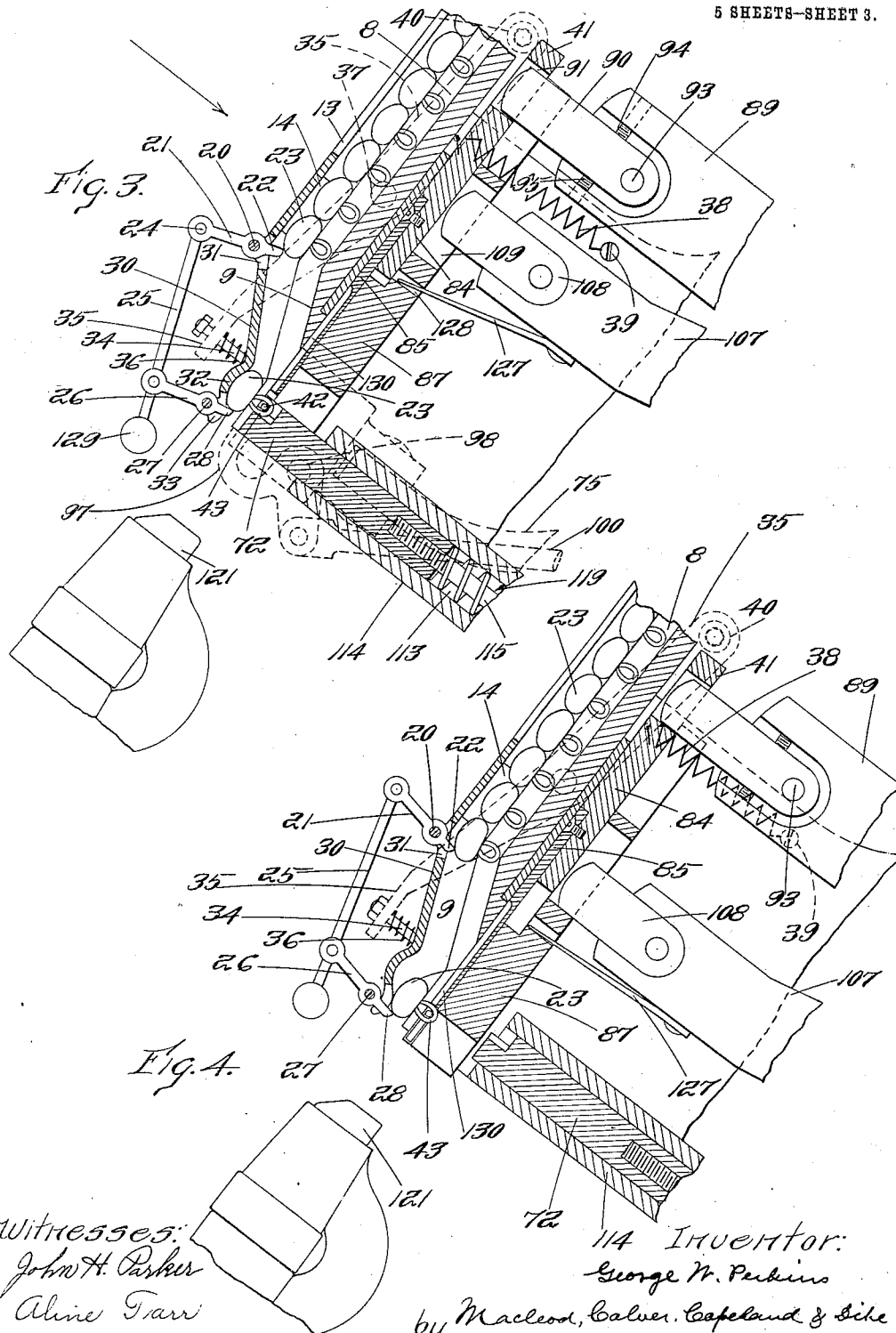
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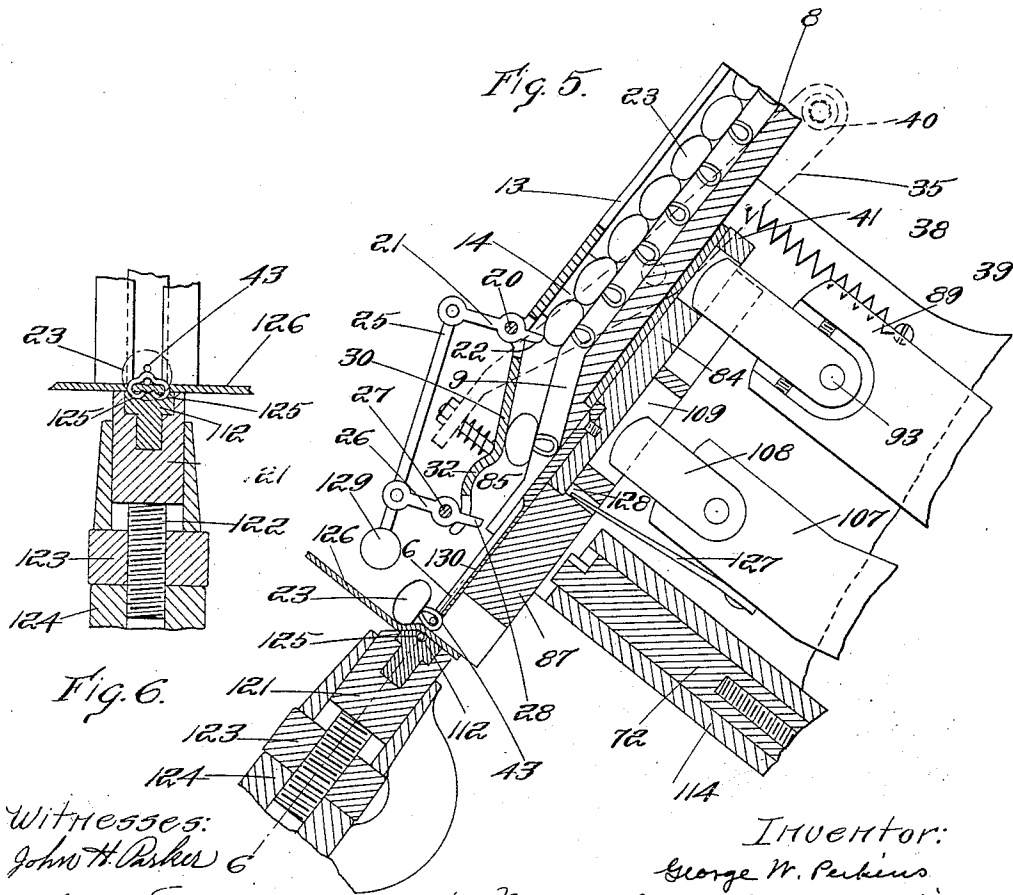


