

No. 799,550.

PATENTED SEPT. 12, 1905.

W. E. ELLIOTT.
BUTTON ATTACHING MACHINE.

APPLICATION FILED NOV. 22, 1893.

4 SHEETS—SHEET 1.

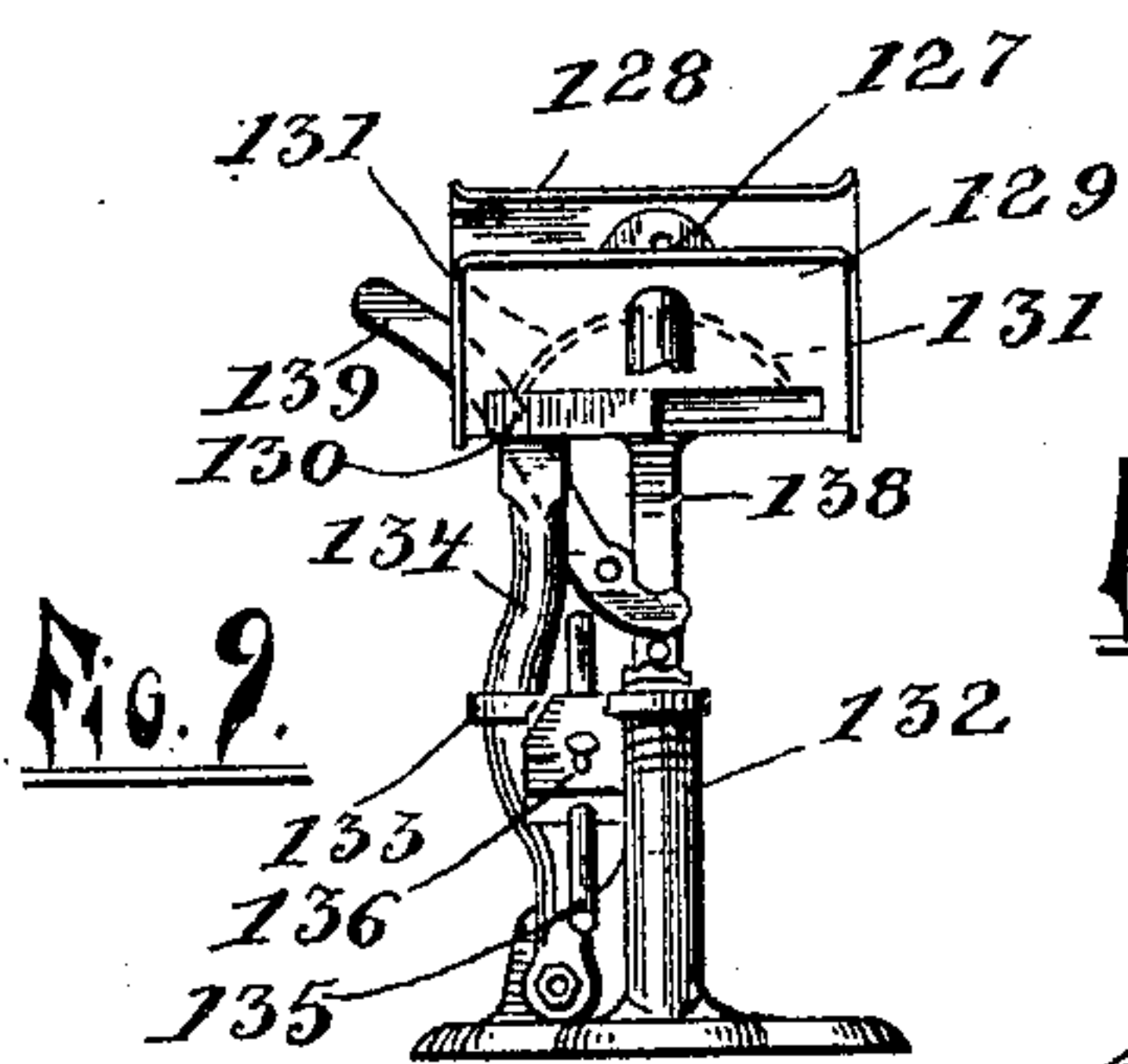
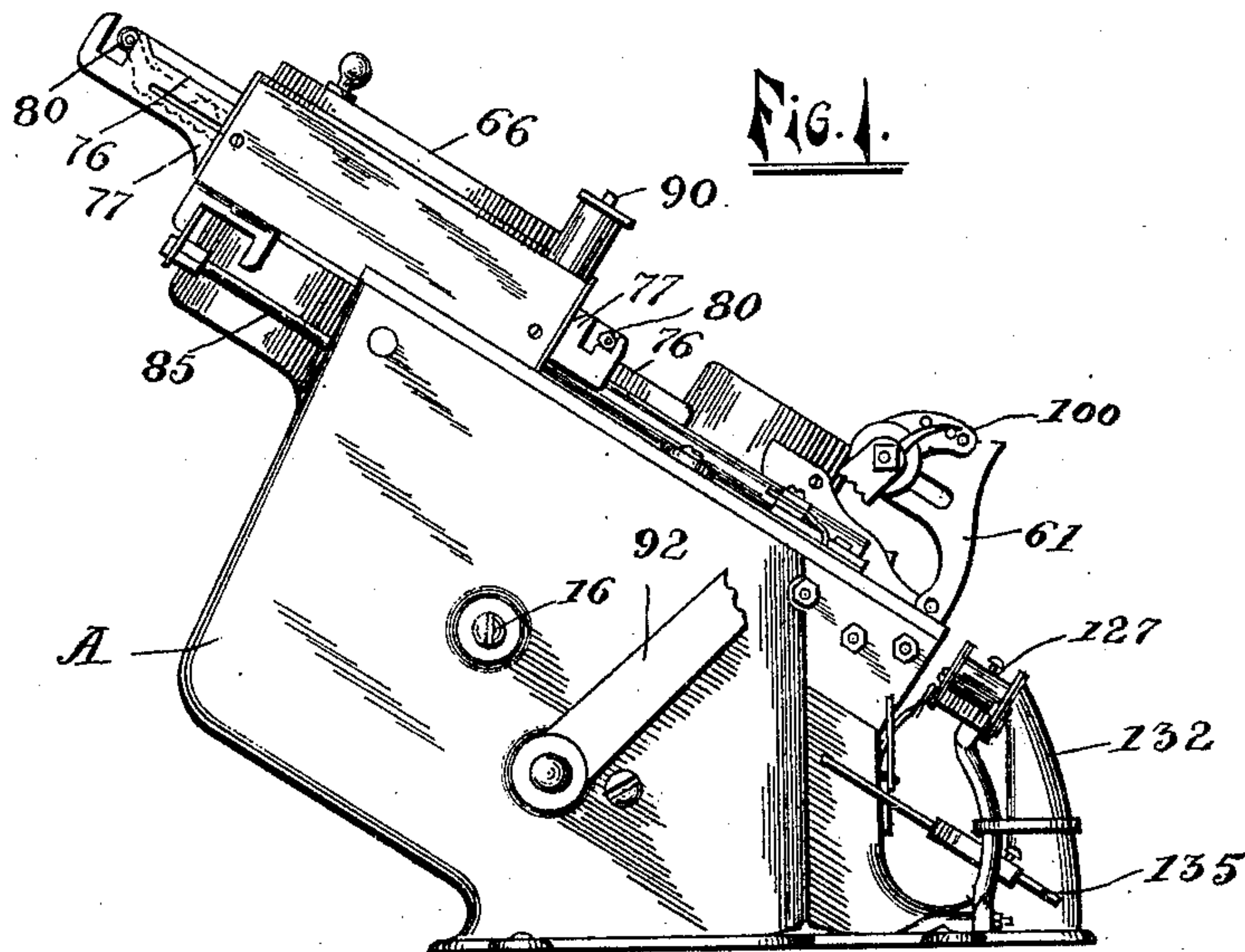


