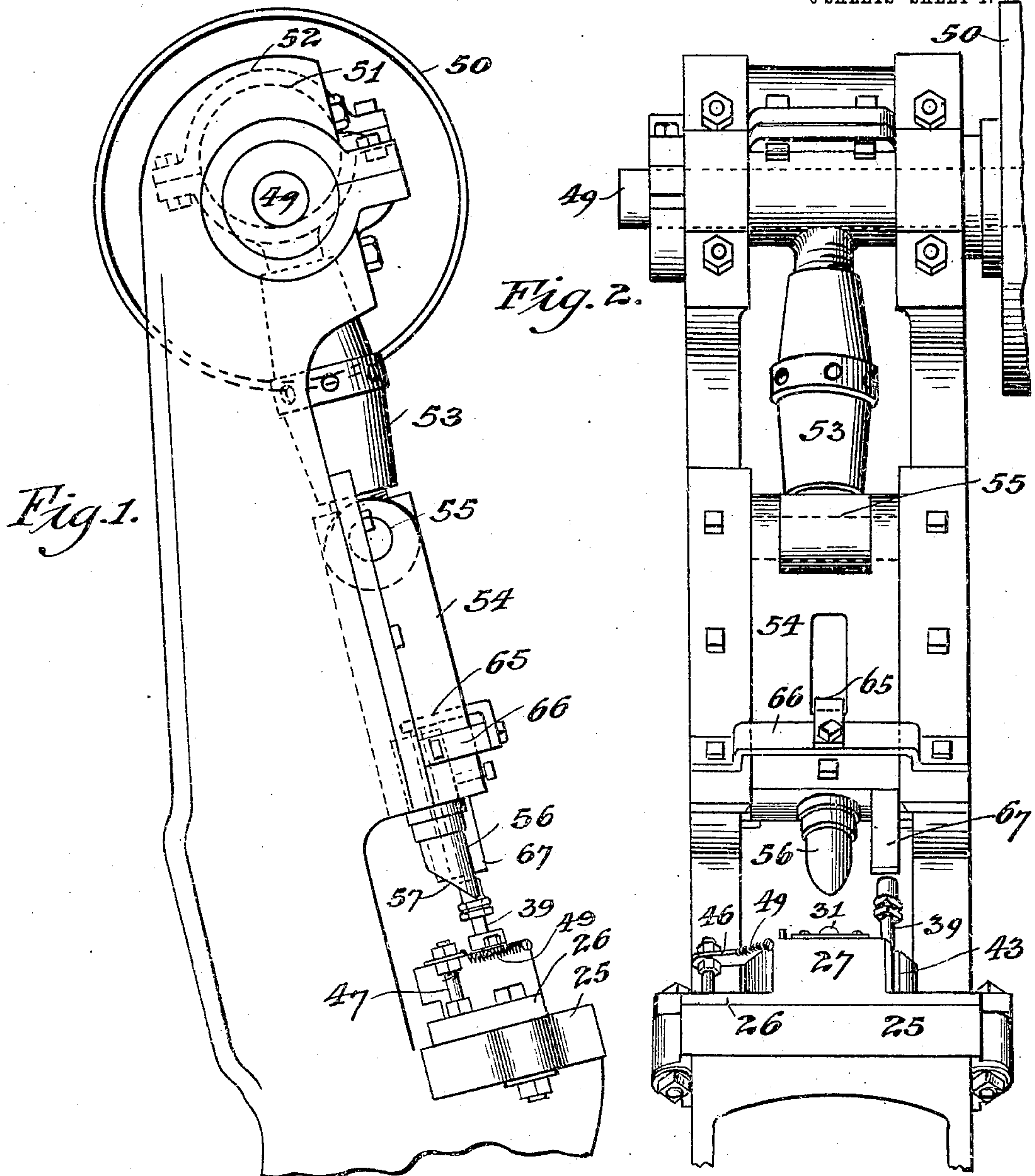


C. S. HUNTINGTON.
MACHINE FOR FORMING BUCKLE FRAMES.
APPLICATION FILED JUNE 8, 1908.

959,941.

Patented May 31, 1910.

6 SHEETS—SHEET 1.



Witnesses,
J. E. Mann,
Walter M. Fuller

Inventor,
Charles S. Huntington
By Alfred Towle & Luthicum
Atty's.