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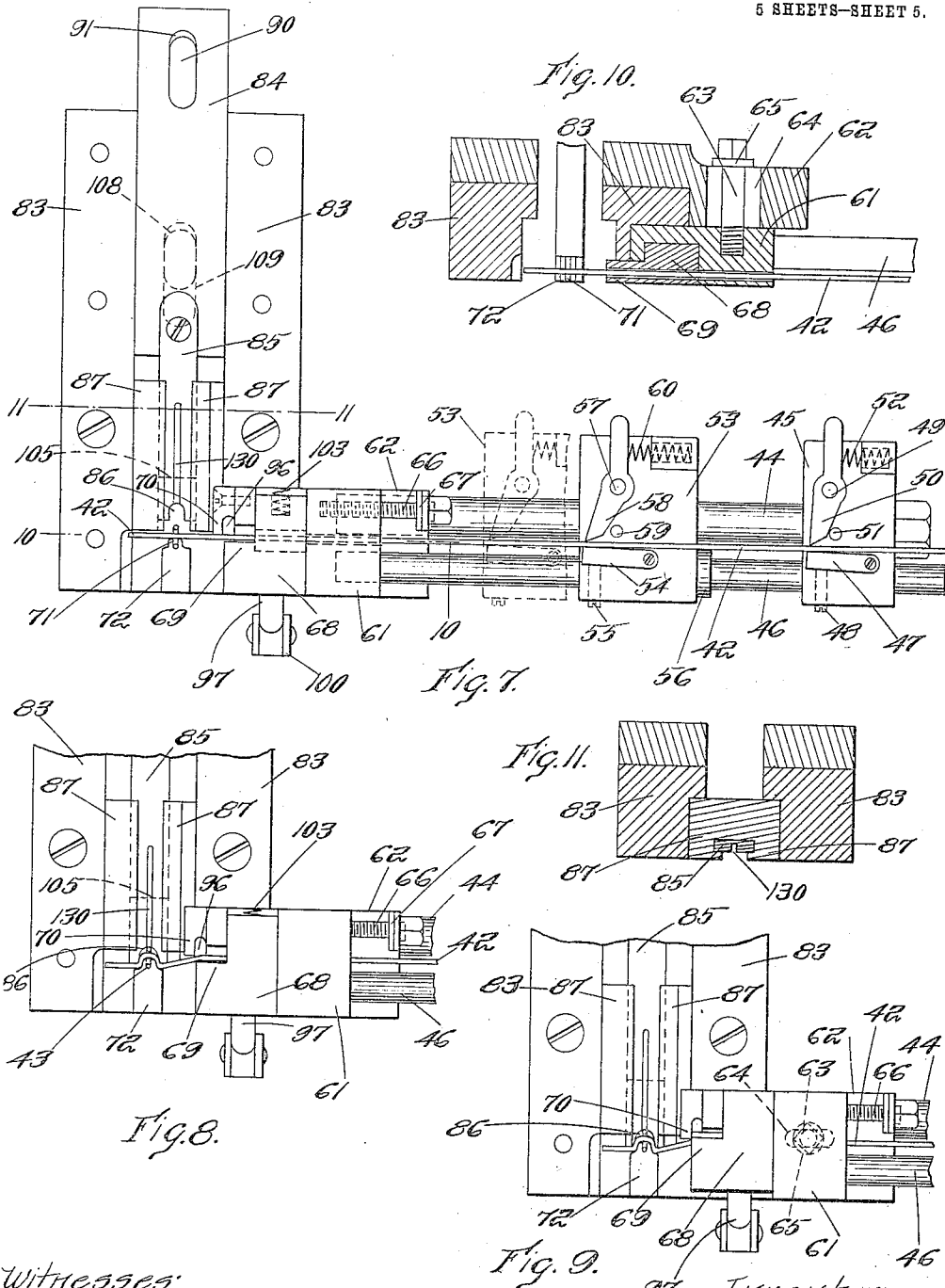
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GEORGE W. PERKINS, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO HEATON-PENINSULAR BUTTON FASTENER COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

MACHINE FOR FASTENING BUTTONS ON SHOES AND OTHER ARTICLES.

982,440.

Specification of Letters Patent.

Patented Jan. 24, 1911.

Application filed April 15, 1910. Serial No. 555,600.

To all whom it may concern:

Be it known that I, GEORGE W. PERKINS, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Machines for Fastening Buttons on Shoes and other Articles, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to a machine for making metallic fasteners for fastening buttons to shoes and other articles and fastening the buttons to such articles with such fasteners.

One feature of the invention relates to the button-feed mechanism whereby one button only is delivered from the raceway at a time and to the means for positioning the button.

Another feature relates to the means for adjusting the upper raceway for different sizes of buttons.

Another feature relates to the means for forming the eye of the fastener.

Another feature relates to the means for forming the legs of the fastener.

Another feature relates to the means for setting and clenching the fastener to the article.

Another feature relates to the adjustment of the anvil whereby a greater or less clench of the legs is made.