Fig. 10.

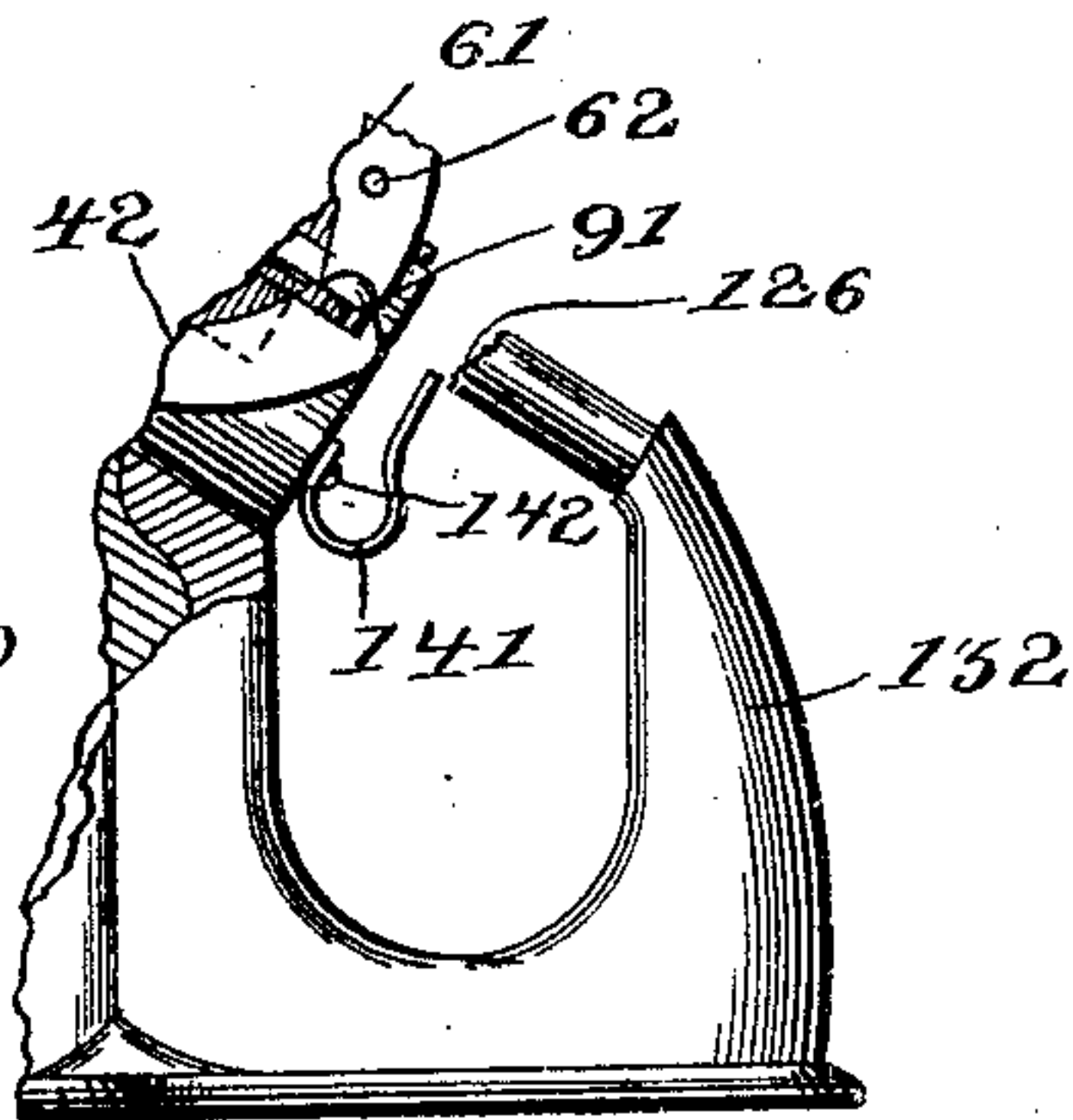
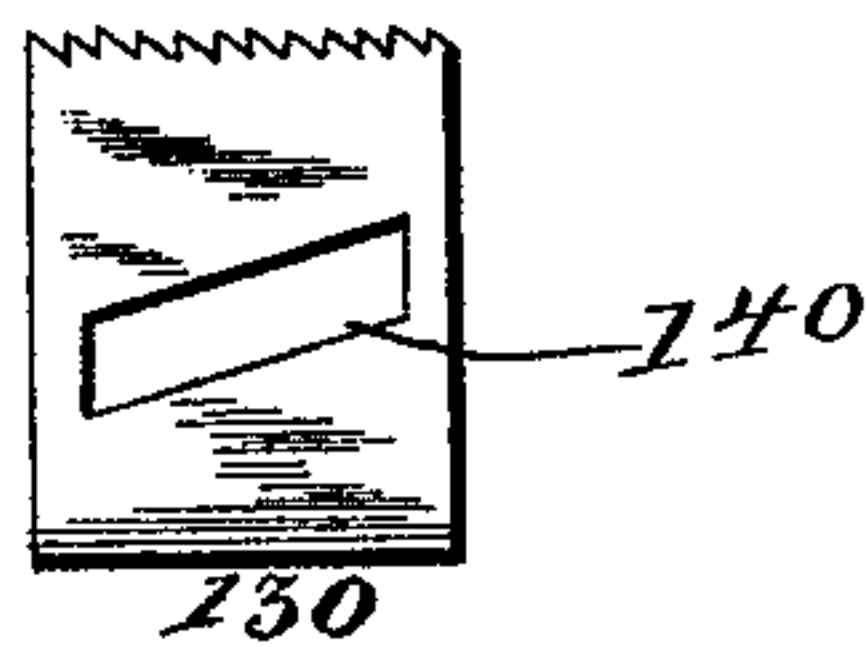


