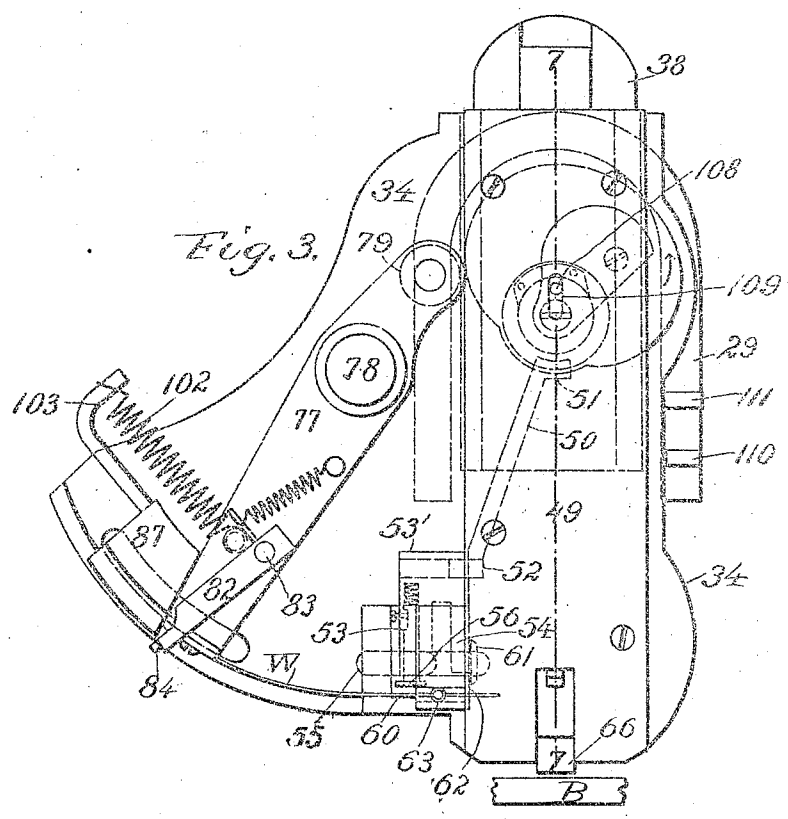
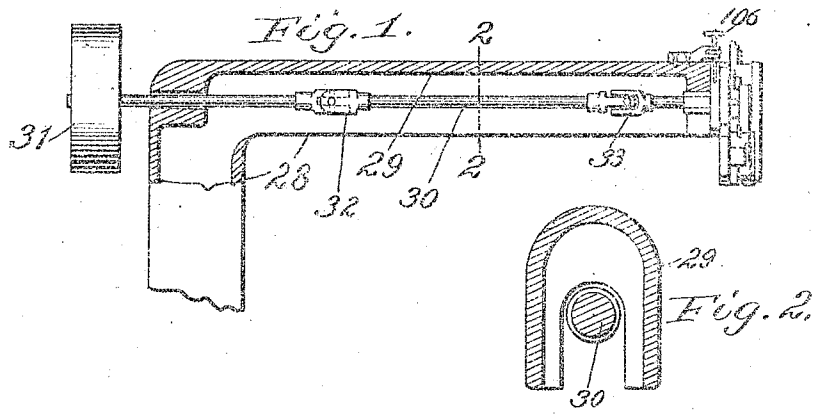