Other features will be more fully explained hereinafter in the specification.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features are pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is a side elevation, partly in section, of a machine embodying the invention. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is an enlarged sectional view, showing certain of the parts shown in Fig. 1, and showing more clearly the mechanism for feeding the buttons one by one to the position for threading the wire and the former for making the loops of the fasteners and the slide which forms the legs of the fastener and also their operating levers. Fig. 4 is a view similar to Fig. 3, showing the parts in different position, showing the button in the operation of being car-

ried to the lower die after the loop and legs have been formed and the arbor has been drawn out of the way. Fig. 5 is a view similar to Figs. 3 and 4, showing the parts at the limit of the downward stroke, showing the fastener inserted in the material and clenched. Fig. 6 is a section on line 6—6 of Fig. 5. Fig. 7 is a view of some of the parts shown in Fig. 3, looking in the direction of the arrow, the button-feed being stripped off and showing the method of threading the wire through the eye of the button hole. Fig. 8 is a view of a portion of the parts shown in Fig. 7, showing the parts in a slightly different position, with the slide moved down to bend the wire over the arbor to form the loop of the fastener. Fig. 9 is a view similar to Fig. 8, showing the fastener cut off at the proper length after the loop is formed and about to have the legs formed by the downward movement of the slide. Fig. 10 is a section on line 10—10 of Fig. 7. Fig. 11 is a section on line 11—11 of Fig. 7. Fig. 12 is a detail view of a portion of the button elevator, showing the beveled surface from which the buttons drop into the raceway.

Referring now to the drawings,—1 represents the hopper in which the buttons are held in bulk, and 2 the hopper stand raceway into which the buttons are delivered by an elevator 3 having the beveled upper edge 4 which lifts the buttons from the hopper and from which they overflow when the elevator has reached the upper end of its stroke and roll over into the raceway 2, the surplus buttons falling back into the hopper 1. The elevator mechanism is operated through connecting rod 5, crank 6 and driving shaft 7 in well known manner. From the hopper stand raceway 2 the buttons pass to a connecting raceway 8 of steep descent, which I term the upper raceway, and thence to the raceway 9 which I term the lower raceway, which is of still steeper descent, which carries them one by one to the position where the wire is to be threaded through the eye of the button.

Secured to the frame just above the hopper stand raceway near its lower end is a switch 10 which extends down into the raceway to prevent the buttons going down from piling on top of each other and to throw the surplus buttons back into the hopper, the raceway being slotted longitudinally for the

passage of the eyes of the buttons and the space 11 between the switch 10 and the top of the raceway being just sufficient to allow for the thickness of the head of the button to pass under it. This switch is adjustable so as to raise and lower it by means of a screw 12 to accommodate buttons having heads of different sizes. The raceway 8, which is also slotted longitudinally for the passage of the eyes of the buttons is provided with a cover 13 to prevent the buttons from falling out of the raceway. This cover is adjustable toward and from the raceway to also accommodate heads of buttons of various sizes, it being desirable that the cover should be set so that it will just barely give clearance to the heads of the buttons so that they will not fly out of the raceway and yet not interfere with their sliding down the raceway. The means which I have shown for holding the cover in position and for adjusting it are as follows: The cover is provided with two pairs of ears 14, 14, near each end straddling the raceway so as to steady the cover and intermediate the two pairs of ears 14 is another pair of ears 15 to which is pivotally connected a lever 16 fulcrumed at 17 between the ears 29. The pivot connection between the lever 16 and the ears 15 is by a pin 18 projecting from the ears and engaging with an elongated slot 19 in the lever 16. By means of the lever 16 the cover 13 may be raised or lowered and may be clamped in its adjusted position by setting up the screw pivot 17 to bind the ears 29 frictionally against the lever. This will be sufficient to hold the lever and the cover in their adjusted position.

Fulcrumed at 20 is a lever 21 having a finger 22 which extends down into the path of the buttons 23 at the lower end of the raceway 13 and adapted to hold back the line of buttons from entering the lower raceway 9. Said lever 21 is pivotally connected at 24 with a lever 25 to which is also pivotally connected a lever 26 fulcrumed at 27 and having a finger 28 which extends into the path of the buttons at the lower end of the lower raceway 9 and is adapted to hold back the buttons. The lever 25 may be reciprocated endwise so as to move the fingers 22 and 28, respectively, to allow a button to enter the lower raceway from above and to allow the button already in the raceway 9 to pass out from the lower end after the fastener has been attached thereto as will be hereinafter described.

Pivoted on the pin 20 to which the lever 21 is pivoted is a plate 30 which extends down above the raceway 9 and rests on the top of the head of the button in the raceway 9. It is formed with a slot 31 through which the finger 22 passes so that the movement of the plate 30 and the movement of the finger 22 will not interfere with each

other. The plate 30 near its lower end is formed with an upwardly curved portion 32 to fit over the head of the button, when the button is in position as shown in Figs. 1 and 3 for the threading of the wire. It is formed with a slot 33 for the passage of the finger 28 so that the movement of the plate and finger will not interfere with each other.

The plate 30 is normally held in engagement with the button in the raceway 9 in the following manner. A pin 34, whose lower end is fast to the plate 30, passes loosely through the lever 35 and is held against the button with a slight tension by a spring 36 which surrounds the pin 34, one end of the spring resting on the plate 30 and the other end of the spring bearing against the lever 35. Said lever 35 is fulcrumed at 37 and is normally held with its rear arm downward and its lower end upward by a spring 38, one end of which is fastened to the rear arm of the lever 35, and the other end of which is fastened at 39 to the frame of the machine. Projecting laterally from the rear end of the lever 35 is a roll 40 which rests upon the upper end 41 of the former holder 84 which will be more particularly hereinafter described, said former holder having a reciprocating sliding movement. When the former holder 84 is in the position shown in Figs. 1 and 3, the rear arm of the lever 35 is held up, giving tension to the spring 38, and the forward arm of the lever 35, by its downward pressure upon the spring 36, holds the lower end of the plate 30 down against the button 23. When the former holder 41 moves down out of engagement with the roll 40, as shown in Fig. 4, the lever 35 is free to respond to the tension of the spring 38 which pulls the rear arm of the lever 35 downward, lifting the forward end of the lever and thereby lifting the plate 30, as shown in Fig. 4, sufficiently to allow the button to pass out from the lower end.