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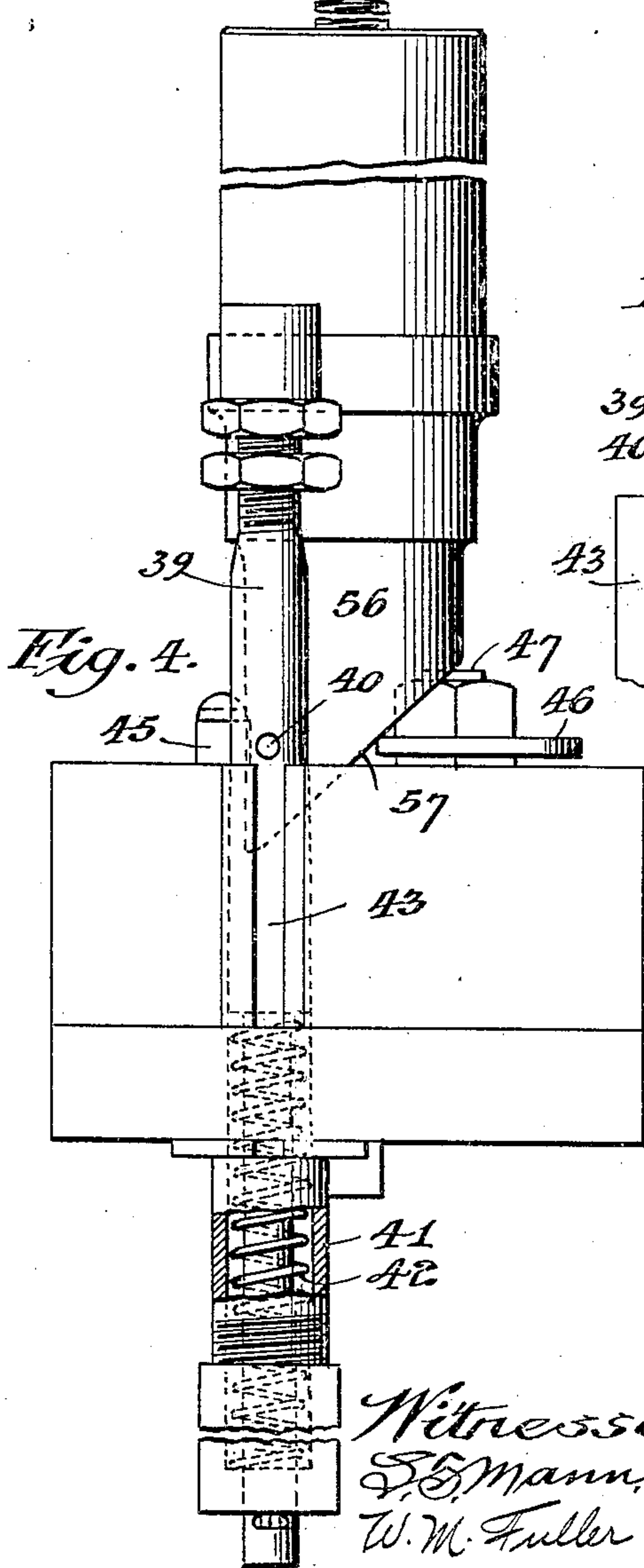
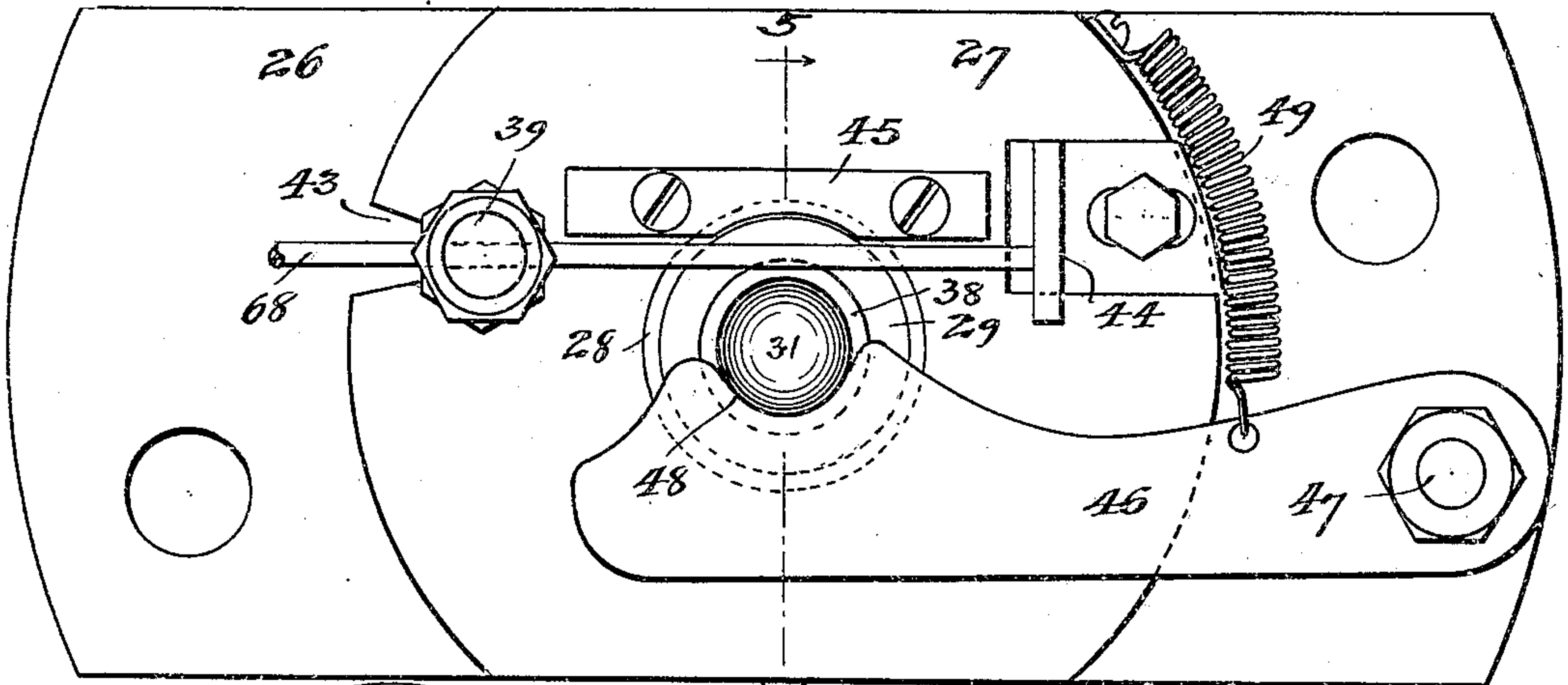
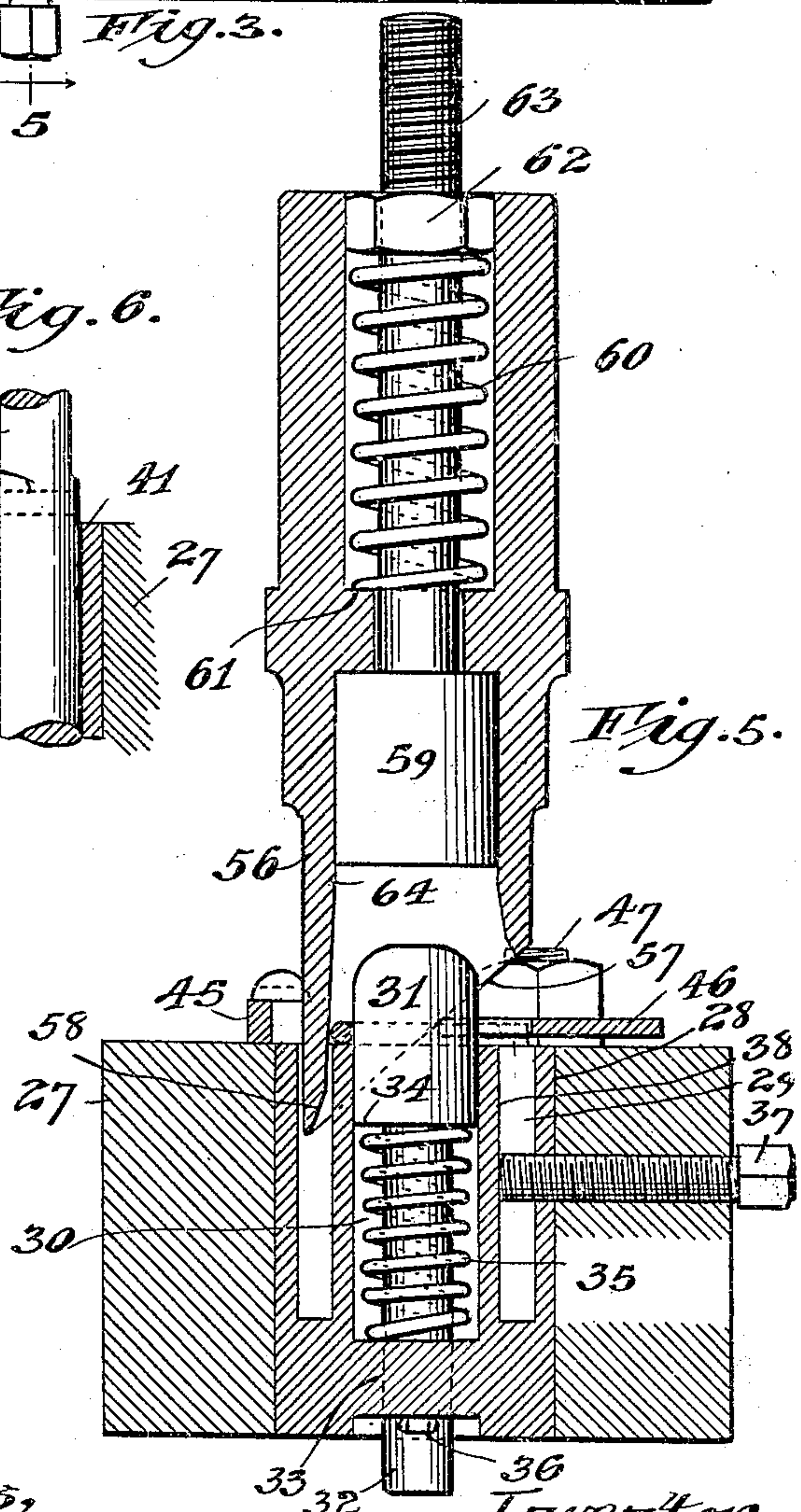
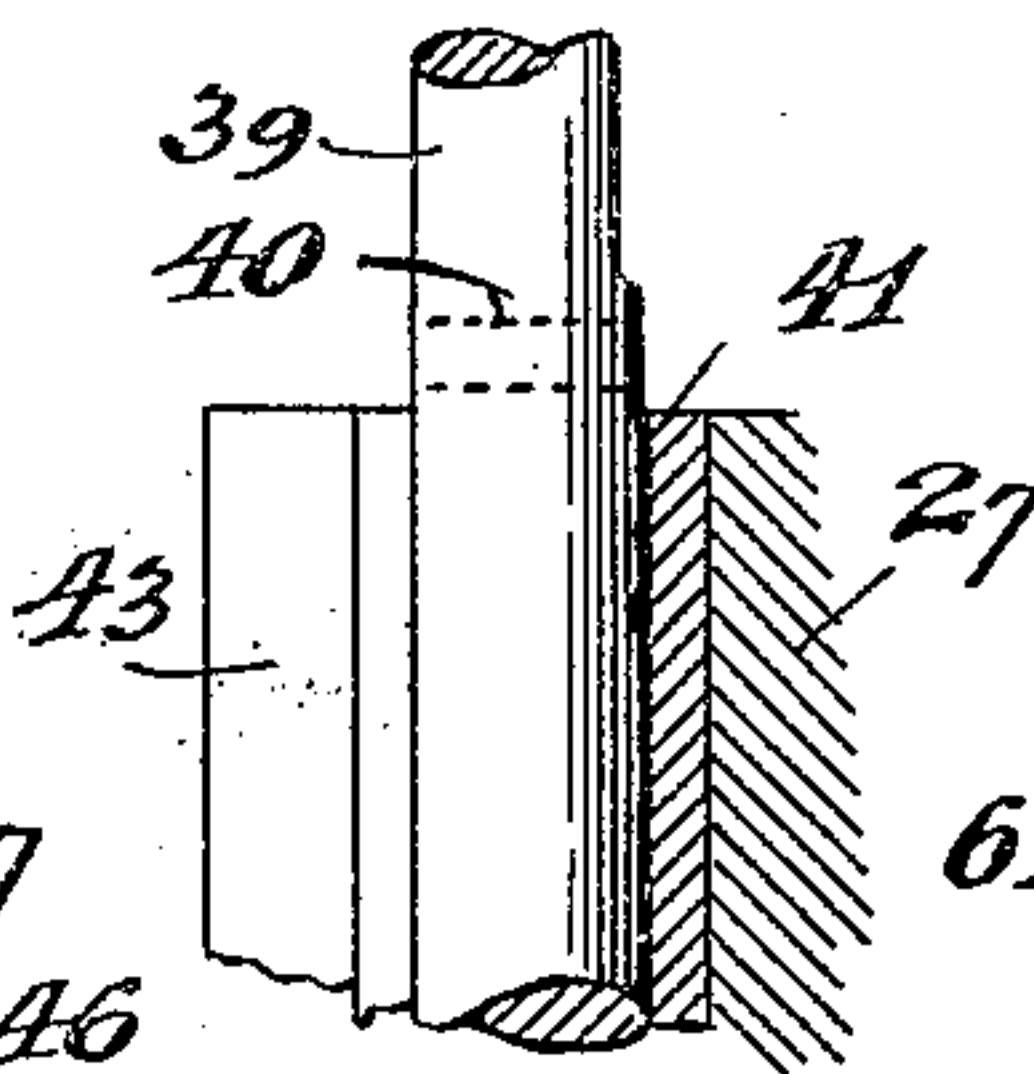