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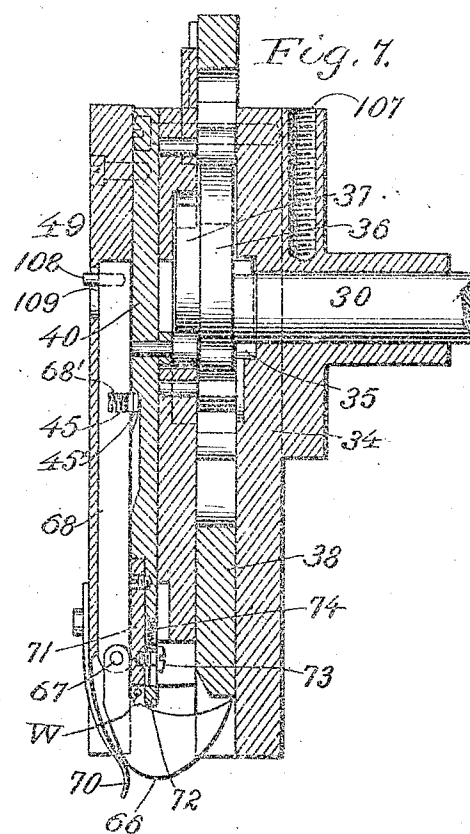
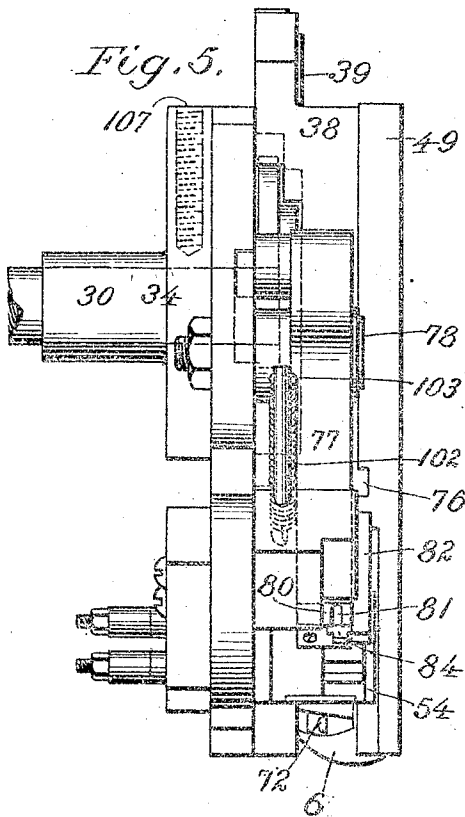
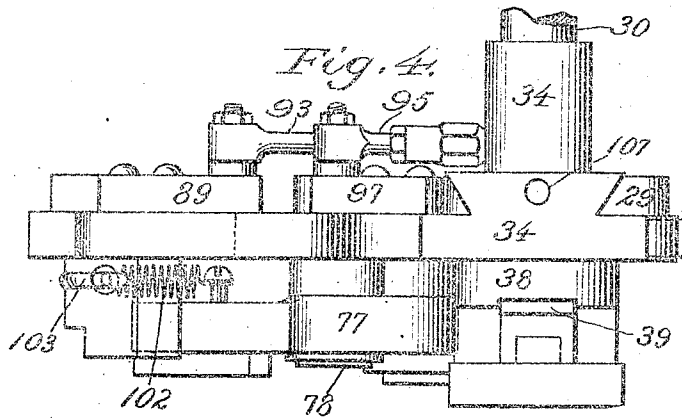
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WIRE STITCHING MACHINE.
APPLICATION FILED JAN. 5, 1909.

Patented Jan. 18, 1910.