When the lowermost button is in the position shown in Figs. 1 and 3, it is held there until the wire is threaded through the eye of the button which is the next step in the operation, 42 representing the wire and 43 the eye of the button. The wire feeding mechanism, therefore, will now be described. See particularly Fig. 7. The wire 42 may be run from a reel in well known manner. Mounted fast on the rod 44 is a block 45, which is termed the "wire end block", and passing loosely through said block 45 is a rod 46 which serves as a guide, and is slidable for a purpose to be hereinafter described.

Pivoted to the block 45 is a rest 47 whose forward end rests on the adjustable stop-screw 48 so that the free end of the rest arm 47 may be raised or lowered. The wire 42 passes over the top of the rest 47. Ful-

crumed at 49 to said block 45 is a dog 50 whose pointed lower end engages the upper side of the wire. The back of the dog 50 rests against a stop-pin 51 projecting from the block to prevent the dog from being turned too far back on its pivot, and a spring 52 bears against the rear side of the upper arm of the dog 50 to hold the lower arm of the dog by yielding pressure against the stop-pin 51 but which yields sufficiently to the forward feed of the wire to allow the wire to be fed forward. The point of the dog, however, engaging with the wire prevents the wire from being moved backward.

Loosely mounted on the rod 44 is a block 53, which is termed the "feed block". Pivoted to the side of the block is a rest 54 similar to the rest 47, the free arm of which rests upon the upper end of an adjustable screw 55. The two screws 55 and 48 should be so adjusted with relation to each other that the rests 47 and 54 will be at the same elevation so that the wire may have an even support. Said block 53 is also slidable on the rod 46.

The rod 46 is provided with a collar 56 which may be integral with it or made separate and attached thereto, which forms a stop to limit the rearward movement of the block 53. Fulcrumed at 57 on the side of the block 53 is a dog 58 whose pointed lower end engages with the wire. A stop pin 59 serves to limit the rearward movement of the dog 58. A spring 60, which bears against the upper arm of the dog 58, holds the lower end of the dog in yielding engagement with the wire. The dotted line position of the block 53, shown in Fig. 7, shows the block in its forward position and shows the length of the stroke.

The forward end of the rod 44 is made fast to the frame of the machine and is stationary. The forward end of the rod 46 is made fast by screwing or otherwise to a slidable block 61. Said block 61 is adjustably secured to the stationary block 62, which is part of the frame of the machine, by a set screw 63 which passes laterally through a wide slot 64 in the stationary block 62, its forward end being screwed into the adjustable block 61, see Figs. 2 and 10. The slot 64 being wider than the diameter of the screw 63, allows a forward and back adjustment of the block 61 corresponding with the excess width of the slot 64. When the clamp screw 63 is set up, a washer 65 binds against the stationary block 62 on each side of the slot. When the screw 63 is loosened, the block 61 may be adjusted by means of the adjusting screw 66 which is screwed into the end of the movable block 61 and has a collar 67 which engages with a notch in the side of the stationary block 62. See Figs. 7, 8 and 9.

In order to adjust the wire feed to feed a longer or shorter blank, the clamp-screw 63

is loosened to relieve the friction of the washer 65 upon the block 62, and then by turning the adjusting screw 66, the block 61 and the cutter-block 68 carried thereby may be moved to the right or left as desired to the extent allowed by the slot 64. For instance, if it is desired to feed a blank longer than that for which the parts are adjusted, as shown in Fig. 10, the block 61 will be moved to the right as is allowed by the width of the slot 64. After being moved to the right as far as desired by means of the adjusting screw 66, the clamp-screw 63 is set up again to bind the block 61 and cutter 68 in the newly adjusted position. In moving the block 61 to the right, it also moves to the right the rod 46 whose forward end is screwed into and made fast to the block 61 as already described, see Fig. 7, and when it moves to the right, the stop-collar 56, which is fast on the rod 46, necessarily moves with the rod 46. That is, referring to Fig. 7, in which the collar 56 is shown as bearing against the block 53 in the most right-hand position of the block 53, when the block 61 and rod 46 are moved to the right as above described, it will move the collar 56 to the right, away from the block 53, thereby allowing a movement of the block 53 also to the right on the return stroke of the block 53 from the forward feed. This allows the dog 57 to start its feed farther back from the cutting point, but the feed operation of the cam 80 will still carry the feed block 53 in its forward movement to exactly the same forward position that it did before the adjustment, thus making the length of stroke of the feed block as much longer as the distance was increased by the adjustment, and, therefore, feeding the wire that much longer so that a longer blank is cut.

The block 61 is cut out or recessed to receive a block 68 in such manner that the block 68 is held by said block 61 and is carried by it when the block 61 is adjusted, and also block 68 is slidable up and down within said block 61. Said block 68 is formed with a cutter portion 69 which serves as the movable member of the wire cutter.

The wire 42 passes through a hole in the adjustable block 61 and also through a large hole in the block 68 which is carried by the laterally adjustable holder block 61 and passes between the up and down movable cutter 69 and the stationary cutter 70; thence through the eye 43 of the button which is positioned in a slot 71 in the top of the arbor 72. The hole in the block 68 through which the wire passes is larger than the wire to allow for the up and down movement of the cutter block 68.