Fig. 13.

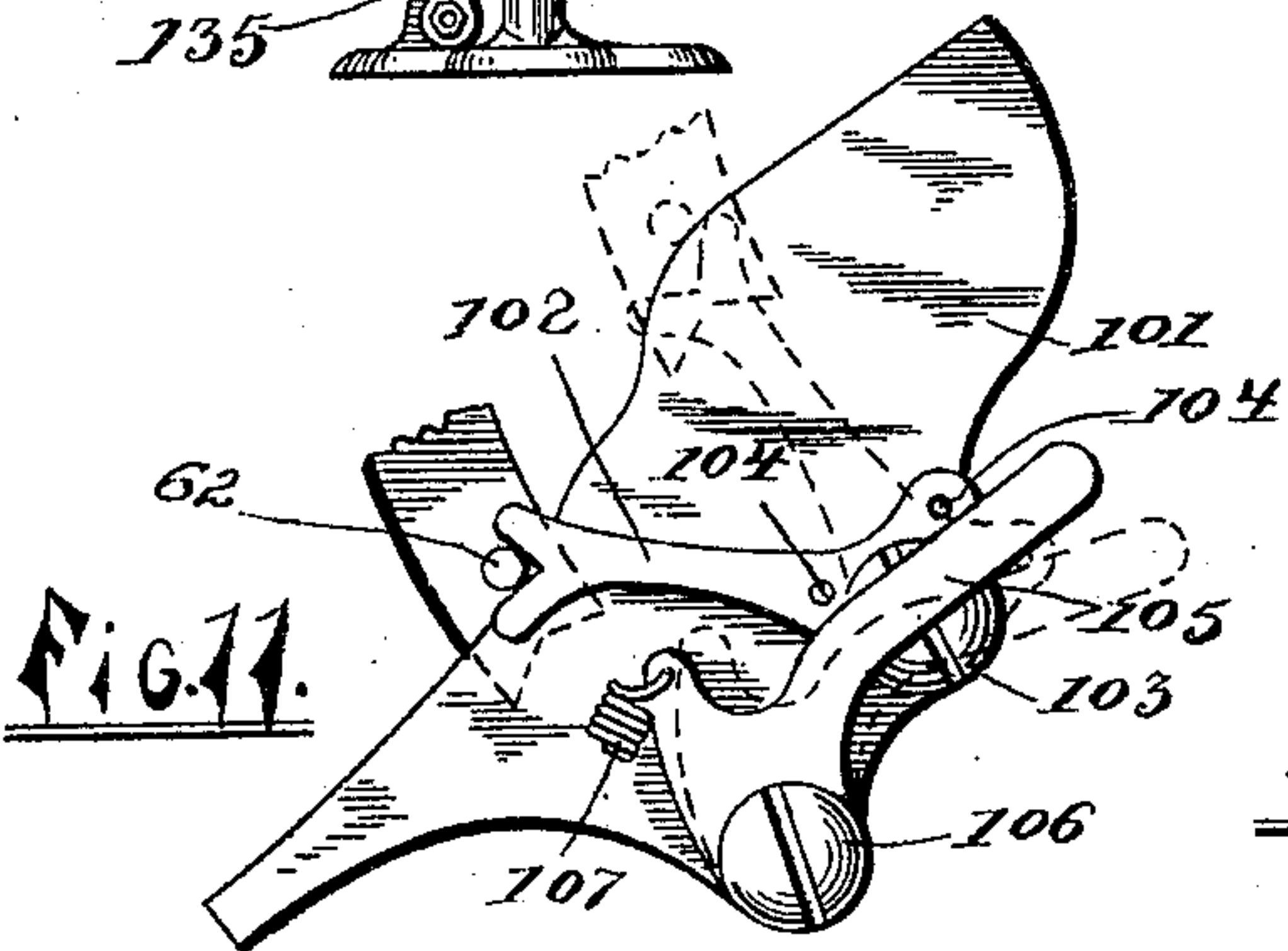


Fig. 11.