4 SHEETS—SHEET 2.



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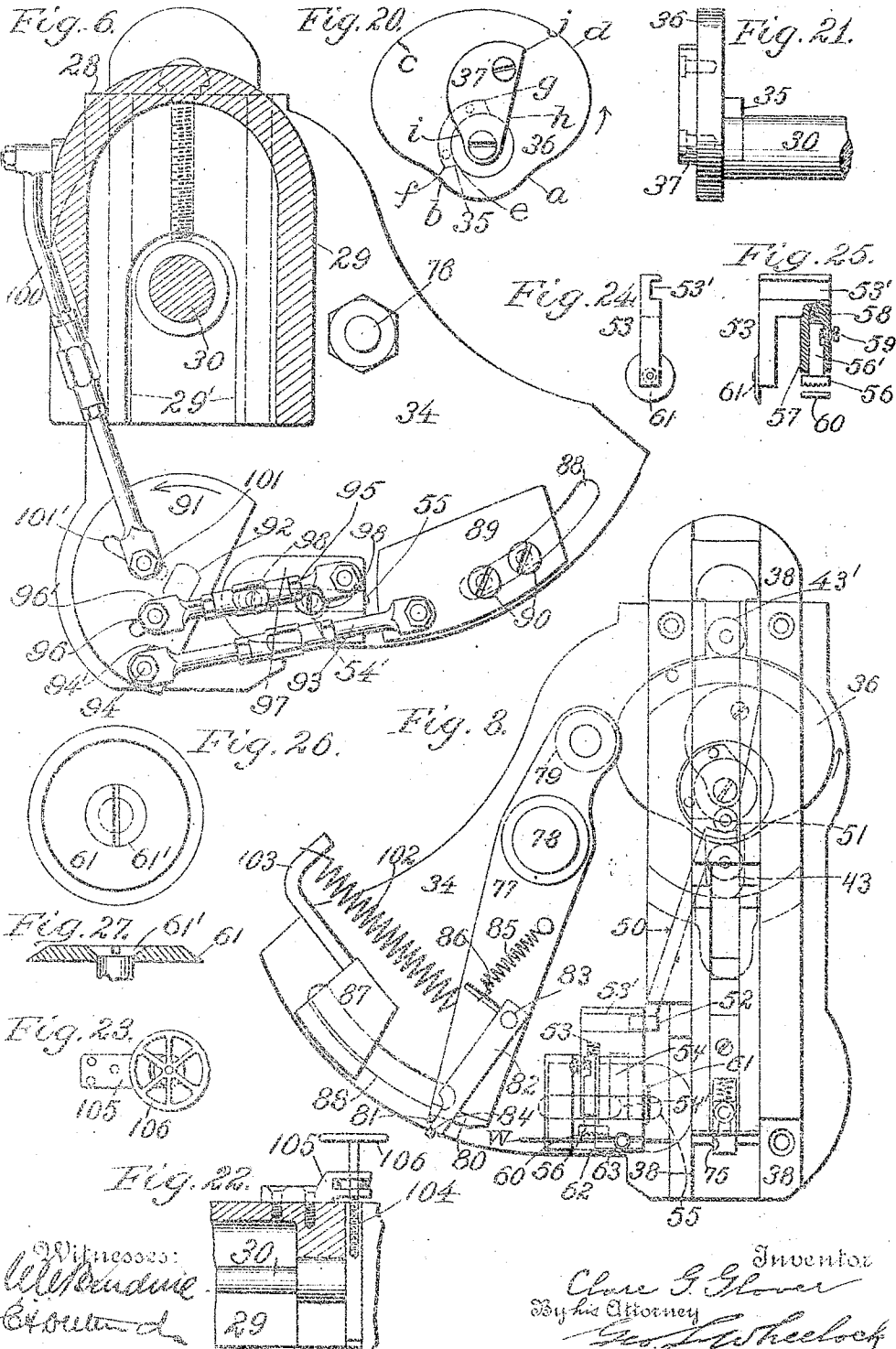
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4 SHEETS—SHEET 3.



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4 SHEETS-SHEET 4.

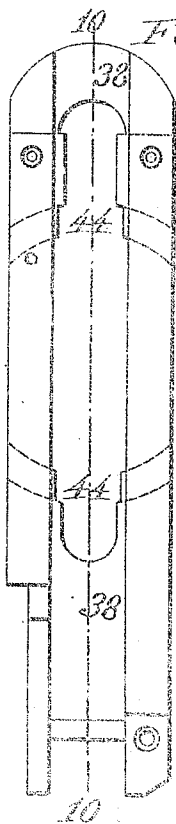


Fig. 9.

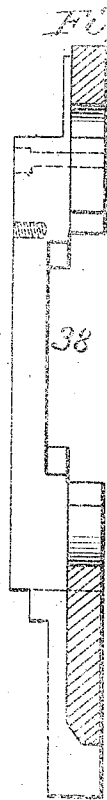


Fig. 10.

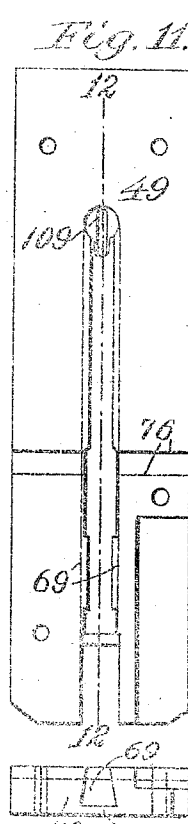


Fig. 11.