At each forward feed movement of the block 53 the wire 42 should be fed forward a distance equal to the length required for a single fastener. The mechanism for actu-

ating the feed is shown in Figs. 1 and 2 and is as follows: Fulcrumed on a shaft 73 between the ears 74 projecting from the frame is a lever 75, the lower end of which is pivotally connected with the wire feed block 53 in any suitable way, the means shown being to form the lower end of the lever with a slot 76 which straddles a pin 77 passing through the ears 78 which embrace the lower end of the lever 75. The upper arm of said lever is bent and provided with a roll 79 which engages with a face cam 80 mounted on shaft 7. The roll 79 is held by yielding pressure in engagement with the face cam by a spring 82, one end of which is seated in a recess in the lever 75, and the other end of which is fastened to the frame. The cam 80 is so proportioned and constructed with relation to the other operating parts of the machine that it will give to the feed block 53 a forward movement at the proper time in the operation and for a distance sufficient to carry the wire the distance of the length of a single fastener. When the block 53 moves forward, the dog 58 engaging with the wire causes the wire to move with the block. The dog 50 on the stationary block 45 will yield sufficiently for the wire to ride under it, and when the cam, during the completion of its rotation after the feed block has been fed forward, moves the feed block 53 on its return stroke, the dog 50 will prevent the wire from being pulled backward with it.

After the wire has been fed, the next operation is to form the loop. The mechanism for doing this is as follows: Longitudinally slidable between the fixed guides 83 is the former-holder 84 to which is secured the former 85 whose lower end is formed with a slot 86 shaped substantially to the contour of the loop which is to be formed in the fastener, so that as the former 85 descends, the lower end of the former will engage the wire and bend it over the curved upper end of the arbor 72, forming the loop. The former 85 also passes through guide grooves in the slide 87. The former 85 is actuated as follows: Fulcrumed at 88 is a lever 89, one end of which is provided with an extension-piece 90 which engages with a slot 91 in the former-holder 84; the other end of said lever 89 carrying a roll 92 which engages with a cam groove 81 in the cam 80. The same cam 80 which actuates the wire feed also actuates the former, so that the movement of the feed and the movement of the former will be properly timed with relation to each other. The extension-piece 90, which engages with the slot in the former-holder, is adjustable for the purpose of allowing for variation in the thickness of the wire. The means for adjustment are as follows: The extension-piece 90 is pivoted on a screw 93 to the lever 89 in a recess in the lever, said recess being of sufficient breadth to allow for a slight turn-

ing movement of the extension-piece within the recess. The extension-piece is engaged on opposite sides by the screw-pins 94, 95, to hold it firmly in its adjusted position. As the former descends, the slotted lower end engages the wire on both sides of the eye of the button and bends it over the curved upper end of the arbor 72, forming the eye of the fastener, as shown in Figs. 8 and 9.

After the loop of the fastener is formed, the section of wire for the proper length of the fastener is cut off from the body of the wire. The mechanism for doing this is as follows: I have termed the upper cutter 70 the stationary cutter because it is stationary during the cutting of the wire. It is, however, attached to and carried by the adjustable block 61 for the purpose of varying the length of the blank to be cut from the wire. The lower cutter 69 is formed as a part of the block 68 which is movable up and down. It is slightly offset from the cutting edge of the stationary cutter 70, the block of which the cutter 70 forms a part being formed with a recess 96 to receive the cutter 69 on its upward stroke. The block 68 and its cutting edge 69 are carried by the adjustable block 61 when said block 61 is moved to adjust it to varying lengths of blank so that the cutters 69 and 70 will maintain their relative positions in all adjustments.

The means for actuating the sliding cutter 69 and the block 68 of which it forms a part are as follows: The lower end of the cutter block 68 rests upon the upper end of one arm of a rocking lever 97 fulcrumed at 98. Said rocking lever 97 is pivotally connected at 99 with a connecting rod 100 which passes through bearings fastened to the frame, its other end being provided with a roll 101 which engages with a cam 102 mounted on the shaft 7, said cam 102 being so formed as to actuate the rod 100 to lift the block 68 and, therefore, the cutter 69 at the proper time. A spring 103 bears against the block 68 on its upper side and tends to press the block downward, thereby also causing the cam roll 101 to remain in engagement with the cam so that after the cutter block has moved upward and the cam roll rides off of the point 104 of the cam, the cutter will be caused to descend again.

After the blank has been cut off, the loop having previously been formed as described, the ends of the blank are bent down around the sides of the arbor to form the legs. The former still remains in engaging position with the loop portion of the blank to hold it firmly against the curved top of the arbor while the legs are being formed. The means for forming the legs are as follows: As already described, the former 85 and the former-holder 84 are slidable in guide grooves in the slide 87 and also the slide 87 is slidable independently of the movement

of the former. The legs are formed by the slide 87. The slide 87 is formed with an upwardly extending recess or slot 105 in its lower end, the width of said slot being just sufficient so that when the slide descends, the legs of the slide formed by said slot will straddle the arbor 72, and by engaging the wire blank, will bend the blank of the fastener down against the sides of the arbor while the arbor is held stationary, forming the legs.

The mechanism for actuating the slide 87 is as follows: Fulcrumed at 106 is a lever 107, one end of which is provided with an extension-piece 108 which engages with the slot 109 in the slide 87, the other end of said lever 107 carrying a roll 110 which engages with a cam groove 111 in the cam 80 on the opposite face from the cam groove 81 which is engaged by the roll 92 carried by the former actuating lever 89. The full downward stroke of the slide 87 is more than sufficient to bend the legs around the arbor. It has a further descent for the purpose of carrying the button and attached fastener down into contact with the leather or other material 126 which is resting on the upper end of the die 112. It is important, however, after the slide has descended sufficiently to form the legs, that the arbor be moved out of the way to permit the further descent of the slide for the purpose of bringing the fastener with the attached button into contact with the material on the die as above stated. The mechanism for thus withdrawing the arbor is as follows: The arbor 72 is slidable longitudinally in a recess 113 in the base 114 of the machine, being slidable in a direction at right angles with the direction of movement of the former 85 and slide 87. Said arbor is mounted upon and carried by a slide rod 115, the forward end of which is connected with said arbor, the other end of which is connected with one end of a lever 116 which is fulcrumed at 117, the other end of said lever 116 carrying a roll 118 which engages with the rim of the cam 80. A spring 119 normally holds the arbor in the forward position to receive the wire blank. The periphery of the cam 80 is formed with a projection 120 which engages with the roll 118 on the lever 116 at the proper time to turn the lever 116 so as to retract the arbor out of the path of the slide, and when the projection 120 has ridden past the roll 118, the spring 119 will throw the arbor back into operative position. In the meantime, the cam which actuates the slide 87 will have carried the fastener and the button down into contact with the material 126 to which the button is to be attached which is laid over the top of the die 112, as shown in Fig. 5. At the same time that the slide is completing its descent after the arbor has moved out of the way so that the