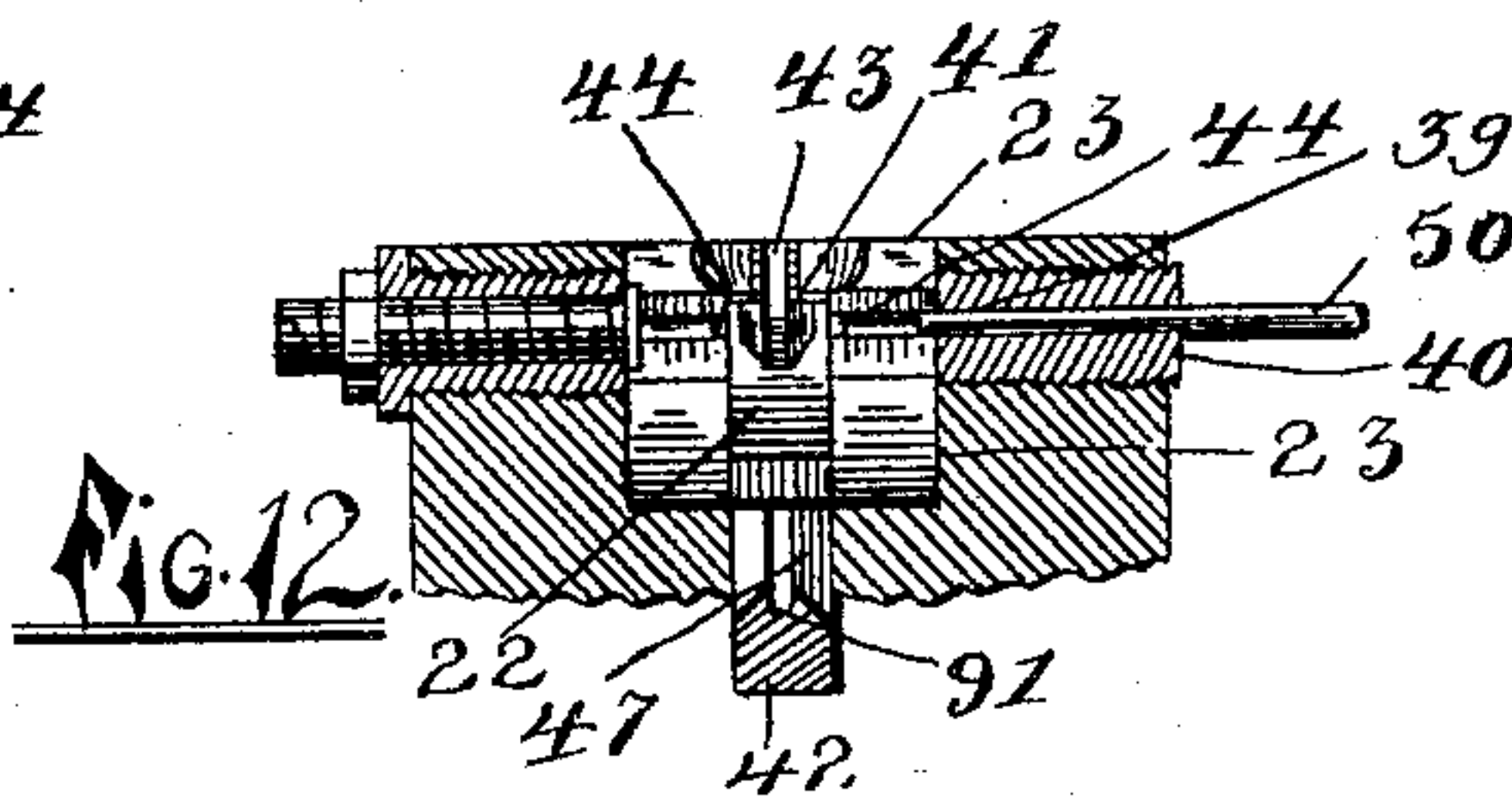


Fig. 12.

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Witnesses

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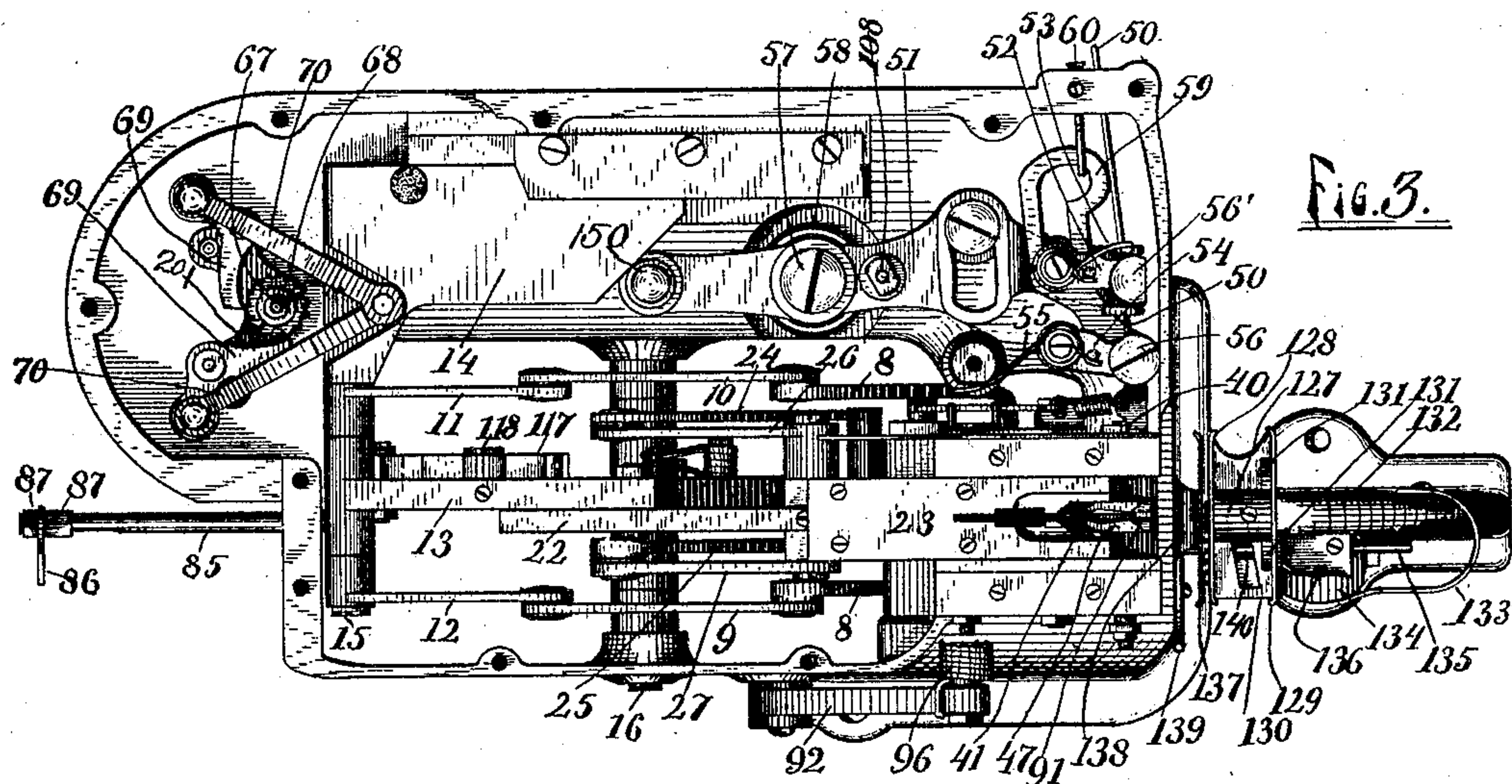


Fig. 3.