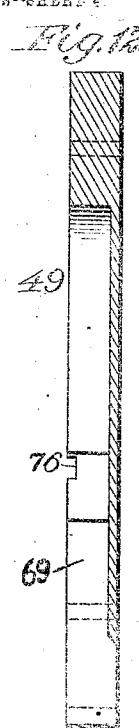


Fig. 12.

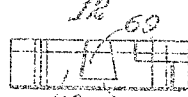


Fig. 13.

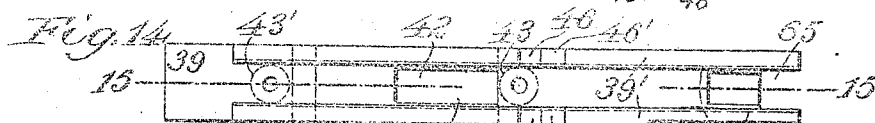


Fig. 14.

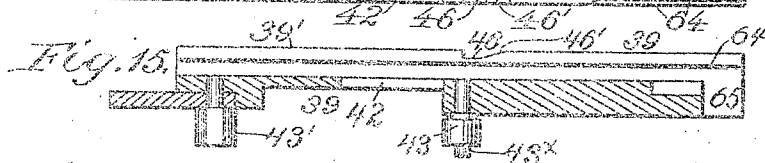


Fig. 15.

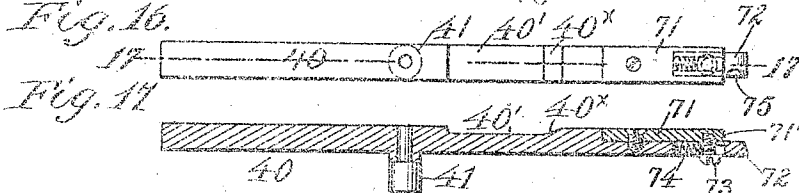


Fig. 16.

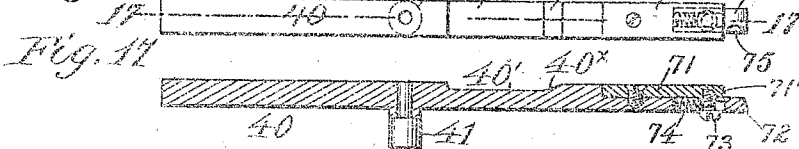


Fig. 17.

Fig. 18. 45^x
45^x 45
45^x 47

Fig. 19. 45^x
45^x 47
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UNITED STATES PATENT OFFICE.

CLARE G. GLOVER, OF NEW YORK, N. Y., ASSIGNOR TO HENRY A. MULLER COMPANY,
A CORPORATION OF NEW YORK.

WIRE-STITCHING MACHINE.

946,799.

Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed January 5, 1909. Serial No. 470,842.

To all whom it may concern:

Be it known that I, CLARE G. GLOVER, a citizen of the United States, and resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Wire-Stitching Machines, of which the following is a specification.

My invention refers to improvements in wire stitching machines and the objects of my invention are to provide a simple and efficient device whereby wire may be drawn from a reel, cut, shaped into a staple and forced into the article which is to be stitched. I accomplish these and other useful objects by the means hereinafter specified and set forth more particularly in the claims.

In the accompanying drawings forming part of this specification and wherein corresponding letters and figures of reference refer to corresponding parts, Figure 1 is a vertical longitudinal section through the portion of the frame of the machine upon which the working parts are mounted, the latter being shown in side elevation. Fig. 2 is an enlarged section along line 2—2 in Fig. 1. Fig. 3 is a front view on a still larger scale, Fig. 4 a ground plan, Fig. 5 a side elevation, and Fig. 6 is a rear view, partly in section, of the principal mechanism of the machine. Fig. 7 is a section along line 7—7 in Fig. 3, and Fig. 8 a view corresponding with Fig. 3, the cover plate, however, being omitted. Fig. 9 is a front view of a slide box forming part of the mechanism, and Fig. 10 a section along line 10—10 in Fig. 9. Fig. 11 is an inner view of the outside face plate, and Fig. 12 a section along line 12—12 in Fig. 11. Fig. 13 is a bottom view of said face plate. Fig. 14 is a front view of a former embodied in the mechanism, and Fig. 15 a section along line 15—15 in Fig. 14. Fig. 16 is a front view of a driver coacting with the former illustrated in Fig. 14, and Fig. 17 a section along line 17—17 in Fig. 16. Fig. 18 is a side view, and Fig. 19 an end view partly in section of a detail. Fig. 20 is a front view of a set of cams employed in the apparatus, and Fig. 21 a side view of the same. Fig. 22 is a vertical section through part of the frame of the machine with part of the head attached, and Fig. 23 a top view of part of Fig. 22. Fig. 24 is a side view, and Fig. 25 a rear view of the cutter

bar. Fig. 26 illustrates a wire cutter employed by me, Fig. 27 being a section along line 27—27 in Fig. 26.