Fig. 6.



Witnesses,
S. E. Mann,
W. M. Fuller

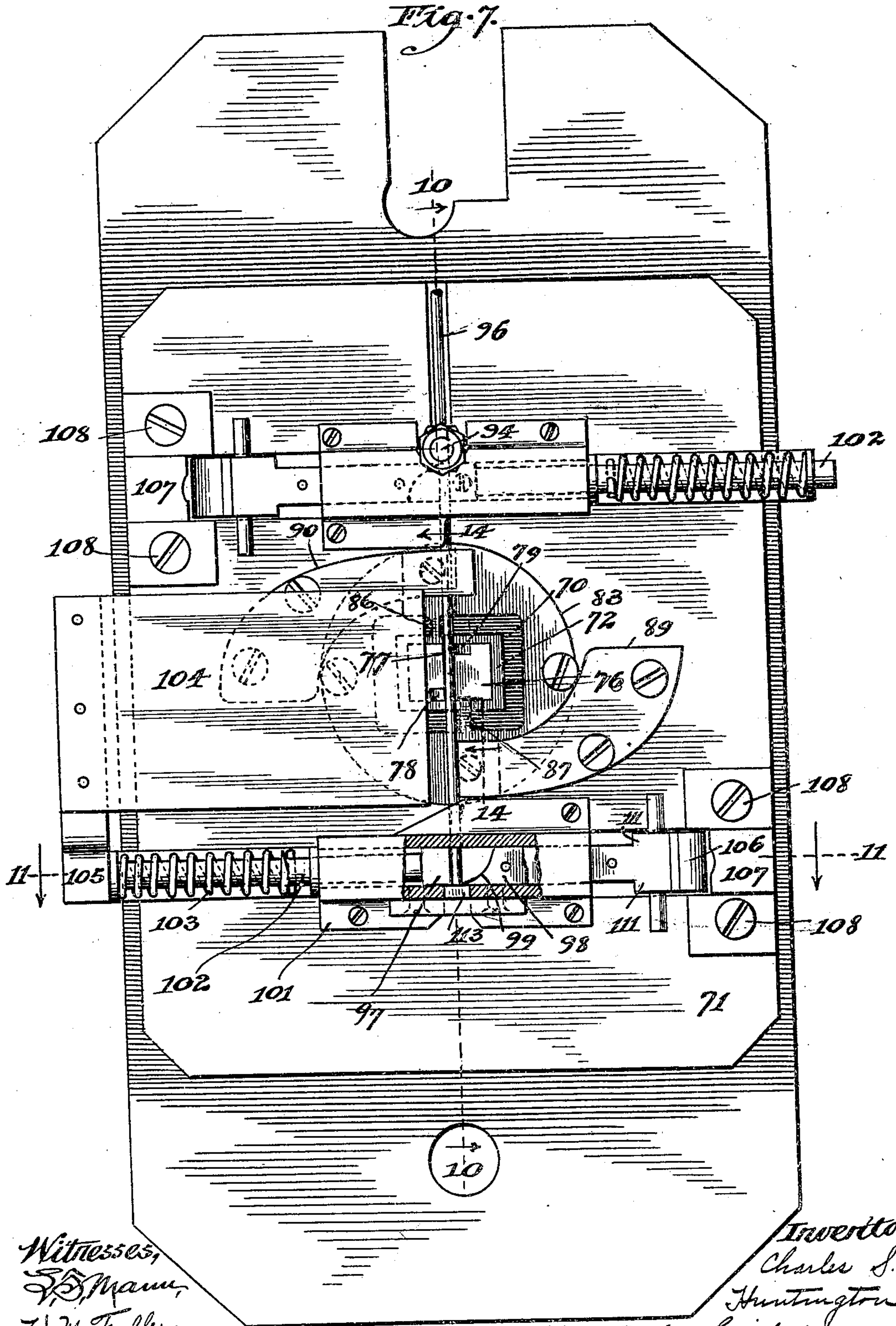
Inventor,
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By *W. L. Towle & Lint*

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6 SHEETS—SHEET 3.

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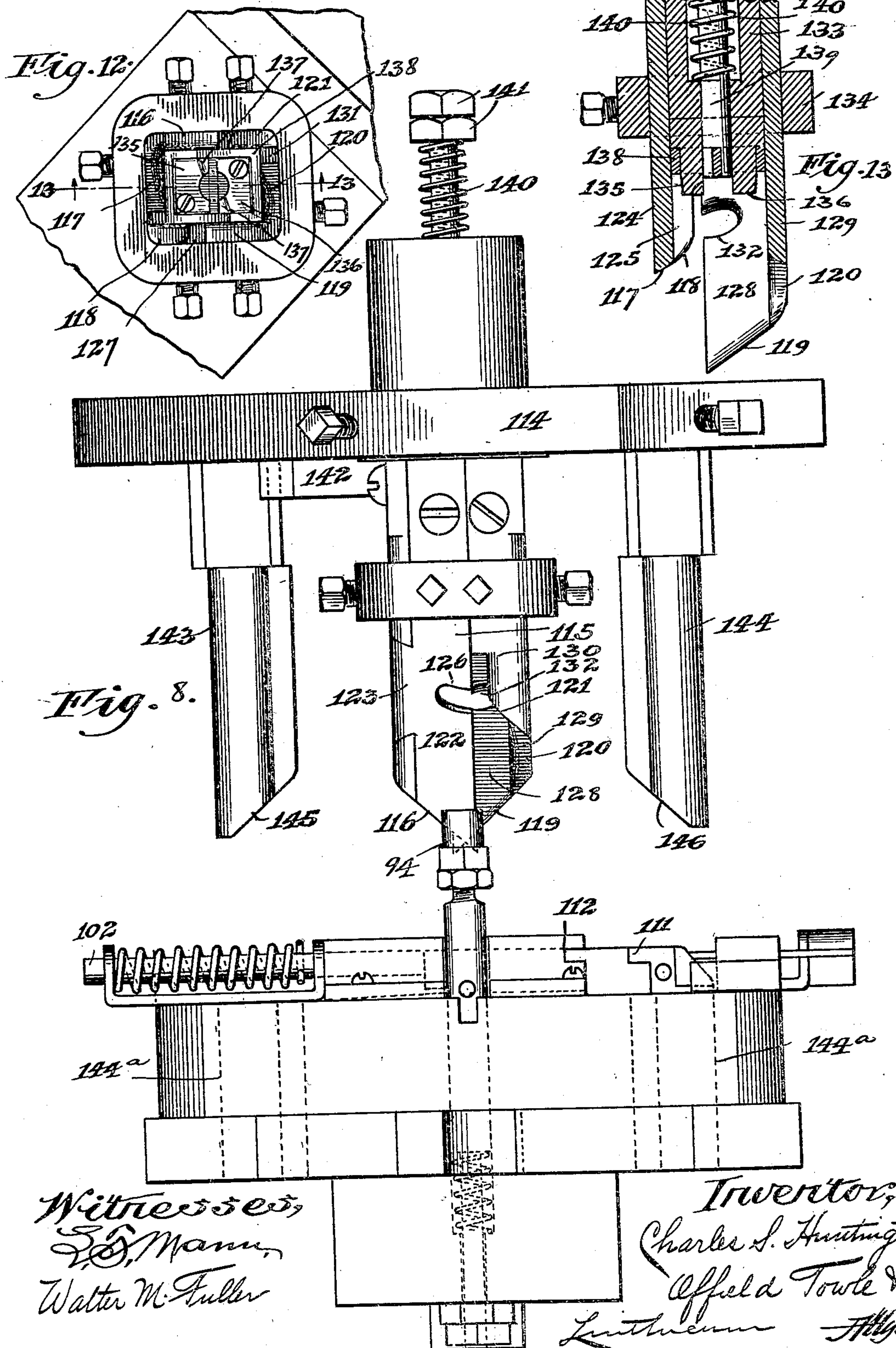
By *Offield Towle & Luthincum Attys.*

