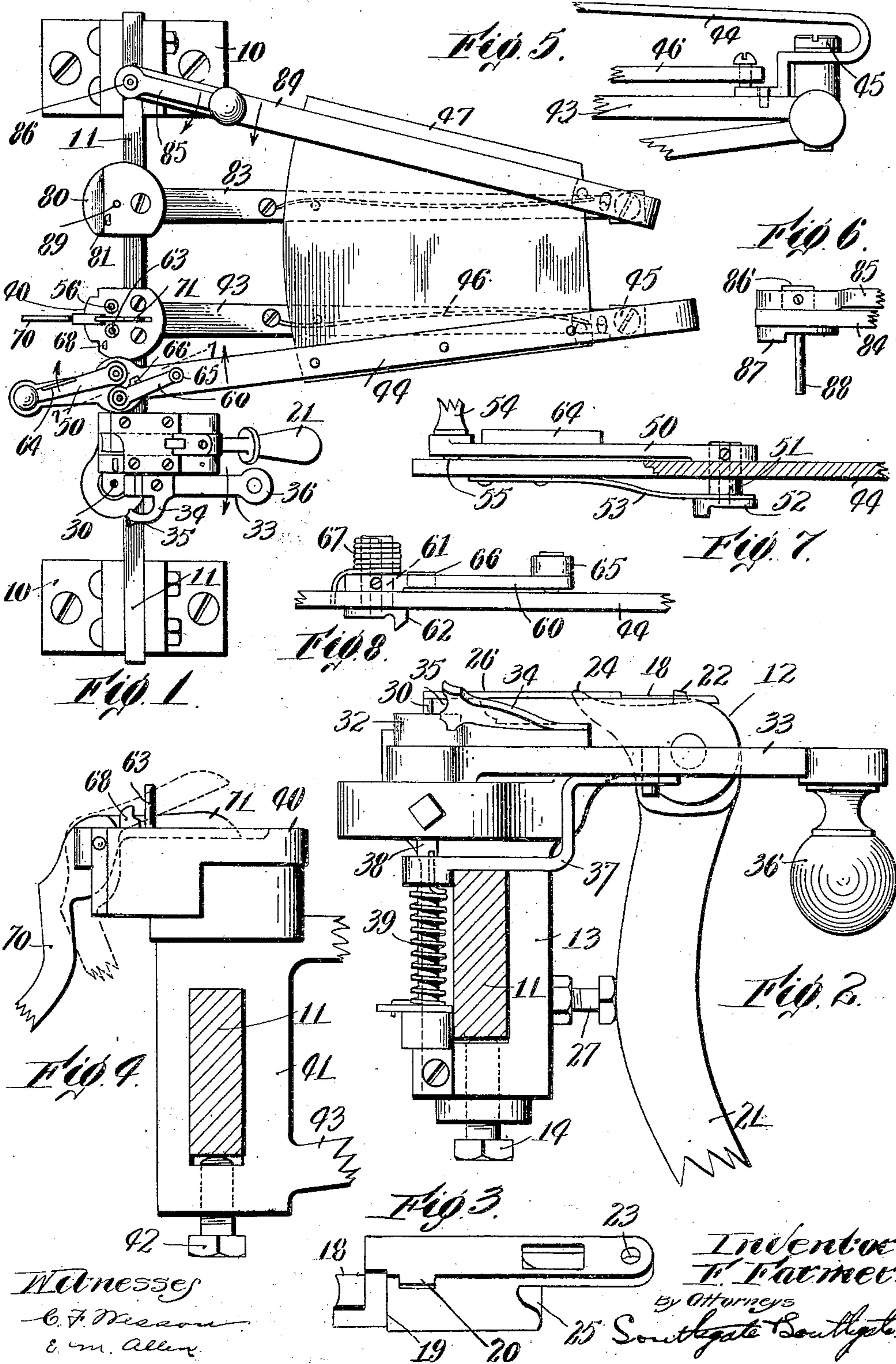


F. FARMER.  
WIRE BENDING DEVICE.  
APPLICATION FILED DEC. 21, 1907.

921,819.

Patented May 18, 1909.