In the drawings 28 is the frame of the machine having an upper horizontal arm 29 U-shaped in cross section, the rear end of which contains the bearing for the driving shaft 30, carrying a pulley 31, said shaft being made flexible by having interposed between its sections two coupling joints 32 and 33, one placed at right angles to the other.

34 is a plate containing a bearing for the front end of shaft 30. Said plate in the rear has a dovetail cross section which is adapted to slide vertically in a flange 29' at the front end of arm 29.

35, 36 and 37 are three cams fixedly mounted on shaft 30 in front of plate 34.

38 is a plate, shown in detail in Figs. 9 and 10, called the slide box screwed to plate 34 so as to permit the cams 36, 37, to operate between said two plates.

39 is a device, shown in detail in Figs. 14 and 15, for shaping the staple, hereinafter called the former, the configuration given by it to a wire staple being the usual U-shape.

40 is a device, shown in detail in Figs. 16 and 17, hereinafter termed the driver, for driving the staple, after it has been cut off and shaped, into the article such as a book B which is to be stitched, no arrangement being shown here for clenching the legs of the staple after the same pass through such article, as I propose to use any of the various well known devices now employed for that purpose. Said driver fits into and is adapted to travel along former 39 between flanges 39' so as to bring the faces of said flanges and of the driver even.

41 is a roller mounted on said driver which passes through slot 42 in former 39.

40' is a groove on the face of the driver having a slope 40*.

43 and 43' are two rollers mounted upon former 39 and passing through slot 44 in plate 38.

43* is the pin on which roller 43 revolves. The upper projecting surface of said pin is flattened.

45 is a device, shown in detail in Figs. 18 and 19, hereinafter called a supporter stop having a shank 45' and two arms 45*.

which latter are adapted to rest in notches 46, 46, on the two side flanges 39' of former 39, 46' being sloping sides of said notches and 40* before mentioned slope in notch 40', notches 46 and 40' being made of equal depths.

47 is a spiral spring inserted in a socket in shank 45'. The shank 45' is inserted in a socket 68' in guide bar 68 hereinafter mentioned, and the said spring 47 bears on the bottom of the said socket.

50 is a rod, shown in dotted lines in Figs. 3 and 8, having heads 51 and 52, head 52 fitting in a horizontal groove 53' on a saddle shaped bar 53, which is shown in detail in Figs. 24 and 25, and is hereinafter called the cutter bar.

54 is a block hereinafter called the cutter block adjustably attached to plate 34 along which bar 53 is made to slide vertically, two vertical grooves being provided for such purpose in block 54, within which the legs of the cutter bar fit. A horizontal projection or flange 54', Figs. 3, 6 and 8, on block 54 fits into and is adjusted to travel in a horizontal slot 55 in plate 34.

56 is a wire stop having a corrugated foot, its shank 56' extending into a vertical socket 57 in one of the legs of cutter bar 53.

58 is a small spiral spring for actuating said shank and for compelling it to slide in said socket, 59 being a set screw inserted in bar 53 and engaging with a flat portion on said shank for limiting its travel and preventing it from revolving.

60 is a wire guide fixedly attached to block 54 underneath wire stop 56.

61 is a circular cutter suitably and revolvably secured to the side of the other leg of cutter bar 53 by a counter-sunk screw 61', Fig. 27.

62 is a tube inserted in a horizontal perforation in the cutter block and held in position by a set screw 63. Said tube serves as a guide for the wire and its center line is placed about even with the upper surface of wire guide 60, and slightly above the cutting edge of the cutter when the same is in its lowest position, whereby the cutter will be slightly revolved and automatically every time the wire is cut and a new cutting edge will be thus placed in operative position after each cutting operation. This is due to the torsional action of the wire upon the cutter in finding its normal central position after it has been displaced during the cutting action of the cutter.