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6 SHEETS—SHEET 4.



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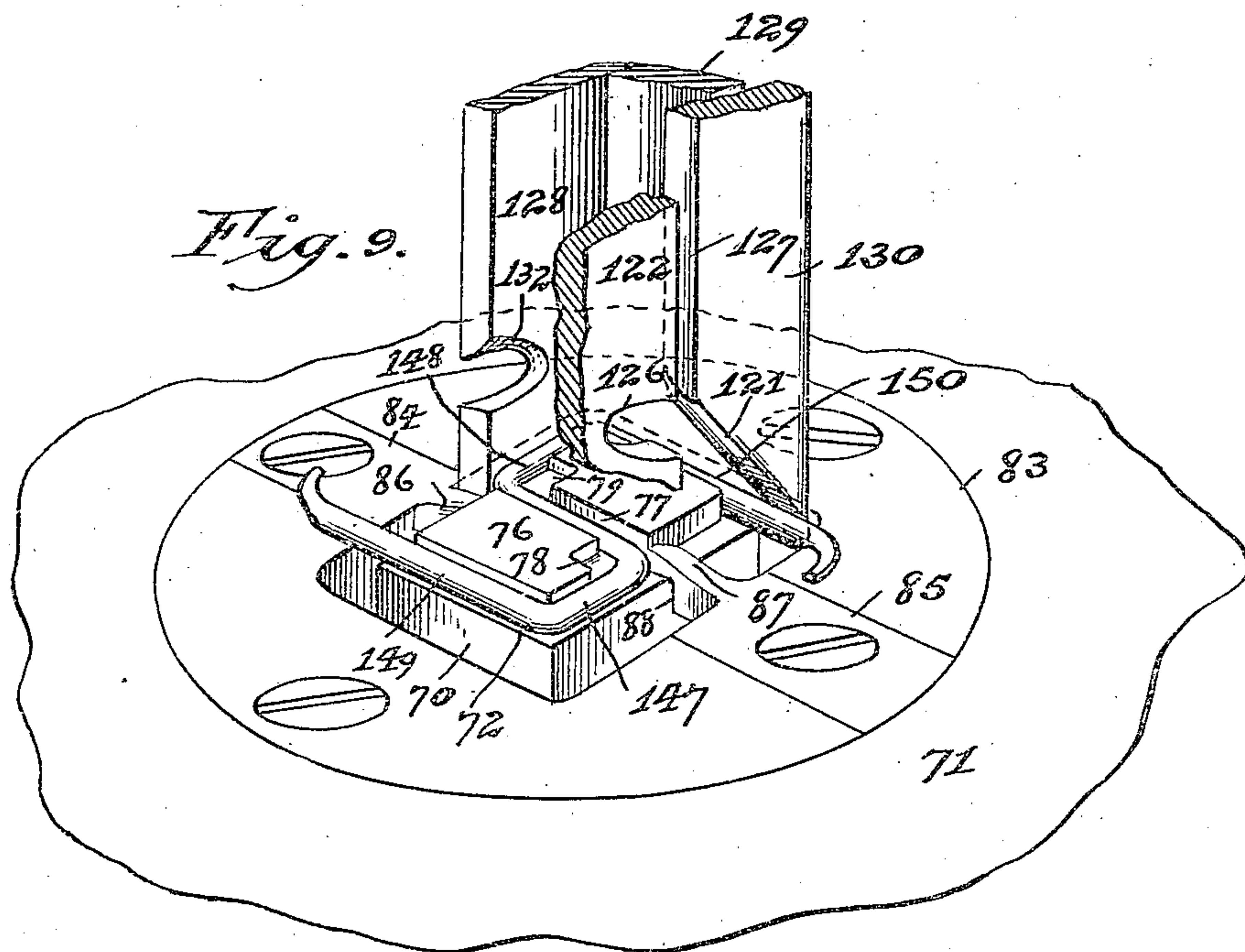
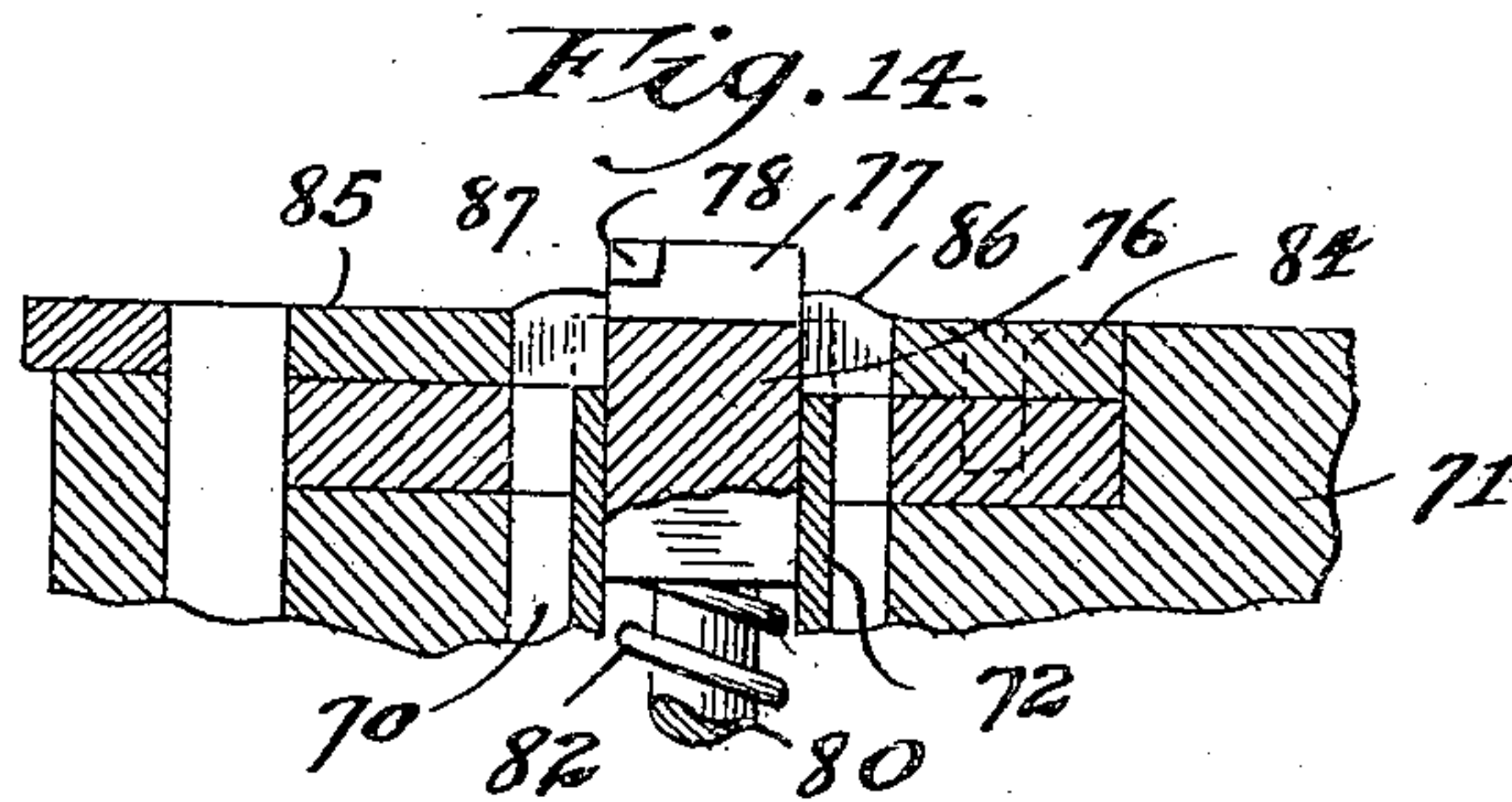
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Luthmann Attys.