button and fastener are carried down against the material, the former 85 will also be continuing its descent and engage the loop of the fastener and drive the legs of the fastener through the material and against the bottoms of the curved recesses 125 in the die 112 and clench the legs against the under side of the material. The cam which actuates the former 85 is so constructed and arranged with reference to the cam which actuates the slide 87 and the cam which actuates the arbor 72 as to properly time their operations with relation to each other. The slide and former will both be retracted after the setting of the fastener sufficiently to get out of the way of the arbor before the arbor is brought back to operative position.

The die 112 is set in the top of the anvil 121 which is preferably adjustable up and down to allow for different thicknesses of leather or whatever the material is in which the fastener is to be inserted, the adjustment being secured by a screw shank 122 which forms a part of the anvil and which passes through the adjusting nut 123 into the base 124. The die 112 is formed with two concave recesses 125 on its upper side to receive the ends of the legs of the fastener and curl the same up to clench them, as shown in Fig. 6, when the former drives the legs through the material 126.

As will be seen from the drawings, the slot 109, in which the extension-piece 108 of the lever 107 engages, is of greater length than the width of the extension-piece so that the lever 107 has a slight movement before it begins to actuate the slide 87. Attached to the lower side of the lever 107 is a spring 127 whose free end engages with a slot 128 in the slide 87. The spring 127 will be put under tension by the movement of the lever 107 until the extension-piece 108 comes into contact with the bottom of the slot 109 and then the lever 107 and its extension-piece 108 will move the slide 87 downward, still keeping the spring 127 under tension. The downward movement of the lever 107 ceases, by reason of the form of the cam, just before the slide 87 has reached the full limit of its downward stroke. This leaves the spring 127 free to resume its normal position, as shown in Fig. 5, thereby carrying the slide 87 slightly farther downward, bringing the fastener into contact with the material by a yielding pressure instead of by a solid blow as would be the case if it were carried the full extent of its movement by the cam and lever, thereby cushioning the blow and also allowing for different thicknesses of material.

The operation of the machine is as follows: The shaft 7 is continuously rotating and the elevator or gate 3 is continually rising and descending to carry up the buttons from the hopper and discharge them into

the raceway 2 so as to keep a continuous line of buttons in the upper raceway 8 with the lowermost button resting against the finger 22. The lever 25 will first be tripped by hand
 5 enough to bring one button down into the lower end of the lower raceway 9 with the curved portion 32 of the cover 30 resting upon it and the finger 28 holding the button from sliding out of the raceway. The leather or
 10 other article 126 to which the button is to be attached is held against the top of the die 112. Now when the machine is started, the sliding wire feed block 53 is first moved forward to thread the wire through the eye of the
 15 button, as shown in Figs. 1 and 3, the cam 80 during this movement of the feed 53 not yet having rotated far enough to actuate the former 85 or the slide 87. As soon as the wire has been fed through the eye of the but-
 20 ton, the cam 80 has rotated far enough to actuate the former 85, by means of its lever 89, to descend and bend the blank so as to form the loop over the top of the arbor 72. There is then a dwell of the cam with rela-
 25 tion to the lever 89 and the high part 104 of the cam 102 has come into engagement with the roller on the rod 100, thereby actuating the reciprocable cutter 69 to move upward and sever the projecting blank from the
 30 body of the wire. Then the slide 87 will be caused to descend by its lever 107 actuated by the engagement of its cam roll in the high part of the cam groove 111 on the cam 80 while the former 85 is still clamping
 35 the loop portion of the fastener just formed against the arbor, thus bending down the outer portions of the blank against the sides of the arbor to form the legs. Then the roll 118 carried by the lever 116 will engage the
 40 projecting portion 120 on the periphery of the cam 80, causing the lever 116 to rock in a direction to withdraw the arbor to one side out of the way of the former 85 and
 45 slide 87; whereupon the former 85 and slide 87 will both descend quickly, the slide carrying down the fastener to bring the legs into engagement with the material, the legs of the slide engaging the material to hold it
 50 in position, while the former continues its descent and forces the legs of the fastener through the material, causing them to clench up against the under side of the material, the legs being turned up by the concave grooves in the top of the die 112.
 55 At the beginning of the downward movement of the former-holder 84, which carries with it the former 85, the rear end 41 of the former-holder will ride down from engagement with the roll 40 mounted on the lever
 60 35; whereupon the forward end of the lever 35 and its pin 34 will be free to be lifted up. When the slide 87 moves down after the fastener is attached, it pushes the button 23 down and the downward pressure of the but-
 65 ton 23 against the finger 28 is sufficient to

tip up the lower end of the placer plate 30 and turn the lever 26 and the lever 25 and the lever 21 so that the finger 28 will be moved out of engaging position with the lowermost button 23 which has been thread-
 70 ed and move the upper finger 22 out of engagement with the lowermost button behind it so that at the same time that the lower button 23 is carried down by the slide out of the raceway 9, the next following button will
 75 pass by the finger 22 into the raceway 9, as shown in Fig. 5, part way down, but not down as far as the curved lower end 32 of the placer plate.