2 SHEETS—SHEET 1.



Witnesses  
C. F. Mason  
E. M. Allen

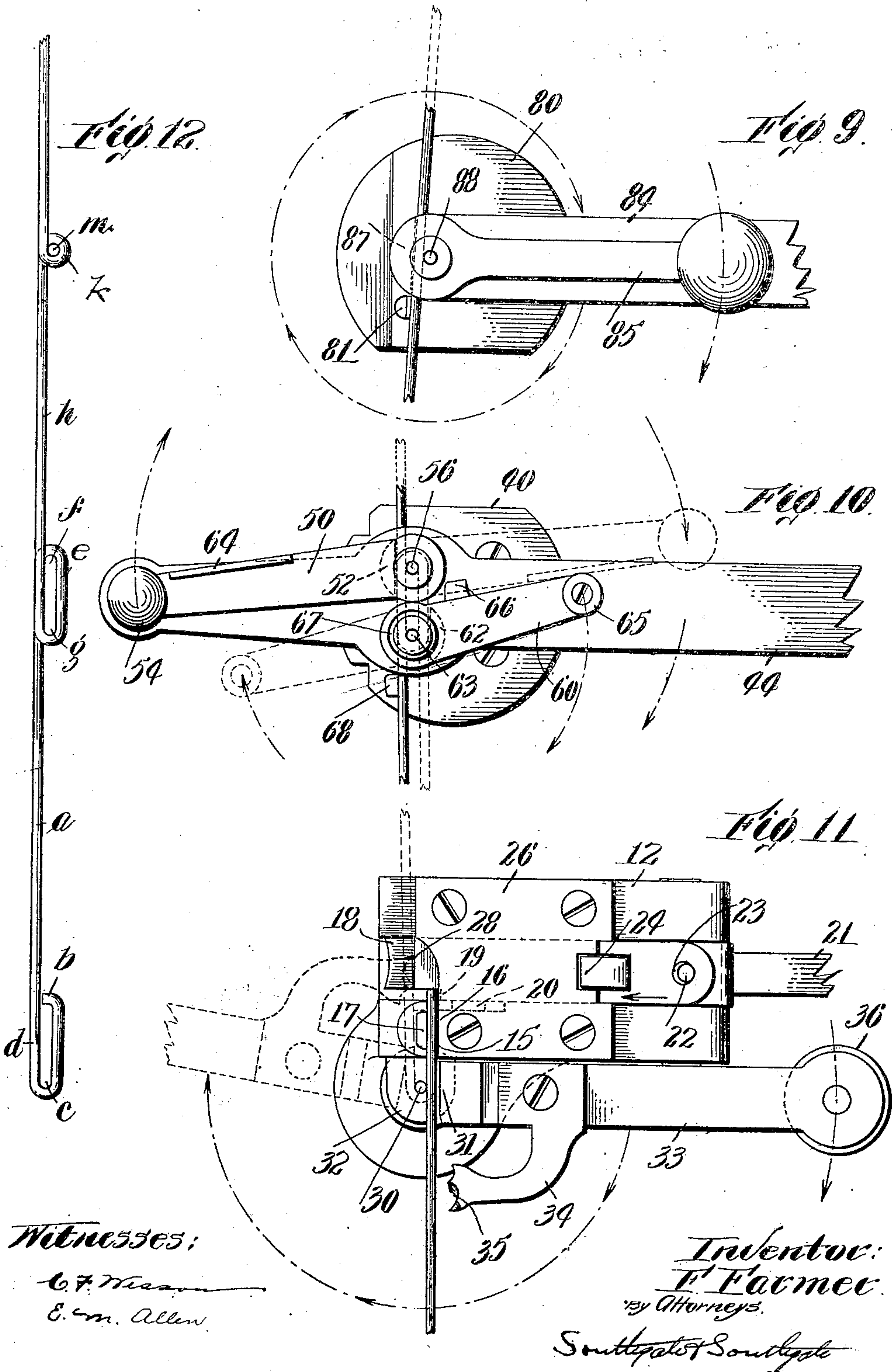
Inventor  
F. Farmer  
By Attorneys  
Southgate Southgate

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Witnesses:

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F. Farmer

by Attorneys.

Southgate & Southgate



# UNITED STATES PATENT OFFICE.

FREDERICK FARMER, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO  
MATTHEW J. WHITTALL, OF WORCESTER, MASSACHUSETTS.

## WIRE-BENDING DEVICE.

No. 921,819.

Specification of Letters Patent.

Patented May 18, 1909.

Application filed December 21, 1907. Serial No. 407,540.

*To all whom it may concern:*

Be it known that I, FREDERICK FARMER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Wire-Bending Device, of which the following is a specification.