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6 SHEETS—SHEET 5.



Witnesses,
J. S. Mann,
Walter M. Fuller

Inventor,
Charles S. Huntington
By *Offield Towle & Luthicium*
Atty's.

959,941.

6 SHEETS—SHEET 6.



UNITED STATES PATENT OFFICE.

CHARLES S. HUNTINGTON, OF OMAHA, NEBRASKA.

MACHINE FOR FORMING BUCKLE-FRAMES.

959,941.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed June 8, 1908. Serial No. 437,383.

To all whom it may concern:

Be it known that I, CHARLES S. HUNTINGTON, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, did invent certain new and useful Improvements in Machines for Forming Buckle-Frames, of which the following is a specification.

My invention relates to dies or formers for manufacturing wire rings, loops, buckle frames, or the like, its main object being to provide a device of this character which will have comparatively few parts, which will, therefore, be simple in construction, and will consequently be economical to manufacture, a further object being to produce frames, loops, or rings of the character indicated at small cost and with comparative rapidity. In the simplest embodiment of the invention the machine has a form about which the wire or rod is to be bent, and a reciprocating shaper adapted to slide longitudinally or axially over said form and by means of its lower edge, preferably inclined, press the rod or wire against the form, whereby it assumes the shape thereof. The mechanism is provided with a cutter for severing the roll or supply strip of wire into sections of the proper length, and feeding means for placing or advancing these sections transversely of the cooperating form and shaper. The object of having the lower or operative edge of the shaper inclined, as specified above, is to enable the same to operate successively on the adjacent consecutive sections or portions of the piece of wire. Where a round wire is used the convexity of its surface may provide a sufficient bevel or wedge surface whereby as the shaper moves toward the form, its lower edge co-acting with the convex, beveled, or wedge surface of the wire will cause the same to be curved or bent around the centrally-disposed internal form. In some instances, however, in order to enable the shaper to force the transverse wire toward the form during its axial movement, it is desirable to bevel the inclined edge of the shaper toward the form so as to provide a more effective wedge action. In order that the completed ring, loop, or buckle frame may be quickly and automatically removed or discharged from the forming mechanism, I make the form around which the wire is bent movable and provide means for pressing the same out of the completed ring or frame so as to separate the

bent wire therefrom. It is desirable to have the completed ring or buckle frame retracted from the form with the shaper, and I therefore make the internal recess of the latter somewhat smaller at its inner portion than at its mouth, whereby when the shaper is forced toward the form and bends the wire, in so doing the latter will fit in the shaper sufficiently tightly to be withdrawn there- with or therein after the form has been pressed out of the frame as described above. I provide also in this mechanism an ejector, preferably within the shaper, for discharging the completed ring or frame therefrom after the shaper has been retracted from the form. In order to prevent the ejected or discharged ring or frame from dropping into the recess provided in the base block to accommodate the shaper during the bending operation of the wire around the form, I equip the mechanism with an automatically-acting obstruction or gate which may partially or wholly cover this aperture or recess after the shaper has been withdrawn therefrom, so that the ejected ring or frame may drop or fall upon this obstruction or gate and slide therefrom by gravity into any suitable receptacle. Broadly stated, this is the heart and essence of my invention, but numerous other points and features of novelty and advantage will be made apparent from the following detailed description of the ring former and buckle frame manufacturing device.

On the accompanying drawings I have illustrated two preferred embodiments of my invention, and on these drawings like reference characters refer to the same parts throughout the various views.

Figure 1 is a side elevation of the upper or main portion of a press equipped or supplied with a ring forming mechanism embodying my invention; Fig. 2 is a face or front view of the construction illustrated in Fig. 1; Fig. 3 is a face or plan view of the base block on the press having mounted thereon the form, wire cutter, and gate or obstruction; Fig. 4 is an end elevation partly in section of the cooperating parts of the ring forming device illustrated upon an enlarged scale; Fig. 5 is a section on line 5—5 of Fig. 3, as viewed in the direction indicated by the arrows, showing also the shaper and ejector, the latter being unsectioned; Fig. 6 is a fragmentary section through the wire or rod cutting or severing device; Fig.

7 is a plan view of another style of form and wire cutter for employment in the manufacture of buckle frames or the like; Fig. 8 is a side elevation of the form and bed-plate shown in Fig. 7, and the cooperating reciprocating shaper and attached parts; Fig. 9 is a fragmentary perspective view illustrating the co-action between the form and shaper; Fig. 10 is a vertical cross-section on line 10—10 of Fig. 7; Fig. 11 is a section on line 11—11 of Fig. 7; Fig. 12 is a bottom plan view of the shaper; Fig. 13 is a longitudinal section of the shaper on line 13—13 of Fig. 12; Fig. 14 is a section on line 14—14 of Fig. 7; Fig. 15 is a bottom plan view of one of the wire cutters and end benders; Fig. 16 is an inner end view of the sliding wire cutter and its associated operating block illustrated in bottom plan in Fig. 15; Fig. 17 is a bottom plan view of one of the curved wire guides or guards on the top face of the bed-plate; Fig. 18 is a bottom plan view of the companion curved guide; Fig. 19 is a fragmentary section illustrating the manner of cutting and bending the end of the wire; Fig. 20 is a view of the same fragment as shown in Fig. 19, illustrating the parts in different positions; Figs. 21 and 22 are edge and face views of a strip of wire after its ends have been cut and bent in opposite directions; Fig. 23 illustrates the buckle frame partly formed; Fig. 24 is a face view of the completed buckle; and Fig. 25 is an edge view of the same.

Bolted on the table 25 of the press, Figs. 1 and 2, is a base-block 26 having a central recessed portion 27 mounted centrally in which is a bushing 28 (Figs. 3 and 5) having in its top face an annular recess or cavity 29 and a central aperture 30 housing a cylindrical form 31 equipped with a downwardly-extended stem 32 of lesser diameter projecting through a hole 33 in the base of the bushing. I interpose between the shoulder 34 at the lower end of the form and the bottom of the recess or well 30 a coil expansion spring 35, which normally projects the form above the top face of the base 27, as indicated in Fig. 5, the extent of upward movement of the form being limited by a cross-pin or cotter 36 extending through the lower protruding end of the stem 32 and co-acting with the bottom face of the bushing. This central bushing may be held in place by any suitable means, as, for instance, by one or more set-screws or bolts 37 abutting against the inner cylindrical shell or sleeve 38 of the bushing.

The part characterized 39 (Figs. 2, 3 and 4), supplied with a transverse aperture 40 therethrough of substantially the same diameter as the wire, is a spring-pressed reciprocatory wire-cutter of the usual and ordinary construction, the same being vertically slidable in a sleeve 41 (Fig. 4) mounted

in the base 27, the sleeve containing an expansion spring 42 adapted to force the sliding part of the cutter upwardly. In order that the unsevered portion of the wire may travel up and down with the cutter, the sleeve 41 and base 27 are slotted at 43 (Figs. 2 and 4). On the base 27 at the other side of the form 31 the mechanism has an adjustable wire stop 44 against which the end of the wire abuts as it is fed forwardly, and, as is clearly indicated in Fig. 3, the severed section of the wire overlies the top end of the sleeve 38 and the circular aperture or recess 29. To prevent dislodgment of the wire a guard 45 may be mounted on the base adjacent to the wire on the opposite side from the form 31. A gate or obstruction 46 is pivoted on a post 47 on the top of the base and has an inner end portion 48 curved in substantial accordance with the convex cylindrical surface of the form 31 against which it is adapted to strike, as is clearly shown in Fig. 3. This gate or obstruction is normally held in the position indicated by a coil spring 49 which permits the gate, however, to be rocked on its pivot pin 47 so as to move away from the form 31 and the annular recess 29.