As soon as the lowermost button has
 80 passed out from under the finger 28, the weight 129 on the lower end of the lever 25 will be sufficient to turn the levers 26, 25, and 21 back to bring the fingers 22 and 28
 85 again into engaging position to prevent another button entering the raceway 9 and to prevent the button which has just entered the raceway 9 from passing out of it or even quite to the curved seat 32 of the
 90 placer plate 30. The slide 85 is formed with a groove 130 in alinement with the path of movement of the eye of the button so that when the slide is carried up on its return stroke far enough for the groove to
 95 reach the eye of the button, the eye of the button will drop into the groove, releasing it somewhat from the tension of the placer plate 30 upon it, and it will then slide down to the lower end of the lower raceway under the curved seat 32 and the placer plate
 100 will still rest upon it and the finger 28 will prevent the button from passing out of the lower end of the raceway. This completes one cycle of operations and at the next rotation of the cam 80 the operation will be
 105 repeated.

What I claim is:

1. In a button fastening machine, a button feed raceway, means for separating the lowermost button in the raceway from the
 110 others behind it, means for holding in check said other buttons while the advance button moves to the fastener attaching mechanism, means for attaching the fastening to the button, means for holding the advance
 115 button in check while the fastener is being attached thereto and means for releasing both of said checks whereby the advance button with the fastener attached is released from the raceway and another button is allowed to pass to the position for receiving a fastener.
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2. In a button fastening machine, a button feed raceway, means for separating the lowermost button in the raceway from the
 125 others behind it, means for holding in check said other buttons while the advance button moves to the fastener attaching mechanism, means for threading a wire from a
 130 reel through the eye of the lowermost but-

ton, means for bending the wire to form a loop, means for cutting the wire which is threaded through the eye of the button from the line of wire to form a blank of predetermined length for the fastener, means for forming the legs of the fastener, and means controlled by the movement of the mechanism which forms the fastener to release the checks which hold the buttons against movement during the attaching of the fastener to the button.

3. In a button fastening machine, a button feed raceway, means for separating the lowermost button in the raceway from the others behind it, means for holding in check said other buttons while the advance button moves to the fastener attaching mechanism, means for threading a wire from a reel through the eye of the lowermost button, means for bending the wire to form a loop, means for cutting the wire which is threaded through the eye of the button from the line of wire to form a blank of predetermined length for the fastener, means for forming the legs of the fastener, means controlled by the movement of the mechanism which forms the fastener to release the checks which hold the buttons against movement during the attaching of the fastener to the button, a die, means for carrying the button and attached fastener into engagement with the material placed upon the die to which the button is to be attached and means for setting the fastener into the article to which it is to be attached.

4. In a button fastening machine, a button feed raceway, means for separating the lowermost button on the raceway from the others behind it, means for holding in check said other buttons while the button moves to the fastener attaching mechanism, means for threading a wire through the eye of the button, means for bending the wire after it is threaded through the eye of the button to form a loop and legs for a fastener and means controlled by the movement of the mechanism which forms the fastener to release the checks which hold the buttons against movement during the attaching of the fastener to the button.

5. In a button fastening machine, a button feed raceway having an inclined upper portion down which the buttons are adapted to slide in continuous series and a lower portion to which one button at a time only is admitted, a pivoted lever having a stop finger which extends into the entrance from said upper raceway to said lower raceway to check the entrance of the buttons thereto and having a second finger which projects into the exit end of said lower raceway to prevent the passage of the button out of said lower raceway, means for actuating said pivoted lever whereby both of said stops are simultaneously moved to allow the

discharge of the button in said lower raceway and to admit another button in the said lower raceway, means for threading a wire blank for a fastener through the eye of a button in said lower raceway, mechanism for bending and forming the said threaded blank to form a fastener and means controlled by the movement of said fastener forming mechanism to release the detent from the lower end of said lower raceway and the detent from the upper end of said lower raceway.

6. In a button fastening machine, button feeding mechanism, means for threading a wire through the eye of a button, an arbor to support the button and the threaded wire, a reciprocating former which bends the threaded wire upon the arbor to form the loop of the fastener after it has been threaded, a movable cutter for cutting the wire to form the requisite length for the fastener after it has been threaded and before the legs are formed, a reciprocating slide separate and independent from the loop former and the cutter which bends the projecting ends of the severed blank to form the legs of the fastener, and means for actuating the loop forming mechanism, the cutter and the leg forming mechanism so that they all move separately from each other.

7. In a button fastening machine, button feeding mechanism, means for threading a wire through the eye of a button, an arbor to support the button and the treaded wire, a reciprocating former which bends the threaded wire upon the arbor to form the loop of the fastener after it has been threaded, a movable cutter for cutting the wire to form the requisite length for the fastener after it has been threaded and before the legs are formed, a reciprocating slide separate and independent from the loop former and the cutter which bends the projecting ends of the severed blank to form the legs of the fastener, means for actuating the loop forming mechanism, the cutter and the leg forming mechanism so that they all move separately from each other, common driving mechanism for the loop forming mechanism, cutting mechanism and leg forming mechanism and connections between said driving mechanism and said loop forming, cutting and leg forming mechanisms whereby their regular sequence of movements are all automatically controlled.

8. In a button fastening machine, means for threading a wire through the eye of a button, an arbor to support the button and the threaded wire, a reciprocating former which then bends the threaded wire over the arbor to form the loop of the fastener after it has been threaded and then dwells clamping it to the arbor, a reciprocating slide which bends the projecting ends of the blank to form the legs of the fastener while said

loop former still clamps the wire to the arbor, means for withdrawing the arbor from the fastener, a die for the support of the article to which the button is to be attached, means for positively actuating the slide which forms the legs of the fastener to bring the fastener into engagement with the material on the die, a spring connected with the slide which is put under tension by said slide actuating mechanism, means for limiting the downward actuation of the slide by said positive mechanism and for releasing the tension upon the spring whereby the spring is free to resume its normal position of lesser tension and thereby the spring moves the slide farther down and presses it by a yielding pressure against the material on the die, means for actuating the former to drive and clench the fastener while the material is clamped by said yielding pressure.

9. In a machine for attaching fasteners to buttons, means for feeding and threading a wire through the eye of a button, means for adjusting the wire feed whereby the predetermined length of wire to be fed may be varied a reciprocable cutter holder and cutter for cutting the predetermined length of blank from the wire and means for adjusting the cutter in the longitudinal direction of the wire whereby the path of movement of the cutter may be varied and whereby the length of the blank to be cut may be varied by the changed path of the cutter as well as by the variation of the feed.