This invention relates to a wire bending device or machine, capable of forming a series of loops in a wire. While the invention is capable of general use, it is especially adapted for making jacquard needles and articles of that kind in which a wire is provided with two or more loops, at least one of which is elongated in the direction of the wire, although it is to be understood that the invention is capable of use for the production of any other similar article from wire or the like. It will be described with particular reference to its use for the purpose of making such jacquard needles.

With this end in view the invention comprises in its complete form a series of wire bending devices adjustable with respect to each other, so that the distance between the bends may be regulated at will. The first of these devices is a means for forming a bend at the end of the wire, and comprises also a device for turning the wire about a center when its end is held in the position in which it is bent so that the body of the wire itself turns around 180 degrees in the machine and comes naturally into contact with the second bending device so that it is accurately located in position for the operation thereof. This second bending device comprises a loop former which operates to turn the wire again around a pin and form a loop. In its preferred form it operates to produce an elongated loop and bends it about two pins instead of one. This brings the end of the wire again into position at 180 degrees from the original position of the wire in the first bending device and in contact with another loop former which forms another loop therein. It will be understood, of course, that the relative locations and arrangements of these parts may be varied, and that the invention involves combinations of any two or more of them without the others, and that, of course, when it is not necessary to form all of these loops, one or more of the above mentioned devices may be removed

from the machine or otherwise prevented from operating.

In the form in which the machine is illustrated, the various parts are operated by hand, and this is a convenient and simple way of constructing and operating the machine, but of course, it is not necessary that the parts should be operated by hand, as they might be connected up in any ordinary way for mechanical operation.

Reference is to be had to the accompanying drawings which show a preferred embodiment of the invention, and in which—

Figure 1 is a plan thereof. Fig. 2 is an end elevation showing the supporting bar in section. Fig. 3 is a perspective view of a detail of mechanism for making the first bend. Fig. 4 is an elevation partly in section, showing how the completed article is discharged from the device. Fig. 5 is a fragmentary end view of a supporting arm for one of the loop formers. Fig. 6 is an elevation of the operating end thereof. Fig. 7 is a sectional view on the line 7—7 of Fig. 1, showing a part of the first loop former in elevation. Fig. 8 is an elevation of the same showing another part of this loop former. Fig. 9 is a plan of the loop former shown in Fig. 6. Fig. 10 is a plan on an enlarged scale of the second loop former showing another position of the parts in dotted lines. Fig. 11 is a plan of the head carrying the mechanism for performing the first two operations on the jacquard needle, and Fig. 12 is a view of a product which the machine is capable of producing.

In order to clearly show the operations of the machine as it is illustrated, the jacquard needle to be formed will first be described, reference being had to Fig. 12. The needle *a* is formed from a piece of wire cut to definite length. On its forward end it is provided with a bend *b* and then the wire is bent around an axis *c* to form a loop *d*. Then a loop *e* is made which will be called the elongated loop as it is preferably made elongated in the direction of the wire, but offset therefrom as indicated. This is accomplished first by bending the wire about an axis *f* so as to bring it back parallel with the body of the wire, and then bending it back on an axis *g* in the same direction so that the section *h* of the wire forms a continuation of the main body thereof, and the loop *e* is then completed.



Then a second loop or eye *k* is made by bending the wire about a single axis *m*. The rest of the wire from this point on is straight. It will be seen that there are three sections of wire between the three loops *d*, *e*, and *k*, and beyond the latter all in alinement with each other, the three loops being formed on one side of the body of the jacquard needle. Although as has been stated, the invention may be employed for other purposes, it is herein described with particular reference to the manufacture of such a jacquard needle as that which has been described. Heretofore these jacquard needles have been made substantially by hand, some hand tools being employed for forming the bends, but of such a nature that the operation is slow and expensive. With this invention, even in such simple form as that illustrated, these needles can be made in substantially one-sixth of the time heretofore consumed.

Referring now to the rest of the drawings, it will be seen that the invention is illustrated in a very simple form involving a pair of brackets 10 which may be secured to a bench or the like, and which carry a supporting bar 11 on which the entire operative part of the machine is carried. This support is shown in the form of a bar preferably of uniform cross-section so that the various parts of the device may be adjustable along it to suit the kind of article to be produced.