64, 64 are grooves in flanges 39' of former 39 in which the legs of the staple travel. The recessed end 65 at the foot of former 39, including grooves 64, corresponds in width with the width of the staple which is to be manufactured.

66 is a crescent shaped lever, Fig. 7, forming an anvil piece hinged at 67 to a guide

bar 68 which is adjusted to slide in a dove-tailed groove 69 in face plate 49. 70 is a leaf spring attached to said face plate and serving to force anvil piece 66 rearward.

71 is a driver tip, Figs. 16 and 17, screwed to driver 40, the end 71' of which serves to drive the finished staple into the article which is to be stitched, and 72 a feed guide for the wire having a slotted shank adjusted to slide along said driver tip and guided by a screw 73 screwed into said tip, which screw also limits the travel of guide 72. 74 is a spring for actuating said guide 72. 75 is a slope on said guide so positioned as to guide the wire to the center of grooves 64. It is important that while feeding the wire the same should come directly underneath grooves 64, as otherwise in forming the staple the ends of the wire would become deflected and would not enter into said grooves. The spring actuated feed guide above described serves to prevent lateral movement of the wire while the driver occupies varying positions with reference to the work. The spring 74 is necessary to allow the guide to move upwardly in relation to the driver to allow the driver to contact with the wire, and the slope is useful for guiding the wire to its proper position.

76 is a horizontal slot on the inner face of cover plate 49 adapted to engage with arms 45*.

Cam 36 controls the feed of the wire by the following means: 77 is a feed lever fulcrumed to plate 34 at 78. 79 is a roller at the upper end of said lever in engagement with cam 36. 80 is a tip at the lower end of said lever having a slot 81 which guides the wire. Said slot is concentric with fulcrum 78. 82 is a wire catch fulcrumed to lever 77 at 83 eccentrically with reference to slot 81 so that in case said lever is swung away from cutter box 54, a toe 84 at its lower end which extends rearward and underneath tip 80 will be thrown away from the notch in said lever so as to release wire W that has been held between it and the groove in said lever. 85 is a spiral spring attached to the feed lever and to a pin 86 which connects with wire catch 82 so as to normally hold its lower end against the wire confined between it and tip 80. 87 is a wire adjusting stop for limiting the movement of the feed lever. The same is adjusted to travel along a slot 88 in plate 34. 89 is a plate on the opposite side of plate 34 to which stop 87 is secured by clamps 90. See Fig. 6. 91 is a disk turning on a pivot 92 on plate 34. 93 is a connecting rod articulated to disk 91 at 94 and also to plate 89, and 95 a rod articulated to said disk at 96 and also to a plate 97 which is clamped to the cutter box 54 by means of clamps 98, 98 passing through slot 55 in plate 34. 100 is a rod connecting frame 28 with disk 91 to which it is articulated at 101. The clamps 100

at points 94, 96 and 101 passing through disk 91 to which said connecting rods are articulated, are adapted to travel in slots 94', 96' and 101', respectively, in said disk, said slots running radially with reference to pivot 92. Clamps 96 and 101 are placed at equal distances from pivot 92 and clamp 94 at double such distance, the line of slots 94' and 96' being approximately at right angles to that of slot 101'. 102 is a spring attached to an arm 103 on stop 87 and to lever 77. 104 is a screw, shown clearly in Fig. 22, passing through a lug 105 on frame 28 and provided with a hand wheel 106, which screw extends into a screw socket 107 on plate 34.

108 is a pin on guide bar 68 adjusted to travel in a slot 109 in face plate 49.

110 is a stud projecting forward from frame 29 and 111 a stud above stud 110 and projecting sidewise from plate 34. See Fig. 3.