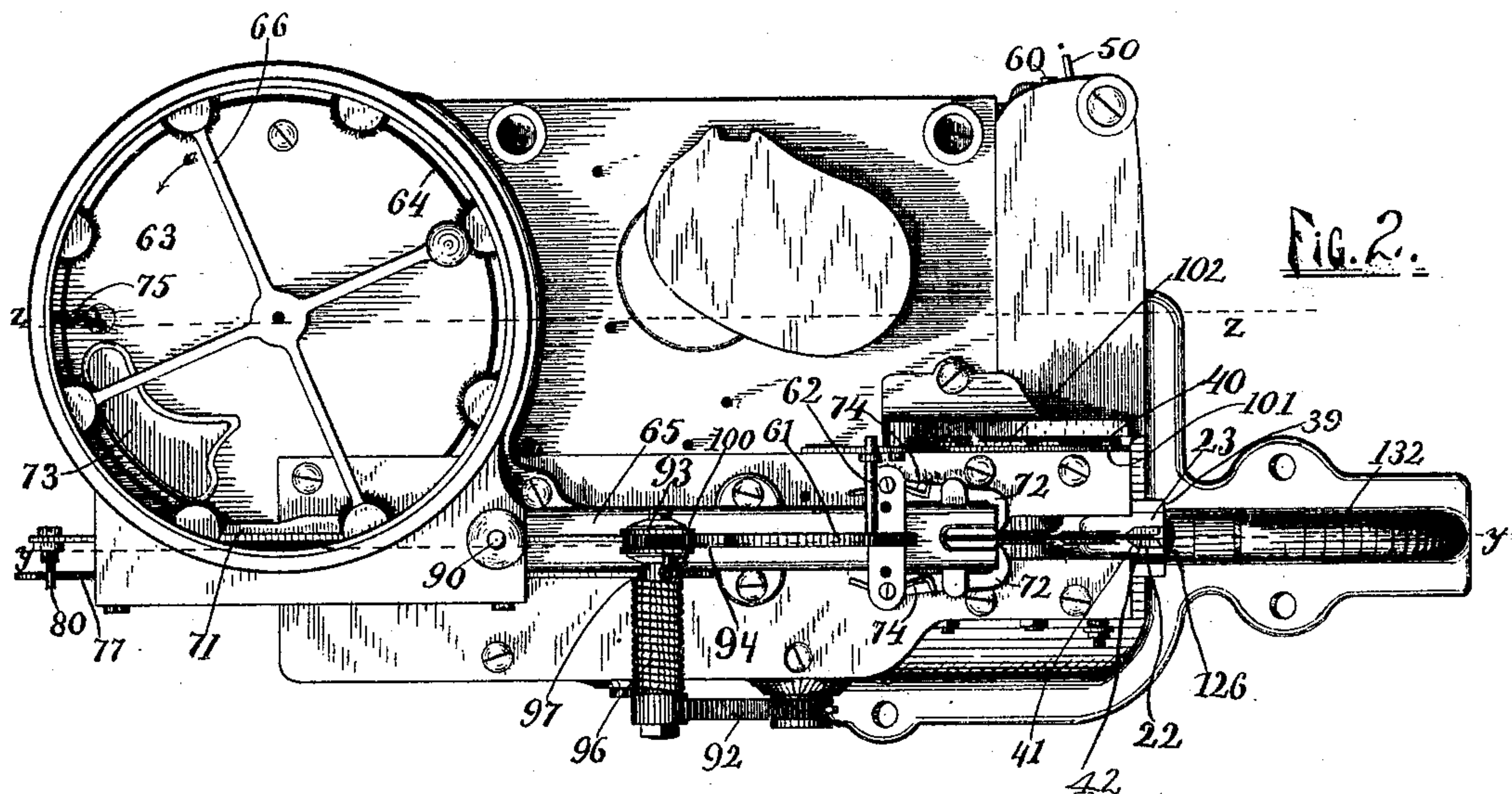


Fig. 2.