Reference is to be had now to Figs. 1, 2 and 11 which show a head 12 from which extends a strap 13 having a binding screw 14 by which the head may be secured on the supporting bar 11 in any desired position. Extending inwardly from the outer edge of this head, preferably at the top, is a guide 15 for receiving the end of the wire to be operated upon as indicated in Fig. 11. This guide has an inner wall 16 and an outer wall 17 between which the wire is placed. Slidably mounted in ways in the head is a bolt 18 which has a jaw 19 on its side, and is provided with a flat surface parallel with its direction of motion. When the wire is placed in the guide its end projects past the notch, the bolt being withdrawn as shown in Fig. 11. The first operation of the machine is to force the jaw outwardly to bend the end of the wire to form the bend *b*. This leaves the bent end *b* extending across the end of the wall 17 under the projection 20 on the jaw which holds it in position while the other operations are performed. The motion of the bolt is accomplished by manipulating a lever 21 which is mounted to swing on a pivot supported by the head. This lever is provided with a projection 22 extending through a perforation 23 in the rear end of the jaw. This serves to reciprocate the bolt when the lever is turned, but in order to provide for giving the bolt a positive forward motion, to bend the end of the wire efficiently, the end

of the lever is provided with a cam 24 which engages an inclined surface 25 on the jaw as the lever is raised to positively force the bolt outwardly and form the bend as indicated in dotted lines in Fig. 11. This is of course accomplished by the jaw 19 being forced past the wire so as to bend the same against the end of the wall 17. In the form shown, there is a cap plate 26 on the top of the head carrying the bolt, this cap-plate being removable for obvious purposes. There is also an adjustable screw 27 located on the strap 13 for engagement with the lever when the same is dropped down to hold the lever in such position that the end 28 of the jaw will be flush with the end of the head, so as to receive the wire when the next operation is performed, as will now be described.

When the wire is first put into the machine, as indicated in Fig. 11, it is guided and held in position not only by the walls 16 and 17, but by a pin 30 and a jaw 31 located in line with these walls. This pin is stationary, and is mounted on a projection 32 on the head. The jaw 31 is mounted on a swinging lever 33 which turns about said pin as a center. On this lever also is a projecting arm 34 which has a notch 35 therein for receiving the wire. The lever has a handle 36 by which it may be turned on its axis, and when the end of the wire has been bent to form the bend *b* this lever is turned as indicated in dotted lines in Fig. 11 through about 180 degrees so as to turn the wire about the pin 30 to form the bend at *c* and complete the loop *d* by swinging the wire through an arc of 180 degrees against the end of the head and bolt. The notch 35, of course, engages the wire and helps to swing it around in this position, and in the end this motion presses it against the end of the jaw or head.

In order to provide for automatically returning the lever 33 to its normal position, as indicated in Fig. 11, it is provided with an arm 37 which, as well as the lever itself, has a bearing on a stud 38 concentric with the pin 30. A spring 39 is connected with this arm and with a stationary part of the device to return the parts to the position shown in Fig. 11. The main body of the wire now extends inwardly from the head 12 so as to engage a loop-forming device carried by the support 11 which will now be described. This loop former comprises a plate or anvil 40, as indicated in Figs. 1, 4 and 10, reference also being had to Figs. 5, 7 and 8 for further details of this part of the machine. This carries a strap 41 surrounding the supporting bar 11 and secured thereon in adjusted position by a screw 42 or the like. From this strap a frame 43 extends outwardly at an angle to the supporting bar. On this frame is mounted a spring arm 44 which carries the main part of the loop-forming mechanism. This arm is preferably movably mounted on



the frame so that normally it will be held out of operative position. For this purpose it is shown as being pivoted on a stud 45 at the end of the frame, and as being provided with a spring 46 which normally holds the arm at an angle to the frame. It is also provided with a shield 47, the purpose of which will be described in connection with the description of the operation. This arm is adapted to project over the plate or anvil 40, and normally to be held up therefrom by its own resiliency. At its end it carries the main portions of the loop-forming mechanism which, as shown, comprises a swinging lever 50, to which is fixed a stud 51 that rotates with it, on which is mounted a cam 52 adapted to engage the wire. A spring 53 normally holds the cam down. A handle 54 is provided for operating this lever. Under this handle is located a spring-pressed pin 55 adapted to engage the surface of the arm to assist in holding the lever in proper position when not in use.