The operation of the device is as follows: The wire *W* is inserted between tip 80 and toe 84 and introduced underneath wire stop 56, cutter 61 and former 39, while the cutter bar and said former are in their elevated positions. The machine is then set in operation in such manner as to make cams 35, 36 and 37 revolve in the direction of the arrows, and the different cams then act as follows: As the portion of the circumference of cam 36 indicated by *a, b*, comes in contact with roller 79 the lower end of lever 77 will occupy a position farthest removed from the cutter bar and in contact with stop 87, spring 102 holding it in such position. At the same time the lower part of the circumference of said cam will engage with roller 43. After that, surface *b c* engages with roller 79 thereby throwing tip 80 and with it wire catch 82 and the wire interposed between the same toward the cutter bar thus feeding the wire, while surface *d a* draws roller 43, and with it former 39, downward till the lower end of said former strikes the wire and begins to form the staple. As cam 36 revolves farther, surface *c d*, which is concentric with the axis of the cam, will maintain lever 77 in its position. Then surface *e f* on cam 35 will strike head 51 and will push down rod 50 thereby forcing down the cutter bar so as to grasp the wire between wire stop 56 and wire guide 60 while cutter 61 cuts the wire, the former at the same time by its contact with the wire, as described, preventing the wire from jumping during such cutting operation. Wire *W* is then underneath grooves 64, surface *f g* on cam 35 maintaining it there, while surface *b c* on cam 36 continues to force roller 43 and with it former 39 downward against the upper surface of anvil piece 66, the width of which corresponds with the inner width of the staple to be produced. At the same time the end parts of the cut off piece

of wire will be forced into those portions of grooves 64 which extend along the anvil piece, thus shaping the staple. After former 39 has moved downward to the extent of about half its travel and below tube 62 spring 47 will force arms 45* on supporter stop 45 out of groove 76 in face plate 49, in which they have been resting, and will force the same into notches 46 in former 39 and into grooves 40' in the driver, thus connecting the former with driver 40 and causing the two to afterward travel together and with them guide bar 68. This will move anvil piece 66 downward, former 39 at the same time swinging it forward slightly and driver 40 swinging it forward farther so as to permit the staple in the rear of anvil piece 66 to be forced downward, after which spring 70 will force the anvil rearward, so as to bring its upper surface substantially even with the bottom of former 39 for the purpose of keeping the horizontal part of the staple from bending as the staple is being driven by driver 40 into the article to be stitched. Thereupon surface *i j* on cam 37 begins to actuate driver 40 so as to move the same downward, while surface *d a* on cam 36 releases roller 79 and permits spring 102 to again draw lever 77 toward stop 87. After this, cam surface *g h* releases head 51 and cam 36 actuates roller 43' so as to move roller 43' upward, whereby the flattened portion of pin 43* is made to catch on shoe 51 of bar 50 so as to pull the cutter bar upward and release the wire. As former 39 travels upward, bevels 46' on flanges 39' will engage with arms 45* and force the same back into groove 76 on face plate 49, thus disconnecting the former and the driver from guide bar 68 and confining the latter in its elevated position, and it will therefore be seen that it is the function of supporter stop 45 to regulate the relative positions of parts 39, 40 and 68, and also the position of guide bar 68 relative to face plate 49.

After the guide piece 68 and the former and the driver have been so brought back into their elevated positions the machine is ready for another operation.

Pin 108 moving in slot 109 limits the downward movement of guide bar 68.

The appliances attached to the rear face of plate 34 in combination with screw 104 are employed to adjust the relative positions of the feeding, cutting and forming devices in accordance with the various lengths of the legs of the staples which are to be produced, the machine providing for only a single width of staple to be made.

The relative positions of the various parts of the apparatus as illustrated in Fig. 8 provide for making a staple having the greatest length of legs which the machine can produce, while Fig. 6 illustrates the position cor-

responding with the making of staples having a shortest length. It will be seen that to provide sufficient feed for a staple with longer legs it is necessary to move plate 89 controlling the position of stop 87 in Fig. 6 toward the right, and to at the same time move plate 97 controlling the position of the cutter in the same direction but only to half the extent to which plate 89 is so moved, and as distances 92, 101 and 92, 96 are equal and each half as large as distance 92, 94, a swinging of disk 91 in the direction of the arrow will cause downward movement of clamp 101 and a corresponding movement of point 96 and plate 97 to the right and double such a movement of clamp 94 and plate 89, and to produce such a swinging movement of said disk I employ screw 104 to draw the head of the machine which comprises plates 34 and 49 and all the parts between the same upward along the dove-tail groove in flange 29'. It is for the purpose of permitting of such up and down movements of the head without interfering with properly supplying power for operating the machine that shaft 30 is made flexible.