In suitable bearings at the upper end of the press or machine frame there is supplied an operating shaft 49 (Figs. 1 and 2) rotated by means of a pulley 50 and having thereon between the bearings an eccentric 51, surrounded by an eccentric strap 52, joined to an eccentric rod 53, the latter being pivoted or hinged at 55 to a suitably guided reciprocating cross-head 54. A hollow cylindrical shaper 56 is mounted in any convenient manner on the lower end of the cross-head 54, the hollow shaper having an inclined mouth or bottom edge 57, desirably inwardly beveled at 58 (Fig. 5). As is clearly indicated, this shaper is mounted in alignment with the form 31 and bushing 28, being of such diameter as to be capable of entry into and withdrawal from the annular recess or cavity 29. Within this shaper there is mounted a sliding ejector or discharger 59 normally forced upwardly by an expansion spring 60 so as to retain the lower portion of the ejector within the shaper, the opposite ends of the spring 60 abutting against the internal shoulder 61 of the shaper and a nut 62 on the threaded upper end of the stem 63 of the cylindrical ejector 59. The hollow interior of the lower end of the shaper 56 is of slightly less diameter immediately below the lower end of the discharger or ejector 59 at 64 than at the mouth of the shaper, for a purpose hereinafter indicated. In other words, the aperture within the lower end of the shaper is upwardly tapered. In order to depress the ejector during the upward movement of the cross-head 54 and shaper 56, I provide on the

frame of the machine an inwardly-extended finger or arm 65 (Figs. 1 and 2) mounted on a cross-bar 66 and lying in the path of travel of the ejector stem 63. Mounted on the reciprocating cross-head 54 is a projection or lug 67 adapted to cooperate with and depress the wire cutter 39 so as to sever the wire into sections during the reciprocation of the cross-head, certain suitable wire feeding means (not shown) being provided for advancing the wire to the machine.

The operation of the device described above is substantially as follows: Assuming that the wire which I have characterized on the drawing as 68 has been fed forwardly through the aperture 40 of the cutter 39 until its end strikes the stop 44, the cross-head 54 and attached parts is caused to descend by the rotation of the shaft 49, the movements of its eccentric 51, and the connection between the same and the cross-head. As the shaper 56 moves downwardly, the stem 63 of the ejector plunger 59 moves away from its actuating finger or arm 65, permitting the spring 60 to retract the plunger 59 into its innermost position within the shaper. Also during this downward movement of the cross-head the lug or projection 67 engages the wire cutter 39, depressing the same so as to sever the section of wire between the stop 44 and the cutter from the main body of the wire on the other side of the cutter. Further descent of the shaper causes the lowermost extremity of its inclined, bottom, beveled, operative edge to pass back of the central portion of this section or strip of wire, and, due to the further descent of the shaper, the wire is pressed around and forced against the cylindrical surface of the form 31 and against the upper edge of shell or sleeve 38 which in effect is also a form determining the lateral conformation of the bent wire, the inclined edge of the shaper itself engaging the gate or obstruction 46 and swinging the same on its pivot 47 away from the form 31 in opposition to the action of spring 49 before the end portions of the wire are brought into contact with those parts of the form previously engaged by the curved portion 48 of the gate or obstruction, it being understood that the form ordinarily acts as an abutment or stop limiting the inward swinging of the gate. It is obvious, therefore, that by the operation described above a wire loop or ring is formed around the form 31 on the top edge of the sleeve or bushing 38, the single plunger or shaper in connection and conjunction with the form and sleeve imparting to the wire both lateral and vertical pressure and shape in one stroke. On further downward travel of the shaper the ejector plunger 59 strikes the top of the form 31 and depresses the same, freeing the ring therefrom, the ring at this time being wedged and held in

the interior part 64 of the shaper of reduced diameter. As the shaper and ejector are retracted or carried upwardly, the ring is carried with them, owing to its frictional contact with the interior cylindrical surface of the shaper, the form 31 under the influence of its projecting spring 35 is pressed upwardly to normal position, the gate or obstruction 46, due to the action of its spring 49, is swung inwardly against the form 31 as soon as the shaper permits this action, the stem 63 strikes the arm 65, and the ejector plunger is moved downwardly relatively to the shaper, thereby discharging or ejecting the ring on to the gate or obstruction 46 from which it slides into any suitable receptacle, it being understood that the parts of the ring forming mechanism are inclined sufficiently, as is clearly shown in Fig. 1, to cause the ejected ring to slide off of the base plate and gate. During this upward travel of the cross-head and arm 67, the cutter 39 is permitted to rise, due to the compelling force of its actuating spring 42, and after having risen to its normal position the wire 68 is again fed forwardly by the means not shown.

Especially attention is directed to the fact that the shape of the top surface of the shell or bushing 38, which may or may not be a plane surface as shown in the drawings, determines the lateral shape of the finished bent wire, that is, the wire blank resting on the top surface of the shell or bushing is not only wiped or wrapped around the center form or post by the beveled edge of the reciprocatory plunger or shaper, but may also in some cases if desired be bent upward or downward, depending upon the configuration of the shell. An example of a slight action of this kind is illustrated in connection with the buckle forming machine described hereinafter. The form and surrounding shell in effect constitute a combination form determining the general shape of the product and also its lateral conformation.

In the remaining figures of the drawings I have illustrated another embodiment of my invention for making wire buckle frames. Extended upwardly within a central rectangular opening or aperture 70 of a bed or base-plate 71 (Figs. 7 and 10) I provide a hollow sleeve or casing 72, rectangular in cross-section, fastened by means of screws 73 to a bottom plate 74 secured by bolts 75 to the under surface of the bed or base-plate 71. The top edge of this sleeve or casing 72, as is apparent from Fig. 10, is of substantially the same plane as the upper surface of the bed-plate, the casing being of such size and dimensions that a rectangular aperture is provided between its outer surfaces and the inner faces of the cavity or recess 70 for the accommodation of the

parts of a reciprocating shaper or former described hereinafter. Reciprocating within this sleeve 72 I provide a form 76 having across its top surface a transverse groove 77 adapted to accommodate the strip of wire to be formed or bent into the buckle frame, and also having at its sides and on opposite sides of the central groove 77 recesses or depressions 78 and 79 intended to accommodate and receive the inwardly-curved ends of the wires before they have been pressed down to become locked with the ends of the common cross-bar of the double-looped buckle frame. The form 76 has a downwardly-extended stem 80 screw-threaded at its lower end and projecting through a hole in the plate 74, the stem being equipped at its bottom end with a pair of nuts 81, limiting the upward travel of the form. A coil expansion spring 82 encircles the stem, and at its opposite ends presses against the form proper and the inner surface of the plate 74, whereby the form is normally yieldingly held slightly above the top surface of the bed plate and above the upper edge of its inclosing or housing casing or sleeve 72. A ring 83 surrounding the form and let into the top face of the bed plate is equipped with a pair of cam plates 84 and 85 (Fig. 9), each having an inwardly-extended cam or beveled finger 86 and 87, respectively, the inner ends of which fit in holes 88 in the sleeve 72 adapted to accommodate the same, the fingers projecting somewhat above the upper edge of the sleeve and being inclined away from the form and from the transverse groove 77 across its top face, as is also clearly indicated in Fig. 9. These cam fingers are likewise disposed on opposite sides of the central groove 77, as is shown in Fig. 7. The purpose of these elevated cam or inclined fingers is to raise the curved ends of the wire blank over the opposite ends of the common cross-bar of the buckle frame when the wire is wrapped or pressed around the form. Fastened to the top of the bed or base plate by means of screws, and on opposite sides of the form, there is provided a pair of guard or guide plates 89 and 90, the main portions of which are raised above the face of the bed plate by the thickened parts 91 and 92, both being formed on their under faces at 93 so as to permit the passage of the wire thereunder.