It will be seen that when the wire has been brought around into position to engage a pin 56, shown as supported on the plate 40, and the arm 44 has then been pressed down on the plate 40, the rotation of the lever 50 from the position shown in full lines to that shown in dotted lines in Fig. 10, will cause the flat side of this cam 52 to engage the wire, and turn it around the pin 56 to form a bend at *f*. This leaves the wire in the position shown in dotted lines, where it extends back toward the head 12. During this operation the end of the wire is guided under the arm 44 by the guard 47. Now if it is desired to form an elongated loop at this point instead of a circular one, the further rotation of the lever 50 is caused to bend the wire at another point instead of carrying it all the way around at this point, although obviously the parts so far described by themselves could be used to continue the bend and form a circular loop or eye at this point entirely around the pin 56.

For the purpose of forming the elongated loop, an additional lever 60 is mounted on the arm 44. This lever is adapted to turn with a stud 61, on which is mounted a cam 62 similar to the cam 52, but deeper and normally located in opposite position. Now when the wire is brought around, as indicated above, it passes under the cam 62 and comes into contact with a second pin 63, shown as supported by the plate 40. The further rotation of the lever 50 causes a plate 64 on this lever to engage a roller 65 on the lever 60, and to turn the latter lever as the lever 50 is turned. Prior to this a cam 66 operates to engage the lever 50 and lift it so that the cam 52 will be brought up so as to ride over the wire during the rest of the rotation thereof. Now the further rotation of the lever 50 will cause the lever 60 to be rotated and the cam 62 to take the wire around the pin 63 into a

position parallel with its original position, forming the bend at *g* and completing the elongated loop *e*. When the lever 60 reaches the position indicated in dotted lines in Fig. 10, this loop *e* having been completed, the lever 50 is released and the lever 60 is returned to its normal position by a spring 67, the lever 50 then being brought by hand back to its original position as shown in full lines.

It will be observed that the wire after being bent in the head 12 comes into contact with the two pins 63 and 56. This is facilitated by a projection 68 on the head 40 having an inclined upper surface over which the wire may ride, and a straight inner surface for engaging the wire after it slips over this inclined surface. The wire is really held between this flat surface and the pins on the head 40. This head is also provided with an extractor shown in Figs. 1 and 4, comprising a lever 70 having a head 71 located in a slot in the plate 40 between the pins 56 and 63, and adapted to receive the wire, so that it may be held in proper vertical position. When the complete article is formed this lever is swung on its pivot as indicated in dotted lines in Fig. 4, to raise the wire off the pins 56 and 63 and extract it from the machine.

It will be understood, of course, that the arm 44 is a spring arm, its own resiliency normally holding it up away from the pins so the wire may come into proper position against the pins without contact with the cams on the under side of this arm. When the wire comes into this position, the arm is lowered and guided into proper position by the pins entering holes in the arm. It is brought into and held in position by hand preferably.

In order to form the circular loop *k*, the wire in the last position described comes over another plate or anvil 80 which has a projection 81 thereon having an inclined upper surface and a flat guiding surface like the projection 68. This plate or anvil 80 is similar to the plate 40, being fixed to the supporting bar 11 in the same way. It is provided with a frame 83 and an arm 84, the details of which will not be described, as they are similar to the frame 43 and arm 44 respectively, except that the guard 47 may be omitted on the arm 84, as one guard may extend clearly across the space between the two frames and serve to guide the wire under both arms, for that is the purpose of this guard. On this arm 84 is a lever 85 shown in Figs. 1, 6 and 9, having a stud 86, cam 87, and pin 88. It will be seen that in this case the pin is supported by the arm instead of by the plate. However it will be obvious that the plate 80 might support the pin if desired. In either case the pin is guided in a hole 89 which is, of course,



located in the plate 80 if the pin is located on the arm. In order to form the circular loop or eye *k*, this arm is simply swung around 360 degrees as is indicated in the drawings. This completes the formation of such a jacquard needle as shown in Fig. 12.

It will be seen that as the head and the two plates 40 and 80 are adjustable along the supporting bar 11, the distance between the loops may be varied at will, and in fact the two plates 40 and 80 may be interchanged if desired, so that the elongated loop may come on the other side of the circular loop, or either one may be used without the other in accordance with the form of the article to be produced. The same is true of the head.

While I have illustrated and described a preferred form of the invention, I am aware that many modifications may be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular form of the invention illustrated and described, but—

What I do claim is:—

1. In a wire bending device, the combination of a guide for receiving the wire, a reciprocating jaw for bending the end of the wire, a hand operated handle, means operated by the handle for moving the jaw, a cam connected with the handle for positively operating the jaw during the bending operation, and independent means on the handle for retracting the jaw when the handle is moved in the opposite direction.