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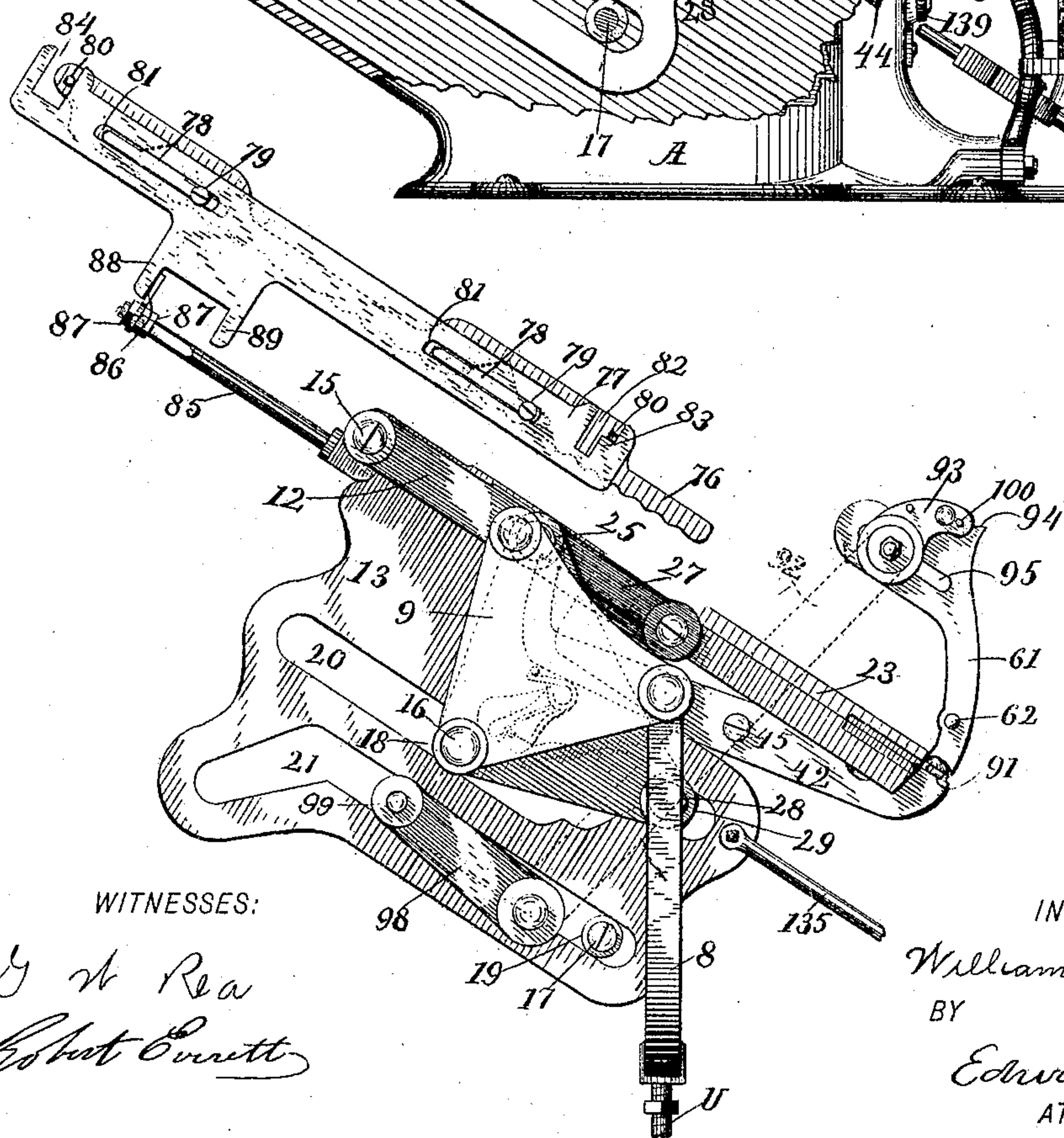
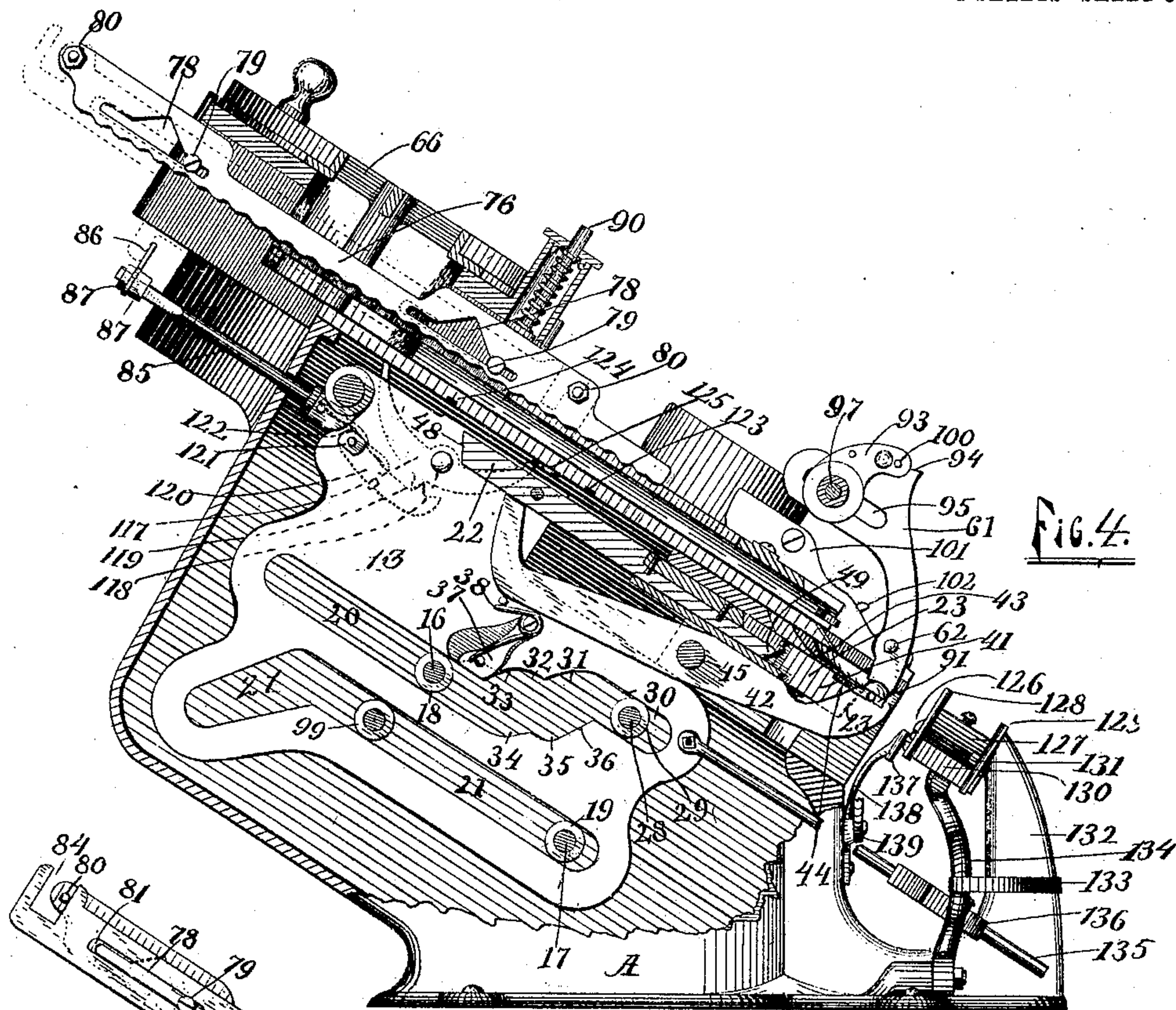
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4 SHEETS—SHEET 3.