At one side of the form I employ an apertured upwardly spring-pressed wire cutter 94 of the usual construction, which coöperates with a cutter plate 95 sunk into the face of the bed plate and equipped with a substantially semi-cylindrical groove in alinement with the aperture of the cutter and adapted to accommodate the wire 96. On the opposite side of the form a like grooved cutter plate 97 is also provided. Slidable on top of the grooved plate 97 is a

combined cutter and bender 98 having an inclined or curved cutting edge and bending surface 99, the cutter partially fitting within an aperture or recess of and actuated by a sliding block 100 working within an open-ended removable casing 101 and spring-pressed away from the groove of the plate or block 97 by a spring-operated rod 102 actuated in one direction by its encircling expansion coil spring 103 engaging at its opposite ends against suitable stops or abutments. It should also be noted that the cutting edge 99 extends downwardly sufficiently at 99^a so as to completely sever the lower half of the end of the wire, that is, that half which rests in the semi-cylindrical groove of plate 97 (see Fig. 20). As is indicated in Fig. 7, a flat plate 104 constituting a gate or obstruction is fastened at 105 to the outer end of the rod 102, being slidable therewith. The outer end of the block 100 has a beveled or inclined surface 106 which coöperates with a similar face of an actuating post or rod movable with the shaper and described more in detail hereinafter. An abutment or block 107 is fastened by means of screws 108 to the top face of the bed or base plate opposite the inclined or beveled face 106 of the sliding block 100 for a purpose indicated hereinafter. The outer end of the block 100 has a bottom portion 109 which slides and is guided in a groove 110 in the base plate. In order to assist in guiding and maintaining the block 100 in correct operative position, its side extensions 111 are located so as to coöperate with the slots 112 in the casing or cover 101. To provide a stop for the wire 96 as it is fed across the form, I supply an abutment 113 against which the end of the wire is adapted to strike, as is clearly shown in Fig. 7. The wire cutting and bending mechanism adjacent to the cutter 94 is in all respects substantially the same as that described above, except that no gate or obstruction 104 is secured to the rod or bar 102. It should be noted, however, that the two wire cutting and bending mechanisms are reversely arranged with respect to the base plate, whereby the two ends of the wire section or blank will be bent in opposite directions, as shown in Fig. 22.

The upper reciprocating shaper which is intended to be operated in a press of the general character and style of that shown in Figs. 1 and 2, by a sliding cross-head similar to that characterized 54, is mounted on a plate or block 114 (Fig. 8) and consists of a hollow body 115 rectangular in cross-section adapted to reciprocate in and be withdrawn from the aperture 70, and has its bottom edge composed of two oppositely-inclined portions each of which has three sections 116, 117, 118, and 119, 120, 121, respectively. The lowermost edge 116 of one-

half of the shaper is at the bottom margin of the wall or plate 122 of the shaper, this wall having a dove-tail connection 123 with the adjacent wall 124, the latter having an inclined bottom operative edge 117 forming a continuation of the edge 116, and disposed at right angles thereto. The edge 118 is at the bottom margin of a smaller plate 125 parallel to the plate or wall 122 and at right angles to the plate or wall 124, its edge 118 forming in effect a continuation of edge 117. It should be noted that the wall or plate 122 has an aperture there-through at 126 substantially opposite the top end of the inclined surface 121. It should also be noticed that the shaper has narrow elongated vertical slots 127 within which the cam fingers 86 or 87 are adapted to fit during the reciprocation of the shaper. The inclined edges 119, 120 and 121 are at the bottom margins of the walls 128, 129 and 130, respectively.

The wall or plate 128 is provided with a recess 132 opposite the upper end of the inclined surface 118 and corresponding to the recess 126. Preferably all of the inclined bottom operative edges are inwardly beveled toward the form or axis of the shaper, as is clearly illustrated. The various plates and walls forming the complete shaper are secured to a central body or core 133 about which a strap 134 is placed to assist in maintaining the walls of the shaper in proper place and alinement. The core or inner body 133 (Figs. 12 and 13) has two downwardly-extended projections 135 and 136, each being of such size and form as to correspond to the openings of the double loop of the buckle frame shown in Fig. 24. In order, however, to provide for the overlapped portions of the ends of the wire forming the buckle frame, each projection 135 and 136 has on its bottom face a slight recess or cavity 137.

A skeleton frame 138 of substantially the same size and shape as the completed buckle frame, and constituting an ejector or discharger, is fixedly mounted on the lower end of an ejector rod 139, normally pressed upwardly by a coil spring 140 encircling the rod and abutting at one end against a shoulder of the core or body 133, and at the other end against a pair of nuts 141 on the upper end of the rod.

Secured to the bottom face of the plate 114 and projecting beyond the same is a finger 142 whose protruding end is adapted to engage and actuate the cutter 94. Suitably mounted on the under surface of the plate 114 is a pair of downwardly-extended posts or pillars 143 and 144 having beveled lower ends 145 and 146, respectively, adapted to cooperate with the inclined or beveled surfaces 106 of the sliding blocks 100.

The operation of this buckle frame form-

ing mechanism is substantially as follows: Assuming that the strip of wire 96 has, by any suitable feeding means not shown, been fed forwardly through the cylindrical aperture of the cutter 94 and the slot 77 of the form until its end strikes the stop 113, and that the portion of the wire between the cutter and stop is resting in the substantially-semi-cylindrical grooves of the cutter plates 95 and 97, then as the plate 114 with its attached shaper and operating posts or wedges descends, the finger or lug 142 engages the upper end of the cutter 94, depressing the same, and severing from the main body of the wire that section between the cutter and stop whose central portion is residing in the groove 77 of the form 76, and whose ends are resting in the grooves of the cutter blocks or plates 95 and 97. As the plate 114 and its posts 143 and 144 descend still farther, the wedge surfaces 145 and 146 engage the beveled or inclined faces 106 of the pair of sliding blocks 100, thereby causing the inward sliding of these blocks and their associated cutters and wire benders 98, the outer faces of the posts or wedges 143 and 144 cooperating with the blocks 107 to maintain the proper alinement of the posts, the latter passing into apertures 144^a of the base.

The inward movement of the cutters and benders 98 is opposed by the action of the springs 103, and as their curved forward faces sever or cut off the lower halves of the ends of the wire resting in the grooves of the cutter plates 95 and 97, the upper uncut portions of the same are bent or curved in opposite directions, due to the curved faces 99 of the blocks, this condition of the wire being represented in Figs. 21 and 22. The outward movement of the rod or shaft 102 shown in the lower portion of Fig. 7, causes a corresponding movement of the gate or obstruction 104 so that the form 76 and the aperture 70 become completely uncovered. As the shaper descends still farther, the lower ends of the oppositely-inclined surfaces 116 and 119 engage opposite sides of the wire adjacent to or at the side of the sleeve 72 and in front of the cam fingers 86 and 87, the surface 116 contacting with the wire in front of the cam finger 87, while the surface or edge 119 engages the wire adjacent to the finger 86. As the shaper continues its downward movement the strips or sections 147 and 148 thereof are bent in opposite directions, resting upon the top end of the sleeve 72, and being pressed by the inclined beveled edges of the shaper into contact with the sides of the form 76 protruding above the end of its inclosing casing 72.

It will be noticed that the various portions of the wire are acted upon successively by the inclined edges of the shaper so that no considerable amount of power is necessary

to drive the mechanism. After the edges 116 and 119 have completed their work on the wire, the edges 117 and 120 operate to bend the portions 149 and 150 of the wire at right angles to the sections 147 and 148 and parallel to the central cross-bar of the frame lying in the groove 77. Subsequently, during still further downward movement of the shaper the inclined edges 118 and 121 act on the protruding portions of the wire so as to complete the two loops, the cam fingers 86 and 87 during this portion of the bending acting to raise the curved ends of the wire over the junctions of the parts 147 and 148 with the central cross-bar, the recesses or cavities 78 and 79 accommodating the inwardly-projecting ends of the wire indicated in dotted lines in Fig. 24.

It should be noted that sufficient space is left at 127 between adjacent plates of the shaper so that the latter will escape the cam fingers during its descent, and, furthermore, the recesses 126 and 132 of the shaper permit the inward turning of the curved ends of the wire as they are acted upon by the uppermost inclined edges 118 and 121. During this bending of the wire around the form the protruding end portions of the wire are maintained in proper position and prevented from swinging upwardly or out of the proper plane by passing under the curved guard plates 89 and 90. On continued descent of the shaper the projections 135 and 136 within the shaper strike against the top face of the form, forcing the latter out of the bent wire, and by passing into the loops of the buckle frame they bend over the ends of the wire indicated in dotted lines in Fig. 24 to the full line position, forming an effective hook connection of the wire ends with the common cross-bar, the cavities 137 accommodating the bent-over ends of the wire. The interior of this shaper may be slightly tapered, or the projections 135 and 136 may be somewhat tapered so that the completed buckle frame will be retracted by and within the shaper. As the plate 114 and the attached parts move upwardly with the buckle frame in the shaper, the completed buckle frame is ejected by the nut 141 on the ejector stem striking any suitable abutment similar and corresponding to the abutment 65 of Fig. 1, whereby the ejector frame 138 is moved downwardly relatively to the shaper, the result being that the buckle frame is discharged upon the gate or obstruction 104, which in the meantime has returned to its normal position, partially covering the form and rectangular aperture 70, under the influence of one of the springs 103, the two springs 103 having returned the sliding cutters to their outermost position, this result being accomplished because of the retraction or lifting of the posts or wedges 143 and 144.