2. In a wire bending device, the combination of a head having a groove therein at one side in which the end of a wire is adapted to be inserted, a bolt having a jaw adapted to slide in said head past the end of said groove, a handle pivoted on said head and having positive means for engaging the bolt and operating it and independent means on the handle for retracting the jaw when the handle is moved in the opposite direction.

3. In a wire bending device, the combination of a head having a groove in one edge thereof extending inwardly and adapted to receive a wire, a bolt having a jaw reciprocable past the end of said groove for bending the end of a wire located therein, a handle pivoted on said head, and a cam mounted on said handle engaging the bolt for operating it and independent means on the handle for retracting the jaw when the handle is moved in the opposite direction.

4. In a wire bending device, the combination of a guide for receiving the wire, a bolt having a jaw located in position for receiving the end of the wire when in said guide, means for positively forcing said jaw past the guide in a direction at right-angles with the

axis of the wire held therein, a pin mounted adjacent to said guide and in line with the other wall thereof, and means for bending the wire around said pin after the end is bent up by means of said jaw.

5. In a wire bending device, the combination of a guide for receiving the wire, a reciprocating jaw for bending the end of the wire, a handle, means operated by the handle for moving the jaw, means connected with the handle for positively operating the jaw during the bending operation, a pin mounted adjacent to said guide and in line with the outer wall thereof, and means for bending the wire around said pin after the end is bent up.

6. In a wire bending device, the combination of a head having a groove extending inwardly from one edge thereof for receiving a wire, a jaw adapted to reciprocate past the groove to bend the wire, a pin mounted on the head in line with the outer wall of said groove and beyond the end of the groove, and means for bending the wire around said pin while the end is held in said groove to form a loop therein.

7. In a wire bending device, the combination of a head having a groove extending inwardly from one edge thereof for receiving a wire, a jaw adapted to reciprocate past the groove to bend the wire, a pin mounted on the head in line with the outer wall of said groove and beyond the end of the groove, and means for bending the wire around said pin into contact with the end of said jaw and the outside of the outer wall of the head.

8. In a wire bending device, the combination of a head having a groove extending inwardly from one edge thereof for receiving a wire, a jaw adapted to reciprocate past the groove to bend the end of the wire, a pin mounted in line with the outer wall of said groove and beyond the end of the groove, means for bending the wire around said pin while the end is held in said groove to form a loop therein, and a handle for turning said means through an angle of 180 degrees.

9. In a wire bending device, the combination of a head having a groove for receiving a wire, a jaw adapted to bend the wire, a pin mounted substantially in line with the outer wall of said groove and beyond the end of the groove, means for bending the wire around said pin while the end is held in said groove to form a loop therein, a handle for turning said means to form a loop, and a spring for automatically returning the handle to initial position after the loop is made.

10. In a wire bending device, the combination of a head having a groove for receiving a wire, a jaw adapted to bend the wire, a pin mounted on the head in line with the outer wall of said groove and beyond the end of the groove, and means for bending the wire



around said pin while the end is held in said groove to form a loop therein, said means comprising a jaw normally located in alignment with the inner wall of said groove and constituting with the pin a part of the guide for said wire, said jaw being rotatable about the pin as an axis.

11. In a wire bending device, the combination of a head having a groove for receiving a wire, a jaw adapted to move past the groove to bend the wire, a pin mounted substantially in line with the outer wall of said groove and beyond the end of the groove, and means for bending the wire around said pin to form a loop therein, said means comprising a jaw mounted to swing about said pin as a center and constituting with the pin when in normal position, a part of said guide, and an arm extending outwardly and adapted to engage the wire, said arm when in normal position being in line with the swinging jaw and with the inner wall of the groove.

12. In a wire bending device, the combination of a guide for the end of a wire having an inner wall, and an outer wall, a jaw movable past the end of said guide to bend a wire therein, a pin in line with the outer wall of said guide and beyond the end thereof, a swinging jaw adapted to swing about the pin as a center and forming a continuation of the inner wall of the guide when in normal position, and an arm mounted to swing with said swinging jaw and having an end constituting a guide for the wire in line with said swinging jaw and, when in normal position, in line with the inner wall of the groove.

13. In a wire bending device, the combination of a guide for the end of a wire having an inner wall and an outer wall, a pin in line with the outer wall of said guide and beyond the end thereof, and swinging means normally in line with the inner wall for bending the wire about said pin to form a loop.