10. In a machine for attaching fasteners to buttons, means for feeding and threading a wire through the eye of a button, a movable cutter which cuts the blank from the wire at some point back of the eye of the button so that there shall be a portion of the severed blank on each side of the eye, means for adjusting the wire feed whereby the predetermined length of wire fed through the eye may be varied and means for adjusting the cutter whereby the distance back from the eye of the button at which the blank is severed may be varied by the same cutter.

11. In a button fastening machine, a die which supports the material to which the fastener is to be attached, an arbor over which the fastener is to be shaped, means for threading a wire from a coil through the eye of a button, a reciprocable former which engages the wire while the wire rests on the arbor and forms the loop of the fastener and then dwells, means for cutting the blank from the strip of wire after the loop is formed and while the former is at rest, a reciprocable slide separate from and movable independently of the said former and cutter which forms the legs of the severed blank while the blank is still held upon the arbor by the former, means for withdrawing the arbor out from under the fastener after

the loop and legs have been formed and means for then moving the former and slide downward carrying the fastener with attached button into contact with the material upon the die.

12. In a button fastening machine, an arbor to support the button while the wire is being threaded through the eye of the button, a reciprocable feed mechanism whereby the wire is threaded through the eye of the button, a reciprocable cutter holder and cutter which are movable transversely of the path of feed of the wire, means for adjusting the position of the cutter holder and cutter whereby the path of movement of the cutter may be varied so as to cut the wire at a greater or less distance from the arbor on which the button is supported.

13. In a machine for forming wire fasteners and attaching them to buttons, means for feeding the wire from a coil through the eye of the button supported upon the arbor, a stationary cutter and a movable cutter cooperating therewith, said movable cutter being reciprocable transversely of the path of movement of the wire, said cutter having a head block, a grooved holder for the head of the cutter which is adjustable lengthwise of the wire thereby adjusting the cutter, said head being movable in said holder block transversely of the wire.

14. In a machine for forming wire fasteners and attaching them to buttons, means for feeding the wire from a coil through the eye of the button supported upon the arbor, a stationary cutter and a movable cutter cooperating therewith, said movable cutter being reciprocable transversely of the path of movement of the wire, said cutter having a head block, a grooved holder for the head of the cutter which is adjustable lengthwise of the wire thereby adjusting the cutter, said head being movable in said holder block transversely of the wire, said cutter holder and head being apertured for the wire to pass through the same on its way to the eye of the button, the aperture in the cutter head being of greater diameter in the direction of movement of the cutter whereby the cutter is permitted to move transversely of the wire to cut the same while the wire lies in said aperture.

15. In a machine for forming wire fasteners and attaching them to buttons, means for threading a wire through the eye of a button, an arbor to support the button and the threaded wire, a reciprocable former which bends the threaded wire upon the arbor to form the loop of the fastener after it has been threaded and means for varying the length of the downward stroke of the former to adapt it to wires of different thicknesses.

16. In a machine for forming wire fasteners and attaching them to buttons, means

for threading a wire through the eye of a button, an arbor to support the button and the threaded wire, a reciprocable former which bends the threaded wire upon the arbor to form the loop of the fastener after it has been threaded, a lever which engages with said former, means for rocking said lever whereby a reciprocating movement is given to said former and means for adjusting said lever to vary its engagement with said former whereby the limit of the downward stroke of the former may be varied for different thicknesses of wire.

17. In a machine for attaching fasteners to buttons, means for threading a wire through the eye of a button, means for clamping the wire after it has been threaded through the eye of the button, a movable cutter, a rocking lever on which said cutter is mounted whereby said cutter is reciprocated transversely of the wire and means for rocking said lever to actuate the cutter.

18. In a button fastening machine, an arbor over which the fastener is to be shaped, means for feeding and threading a wire from a coil through the eye of a button upon the arbor, a reciprocable former which engages the wire while the wire rests on the arbor and forms the loop of the fastener and then dwells clamping the fastener to the arbor, a movable cutter, a rocking lever on which said cutter is mounted whereby said cutter is reciprocated transversely of the wire and means for rocking said lever to actuate the cutter, a reciprocable slide movable independently of the said former and cutter to form the legs of the severed blank while the blank is still held upon the arbor by the former, a driving shaft and intermediate mechanisms between said driving shaft and said former and said cutter actuating lever and said slide whereby their sequence of movement is controlled and timed with relation to each other.

19. In a button fastening machine, an ar-

bor over which the fastener is to be shaped, means for threading a wire through the eye of a button while supported upon said arbor, a reciprocating former which engages the wire upon the arbor and forms the loop of the fastener and then dwells clamping the loop of the fastener to the arbor, means for cutting the blank for the fastener from the wire after the loop is formed, a reciprocable slide which forms the legs of the severed blank, a reciprocable rod connected with said arbor which moves in a right line at right angles with the path of movement of the former and slide, common driving mechanism for said former, slide and arbor moving rod and intermediate mechanism whereby said common driving mechanism controls the time of movement of said arbor.

20. In a button fastening machine, means for threading a wire through the eye of a button, an arbor to support the button and the threaded wire, a reciprocating slide which bends the projecting ends of the blank to form the legs of the fastener, a support for the article to which the button is to be attached, means for positively actuating the said slide to bring the fastener into engagement with the said article on the die, a spring connected with said slide which is put under increased tension by said slide actuating mechanism, means for limiting the downward actuation of the slide by said positive mechanism, means for relaxing the tension upon the spring whereby the spring is free to resume its position of lesser tension and thereby the spring moves the slide farther down and presses it by a yielding pressure against said article upon the die.

In testimony whereof I affix my signature, in presence of two witnesses.

GEORGE W. PERKINS.

Witnesses:

WILLIAM A. COPELAND,
ALICE H. MORRISON.