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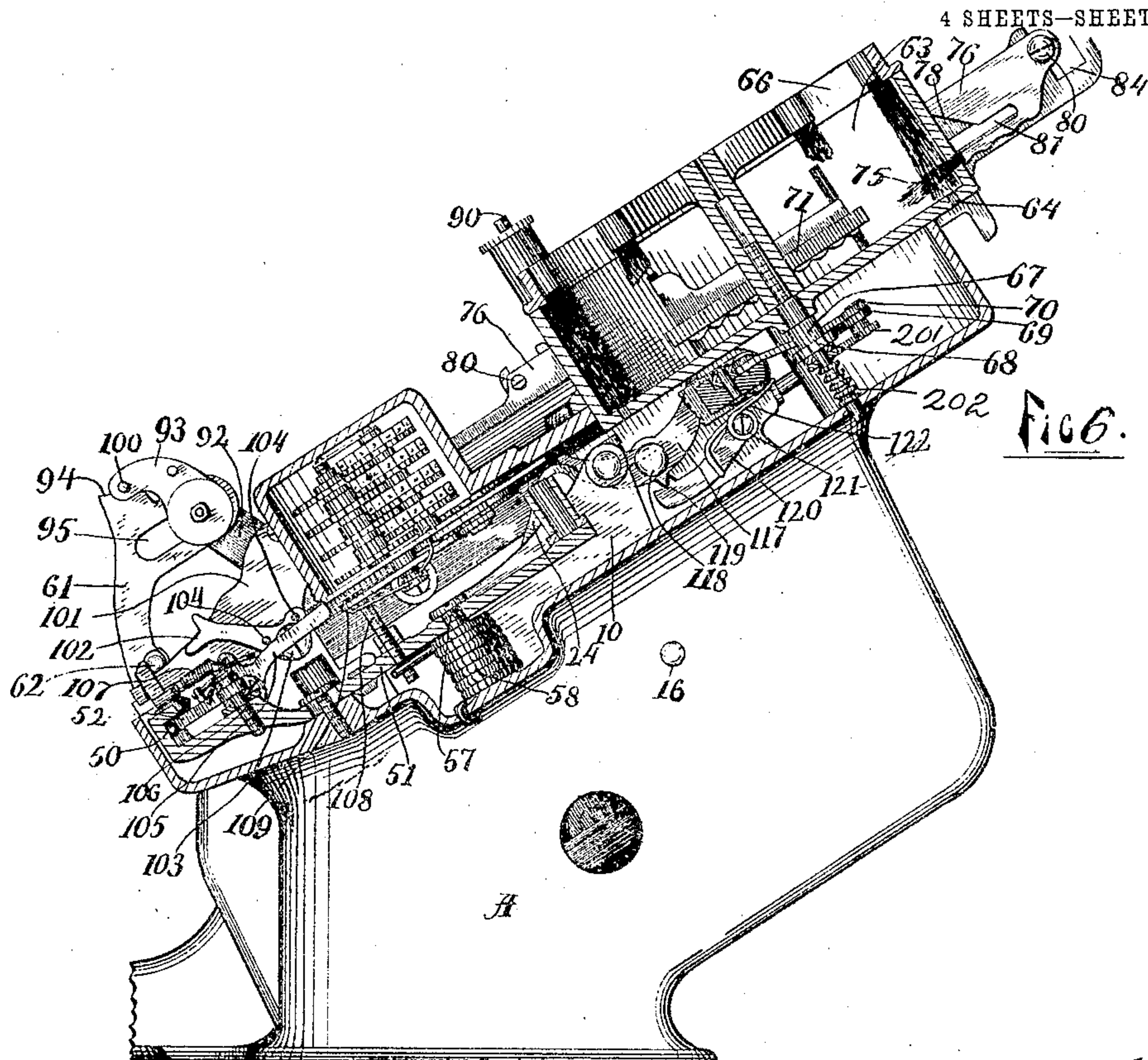


Fig. 6.