14. In a wire bending device, the combination of a guide for the end of a wire having an inner wall and an outer wall, a pin in line with the outer wall of said guide and beyond the end thereof, and swinging means normally in line with the inner wall for bending the wire about said pin to form a loop, said swinging means having a projecting arm constituting a guide for the wire and adapted to carry the free end of the wire into a position at substantially 180 degrees to its original position.

15. In a wire bending device, the combination of a head having a groove for receiving a wire, a jaw adapted to reciprocate past the guide to bend the wire, a pin mounted on the head in line with the outer wall of said guide and beyond the end of the guide, and means for bending the wire around said pin while the end is held in said guide, said means comprising a jaw normally located in alignment

with the inner wall of said guide and constituting with the pin a part of the guide, said jaw being rotatable about the pin as an axis, said arm being movable into a position alongside the outer wall of said guide to hold the wire after the loop is formed.

16. In a wire bending device, the combination of a head having means for receiving a wire, a jaw adapted to bend the wire, a stationary pin and means for bending the wire around said pin to form a loop therein, said means comprising a movable jaw and constituting with the pin a part of a guide for said wire, said jaw being oscillatable about the pin as an axis, and means located in position to engage the wire when formed into the loop for performing another bending operation upon it.

17. In a wire bending device, the combination of a guide for receiving a wire, means adapted to bend the end of the wire when in said guide, a pin located adjacent to said guide, means for bending the wire around the pin after the end is bent, to form a loop, said means comprising wire engaging devices which in normal position constitute a continuation of said guide mounted to swing about said pin as a center to bring the main body of the wire into a position parallel with the part held in said guide, and means located in position to engage the wire when brought into such position for performing another bending operation upon the body of the wire.

18. In a wire bending device, the combination of means for bending the end of a wire, means for thereafter bringing the body of the wire around parallel to the position of the end on which the bend has been made and thus form a loop, and means located in position to receive the body of the wire remote from the loop when so bent around for forming another complete loop in the wire separate from the first loop.

19. In a wire bending device, the combination of means for bending the end of a wire, means for thereafter bringing the body of the wire around parallel to the position of the end on which the bend has been made and thus form a loop, and means located in position to receive the body of the wire when so bent around for forming another loop in the wire, a support for all of said means, and means for adjustably securing one of the loop forming means on said support.

20. In a wire bending device, the combination of means for bending the end of a wire, means for thereafter bringing the body of the wire around parallel to the position of the end on which the bend has been made to form a loop, and means located in position to receive the body of the wire when so bent around for forming another loop in the wire, said last named means comprising a cam adapted to engage the wire, a pin also adapt-



ed to engage the wire, and means for turning the cam to bend the wire about the pin.

21. In a wire bending device, the combination of means for bending the end of a wire, means for thereafter bringing the body of the wire around parallel to the position of the end on which the bend has been made and thus forming a loop, and means located in position to receive the body of the wire when so bent around for forming another loop on the wire, said last named means comprising a cam adapted to engage the wire, a pin also adapted to engage the wire, means for turning the cam to bend the wire about the pin, and a spring arm on which said last named means is mounted, said arm being bodily movable.

22. In a wire bending device, the combination of means for holding the end of a wire, means for bending the body of the wire into a loop while said end is in stationary position, means for engaging the body when swung around to form the loop for turning the body of the wire about an axis to form another bend therein, and a spring arm pivotally mounted on said frame for holding said turning means.

23. In a wire bending device, the combination of means for holding the end of a wire, means for bending the body of the wire into a loop while said end is in stationary position, means for engaging the body when swung around to form the loop comprising a pin, a cam adapted to turn the body of the wire about said pin to form another bend therein, means for turning said cam about the pin as an axis, a frame, and a spring-arm pivotally mounted on said frame for holding said turning means.

24. In a wire bending device, the combination of means for holding the end of a wire, means for bending the body of the wire into a loop while said end is in stationary position, and means for engaging the body when swung around to form the loop comprising a pin, a cam adapted to turn the body of the wire about said pin to form another bend therein, means for turning said cam about the pin as an axis, a frame, a spring-arm pivotally mounted on said frame for holding said turning means, a spring for normally holding said arm at an angle to the frame, and a guard for preventing the wire from passing over said arm.