By inclining the base plate 71 and the plate 114 carrying the shaper, the completed buckle frame will, due to its own gravity, slide over or off of the gate or obstruction 104 into any suitable receptacle provided for its accommodation. A new section of wire is now fed forwardly through the cutter 94, and the operation as described above repeated, this machine being capable of rapidly and economically producing strong and simple buckle frames of the character shown and described.

It should be noted that a distinct advantage of my improved construction and method of forming buckle frames or the like by means of comparatively light plungers or shapers instead of by the massive cams and slides in ordinary use, is made possible because the outer walls of the aperture 70 co-act with the outer faces of the plunger or shaper, keeping the latter up to its work and preventing its comparatively weak operative points from becoming broken off.

In both of the constructions herein described, I am enabled to produce by a single sliding shaper coöperating with parts constituting a form, which determines not only the general contour of the finished product but also any lateral deflections or bends, a bent wire or similar ring, loop, hook, buckle-frame, or the like, in a machine devoid of ponderous and massive parts. By a single stroke of the shaper the completed product is produced.

To those skilled in the art it will be apparent that many slight and minor mechanical changes may be made in the construction herein illustrated and described without departure from the substance of my invention and without sacrificing any of its benefits and advantages.

I claim:

1. In a machine of the character described, the combination of a slidable form, a co-operating shaper slidable longitudinally over said form, means to actuate said shaper, whereby a rod or wire during the movement of the shaper toward said form is pressed by the shaper into contact with and assumes the contour of said form, a spring to return said form to normal operative position, and means to slide said form from the shaped rod or wire to release the latter therefrom, substantially as described.

2. In a machine of the character described, the combination of a form, a coöperating shaper slidable longitudinally over said form, means to actuate said shaper, whereby a rod or wire during the movement of the shaper toward said form is pressed by the shaper into contact with and assumes the contour of said form, means to cause the retraction of the shaped rod or wire with said shaper, and an ejector to discharge the

shaped rod or wire from said shaper, substantially as described.

3. In a machine of the character described, the combination of a movable form, a co-
operating shaper slidable longitudinally
over said form, means to actuate said shaper,
whereby a rod or wire during the movement
of the shaper toward said form is pressed by
the shaper into contact with and assumes
the contour of said form, means to remove
the form from the shaped rod or wire, means
to retract the shaped rod or wire with said
shaper, and an ejector adapted to discharge
the shaped rod or wire from said shaper,
substantially as described.

4. In a machine of the character described, the combination of a movable form, a co-
operating shaper slidable longitudinally
over said form, means to actuate said shaper,
whereby a rod or wire during the movement
of the shaper toward said form is pressed
by the shaper into contact with and assumes
the contour of said form, means to remove
said form from the shaped rod or wire,
means to retract the shaped rod or wire with
said shaper, a spring-actuated ejector slid-
able in said shaper and adapted to discharge
the shaped rod or wire from said shaper,
and means to operate said ejector, substan-
tially as described.

5. In a machine of the character de-
scribed, the combination of a form, a co-
operating shaper slidable longitudinally
over said form, means to actuate said shaper,
whereby a rod or wire during the movement
of the shaper toward said form is pressed
by the shaper into contact with and assumes
the contour of said form, a gate or obstruc-
tion, means to operate said gate or obstruc-
tion, an ejector to discharge the shaped rod
or wire from said shaper on to said gate or
obstruction, and means to operate said ejec-
tor, substantially as described.

6. In a machine of the character de-
scribed, the combination of a form having a
wire or rod receiving groove across its face,
a shaper adapted to slide longitudinally
over said form and having oppositely-in-
clined operative edges adapted to engage
opposite sides of the two ends of the wire
or rod protruding beyond the terminations
of said groove and bend said ends in oppo-
site directions around said form, and means
to actuate said shaper, substantially as de-
scribed.

7. In a machine of the character de-
scribed, the combination of a form having
a wire or rod receiving groove across its
face, a shaper adapted to slide longitudi-
nally over said form and having oppositely-
inclined operative edges beveled toward
said form and adapted to engage opposite
sides of the two ends of the wire or rod
protruding beyond the terminations of said
groove and bend said ends in opposite direc-

tions around said form, and means to actu-
ate said shaper, substantially as described.

8. In a machine of the character de-
scribed, the combination of means to bend
laterally the ends of a wire blank, a form,
means to bend the wire about said form to
make a double-loop wire frame with the
ends of the wire overlapping the junctions
of the common cross-bar with the sides of
the frame, and means to bend said ends so
as to form hook connections with the cross-
bar, substantially as described.

9. In a machine of the character de-
scribed, the combination of means to sever
portions of the ends of a wire blank to re-
duce their thickness and bend them later-
ally, a form, means to bend the wire about
said form to make a double-loop wire frame
with the reduced ends of the wire overlap-
ping the junctions of the common cross-bar
with the sides of the frame, and means to
bend said reduced ends so as to form hook
connections with the cross-bar, substantially
as described.

10. In a machine of the character de-
scribed, the combination of a pair of com-
bined sliding cutters and benders adapted to
sever the end portions of a wire blank and
bend the reduced portions laterally, means
to actuate said sliding cutters and benders,
a form, means to bend the wire about said
form to make a double-loop wire frame with
the reduced ends of the wire overlapping
the junctions of the common cross-bar with
the sides of the frame, and means to bend
said reduced ends so as to form hook con-
nections with the cross-bar, substantially as
described.

11. In a machine of the character de-
scribed, the combination of means to bend
laterally the ends of a wire blank, a form
having a wire receiving groove across its
face in which said blank is adapted to rest,
a shaper adapted to slide longitudinally
over said form and having oppositely-in-
clined operative edges adapted to engage
opposite sides of the two ends of the wire
protruding beyond the terminations of said
groove and bend said ends in opposite di-
rections around said form to provide a
double-loop wire frame with the laterally
bent ends of the wire overlapping the junc-
tions of the common cross-bar with the sides
of the frame, means to actuate said shaper,
means to remove said form from the shaped
frame, and means to enter the loops of said
frame and bend down said wire ends to
form hook connections with the cross-bar,
substantially as described.

12. In a machine of the character de-
scribed, the combination of means to bend
laterally the ends of a wire blank, a movable
form having a wire receiving groove across
its face and recesses adapted to receive the
laterally bent ends of the wire blank after

the frame has been partially formed, a shaper adapted to slide longitudinally over said form and having oppositely-inclined operative edges beveled toward said form
5 and adapted to engage opposite sides of the two ends of the wire in said groove protruding beyond the terminations of said groove and bend said ends in opposite directions around the form to make a double-
10 loop wire frame with the laterally bent ends of the wire overlapping the junctions of the common cross-bar with the sides of the frame, means to remove the form from the shaped wire frame, means to enter the
15 loops of said frame and bend down said wire ends to form hook connections with the cross-bar, and means to operate said latter means, substantially as described.

13. In a machine of the character described, the combination of means to bend laterally the ends of a wire blank, a movable form having a wire-receiving groove across its face, a shaper adapted to slide longi-

tudinally over said form and having oppositely-inclined operative edges adapted to
25 engage opposite sides of the two ends of the wire in said groove protruding beyond the terminations of said groove and bend said ends in opposite directions around said form to make a double-loop wire frame with
30 the ends of the wire overlapping the junctions of the common cross-bar with the sides of the frame, means to actuate said shaper, means movable with said shaper adapted to remove the form from the shaped
35 wire frame, bend down the wire ends to form hook connections with the cross-bar, and retract the completed frame therewith, an ejector in said shaper, and means to operate said ejector to discharge said frame,
40 substantially as described.

CHARLES S. HUNTINGTON.

Witnesses:

A. A. McCLURE,
T. W. AUSTIN.