The turnbuckles in rods 93, 95 and 100 serve to take up any play between the parts with which they connect, and slots 94', 96' and 101' are employed to permit of exact adjustments of the ends of said rods upon disk 91.

Studs 110 and 111 are so positioned that when an article, as a book B, which is to be stitched is placed between said studs so as to closely contact with the same, the feeding, cutting and forming appliances will be in proper relative positions to produce a staple of the length required in such case.

The advantages of my improvements over wire stitching machines heretofore constructed are various and important. By means of my flexible shaft I am enabled to maintain the apparatus in its proper operative position while adjusting the same by one operation in accordance with the length of the staple desired. By intermittently bringing my wire stop in contact with the wire I guard against destroying the wire and contribute toward preserving said wire stop. The various cam movements described produce ready and proper coactions of the various parts of the machine. By attaching spring 102 to the adjustable stop 87 instead of plate 34 I provide for a minimum strain on said spring wherever the stop may be located. By having the former cam always in contact with rollers controlling the feed lever and the former, I avoid any rattling and uneven movements with reference to said parts.

By causing my anvil 66 to travel downward with guide bar 68 I not only continuously support the top of the staple but also its legs along their entire lengths until they

reach the article which is to be stitched. By hinging the combined anvil and supporter 66 to guide bar 68, so as to permit to said combined anvil and supporter vertical as well as swinging movement I am enabled to support the legs of the staple along their entire length from the time the staple strikes the paper which is to be stitched until it has been driven.

I do not wish to confine myself to the details and detail combinations herein set forth, as it will readily be seen that the same might be varied materially without departing from the spirit of my invention.

I claim:

1. In a wire stitching machine, the combination with a suitable frame, of a grooved former, an anvil piece, a guide bar supporting the anvil piece, a face plate on said frame along which the guide bar travels, a driver, and a spring actuated supporter stop constructed and arranged to intermittently connect with the former and with the face plate.
2. In a wire stitching machine, a frame having an adjustable head, a wire feed lever, a stop for the lever, a cutter bar, and a disk linked to the head and suitably adjusted by the same to the thickness of the work, and also linked to the lever stop and to the cutter bar, for adjusting the length of the piece of wire which is to form the staple.
3. In a wire stitching machine, the combination with a suitable frame, of a former having a slot for receiving the wire, a driver, means for actuating the former and the driver, and a spring actuated feed guide for the wire, attached to the driver.
4. In a wire stitching machine, the combination with a suitable frame, of a former provided with a slot for receiving the wire, a driver, means for actuating the former and the driver, and means slidably arranged in the driver for forcing the wire to the center of the slot in the former.
5. In a wire stitching machine, the combination with a suitable frame, of a former provided with a slot for receiving the wire, a driver, means for actuating the former and the driver, and spring actuated means carried by the driver for forcing the wire to the center of the slot in the former.
6. In a wire stitching machine, the combination with a former, a driver, a guide bar, and an anvil mounted thereon, of means for alternately connecting the former and the driver to the guide bar and for disconnecting the same therefrom.
7. In a wire stitching machine, the combination with a head and its face plate, of a former, a driver, a guide bar, an anvil piece mounted thereon, and a supporter stop inserted in a recess in the guide bar and adapted to alternately engage with said face plate and said former.
8. In a wire stitching machine, the com-

5 bination with a suitable frame, of a former provided with a slot for receiving the wire, a driver guided in the former, means for actuating the former and the driver, and
10 spring actuated means located at the lower end of the driver for forcing the wire to the center of the slot in the former and comprising a feed guide movable longitudinally of the driver.

10 9. In a wire stitching machine, the combination with a former, a driver, a guide bar, and an anvil hinged on the guide bar, of means for alternately connecting the

former and the driver to the guide bar and for disconnecting the same therefrom.

15 10. In a wire stitching machine, the combination with a head and its face plate, of a former, a driver, means on the driver for centering the wire, a guide bar, an anvil piece on the latter and a suitable supporter
20 stop constructed and arranged to alternately engage with said face plate and said former.

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