25. In a wire bending device, the combination of a guide for holding the end of a wire, means for swinging the body of the wire around 180 degrees while the end is held in said guide, a pin for receiving the body of the wire when so swung around, means for bending the body of the wire about said pin, an arm for supporting said means, and a guard for preventing the body of the wire from swinging over said arm when being bent.

26. In a wire bending device, the combi-

nation of a guide for holding the end of a wire, means for turning the wire around 180 degrees while the end is held in said guide to form a loop, a plate, a projection on said plate having an inclined surface for receiving the body of the wire, said projection being adapted to hold the wire in position after it passes over said inclined surface, a pin for engaging the opposite side of the wire, and a bending device adapted to bend the wire about said pin, said plate being adjustable toward and from said guide.

27. In a wire bending device, the combination of a guide, a pin, means for bending the wire about said pin when the end thereof is held in said guide, a plate, a pin adjacent to said plate against which the wire rests when bent to form said loop, means for bending the wire about said pin, a support on which said guide and plate are adjustably mounted, whereby their distance apart may be regulated, and means for freeing the wire from the second pin.

28. In a wire bending device, the combination of means for forming a bend in the end of a wire, means for holding said bend in the position in which it is formed, means for bringing the body of the wire around to form an end loop, the end of which comprises said end bend, and independent means for forming a complete loop in the wire at a predetermined distance from the end loop.

29. In a wire bending device, the combination of means for bending the wire to form an end loop with its axis substantially parallel with the axis of the wire, and means for forming a second parallel loop, the two bending means being adjustable toward and from each other.

30. In a wire bending device, the combination of means for forming a bend in the end of a wire, means for bending the wire to form an end loop, and means for forming a complete elongated loop, the axis of which is in line with said wire, the two bending means being adjustable toward and from each other.

31. In a wire bending device, the combination of means for forming a bend in the end of a wire, means for bending the wire to form an end loop, and means for forming a complete loop in the wire at a predetermined distance from the end loop, said last named means comprising means for first bending the wire back about an axis and then bending it forward again about an axis between the first named axis and the end loop.

32. In a wire bending device, the combination of means for bending the wire to form an end loop, and means for forming a complete loop in the wire at a predetermined distance from the end loop, said last named means comprising means for first bending



the wire back about an axis and then bending it forward again about an axis between the first named axis and the end loop, said means for forming the complete loop being adjustable with respect to the means for forming the end loop.

33. In a wire bending device, the combination of a support, a head adjustably mounted on said support, a plurality of plates adjustably mounted on said support, and swinging means carried by each of said plates and by the head for turning a wire about an axis and forming bends therein.

34. In a wire bending device, the combination of a supporting bar, a head adjustable along said bar, a plurality of plates adjustable along said bar, both located at the same side of said head, means connected with said head for bending a wire and leaving it in position across said plates, means connected with the plate nearest the head for forming a loop in said wire and leaving the end thereof extending across the second plate, and means connected with the second plate for forming another loop in the wire.

35. In a wire bending device, the combination of a head, two plates adjustably mounted with respect to said head, means connected with said head for forming a loop in the end of the wire and leaving the wire in contact with the nearest one of said plates, means connected with the said nearest plate for forming an elongated loop in said wire and leaving the end of the wire in contact with the second plate, and means connected with the second plate for forming a circular loop in the wire.

36. In a wire bending device, the combination of a pair of plates adjustable toward and from each other, means connected with one of said plates for forming an elongated loop

in the wire and leaving the end of the wire in contact with the other plate, and means connected with the other plate for forming a circular loop in the wire.

37. In a wire bending device, the combination of a plate having two pins projecting therefrom against which a wire is adapted to rest, an arm connected with said plate, means on said arm for forming two bends in said wire so as to produce an elongated loop parallel with the direction of the wire and over said pins and leave the end of the wire in contact with the second plate, and means connected with the second plate for forming a second loop in the wire.

38. In a wire bending device, the combination of a plate, a pair of pins thereon against which a wire is adapted to rest, means connected with said plate for forming a loop in the wire over said pins, and an extractor located between the pins to extract the wire therefrom.

39. In a wire bending device, the combination of a plate, means connected with said plate for forming a loop in the wire, and an extractor mounted on said plate and comprising a lever adapted to engage the wire and remove it from the plate.

40. In a wire bending device, the combination of a guide for the wire, and a reciprocable bolt having a jaw for bending the wire and having a projection for covering the wire when bent to hold it in position in the guide.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

FREDERICK FARMER.

Witnesses:

ALBERT E. FAY,  
C. FORREST WESSON.