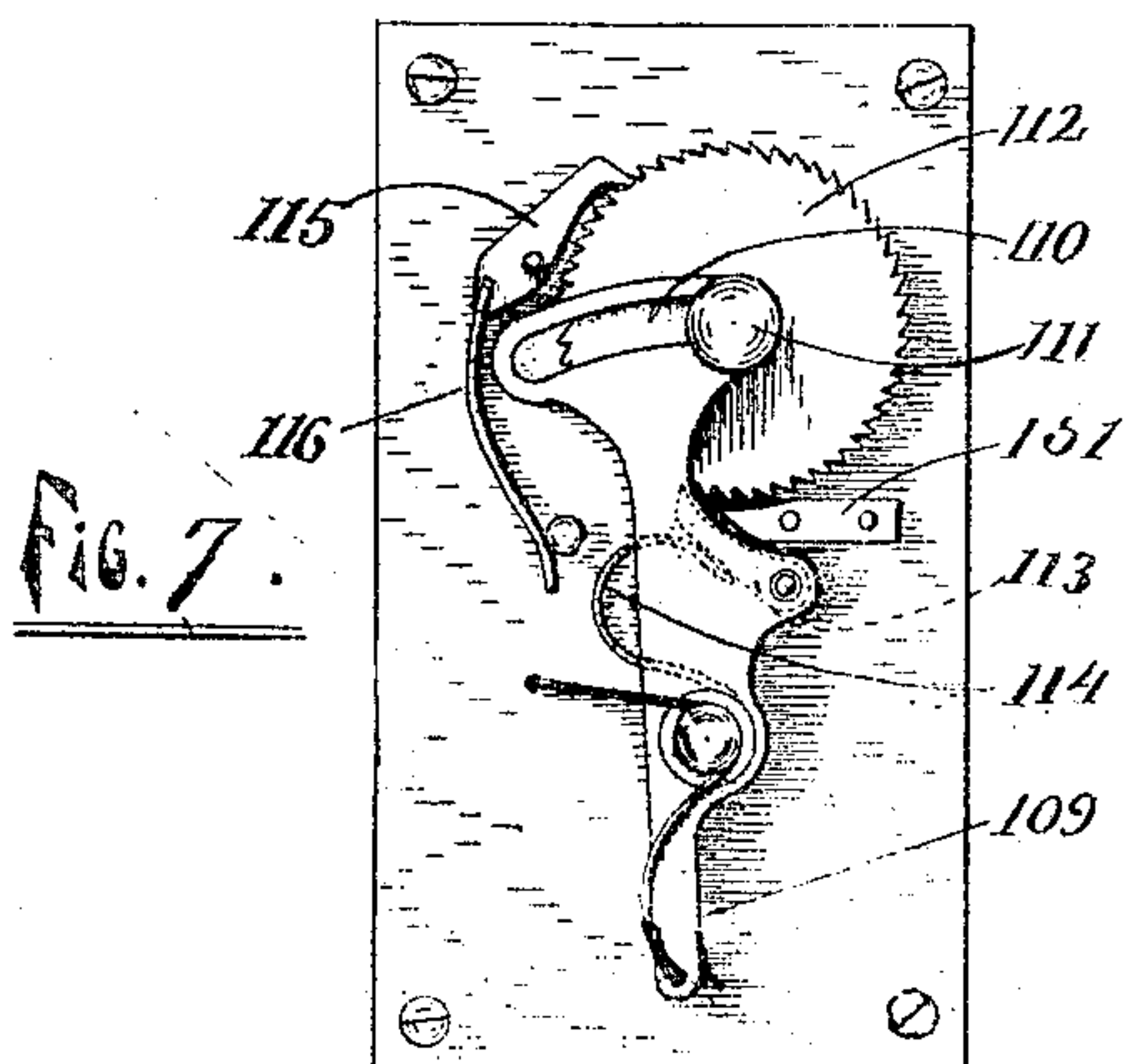
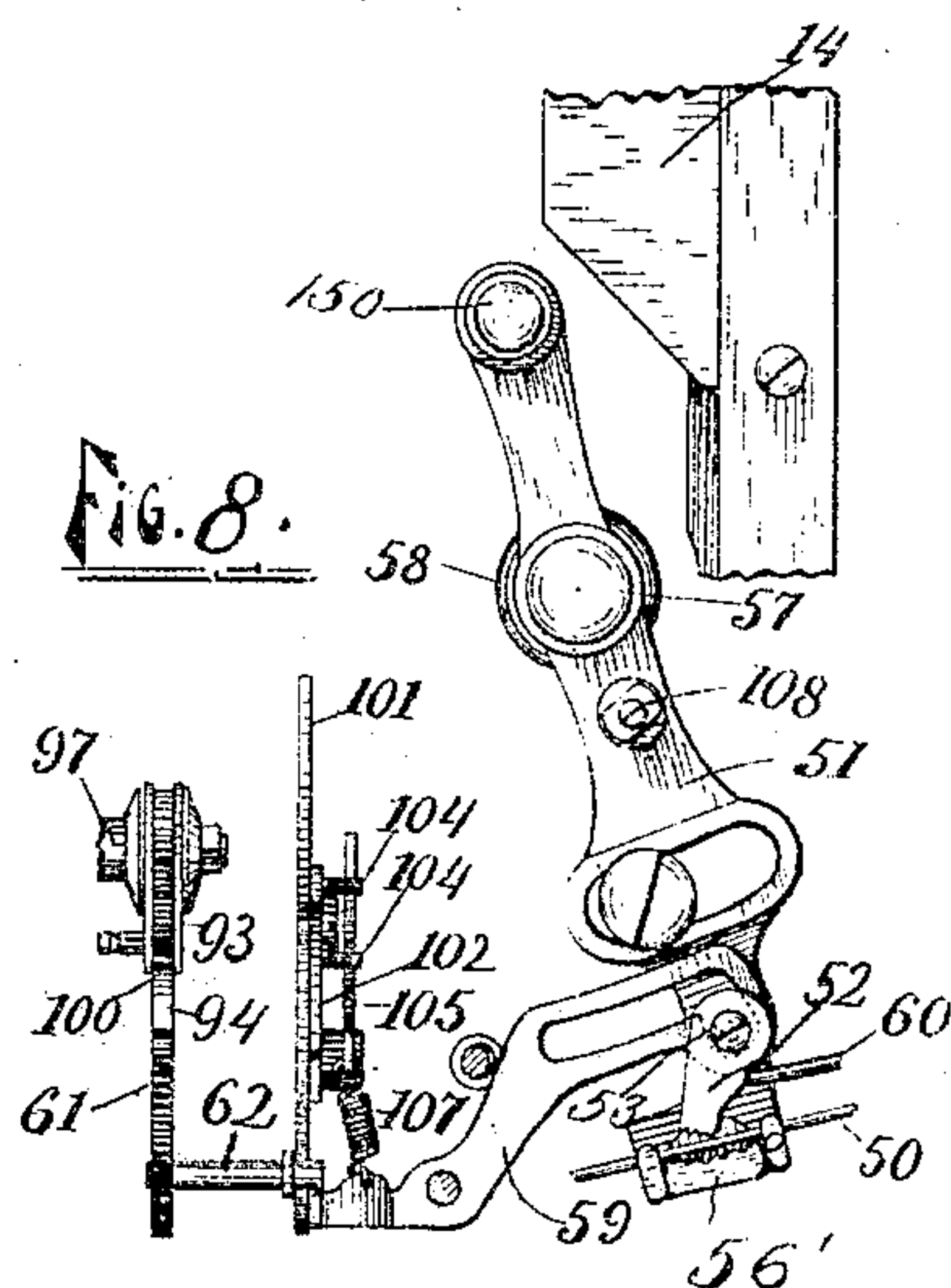


Fig. 7.



UNITED STATES PATENT OFFICE.

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BUTTON-ATTACHING MACHINE.

No. 799,550.

Specification of Letters Patent.

Patented Sept. 12, 1905.

Application filed November 22, 1893. Serial No. 491,655.

To all whom it may concern:

Be it known that I, WILLIAM E. ELLIOTT, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, (whose post-office address is Grand Rapids, Michigan,) have invented certain new and useful Improvements in Button-Attaching Machines, of which the following is a specification.

The nature of my invention relates to certain new and useful improvements in button-attaching machines, and more particularly to that class of machines which passes a wire through the eye of a button, severs a section of such wire, bends the same into a staple, and attaches the button by means of a staple so formed upon any suitable fabric or material.

The objects of my invention are to provide novel, simple, and efficient means whereby buttons are automatically fed at intervals from a hopper through a button-raceway and a wire is inserted through the eye of each button and is then severed and formed into a staple, which is subsequently attached to the fabric or material—such, for example, as the fabric or material of a boot or shoe; to provide a staple-registering mechanism which is actuated by wire and staple feeding mechanism for the purpose of registering the staples which are severed from the wire; to provide novel means whereby the actuation of the registering mechanism is prevented when the button-feeding mechanism fails to feed a button; to provide novel and simple means for regulating the strokes of the staple cutting and bending bar and the staple-driving bar; to provide means whereby the buttons are positively advanced in a column within the button-raceway, so that choking of the raceway by reason of one button clamping another button is entirely avoided, and to generally improve button-setting machines. These objects are accomplished in the manner and by the means hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of the upper portion of the machine designed to stand upon any suitable platform or table. Fig. 2 is a plan view of the staple-making and button-setting machine without the supporting-table. Fig. 3 is a plan view of the same parts as shown in Fig. 2 with the button-hopper, button-raceway, and top plate removed in order to disclose the internal structure of the machine. Fig. 4 is a vertical sectional view on

line Y Y of Fig. 2. Fig. 5 is a side view of the staple-making and button-setting parts of the machine with the plate and case removed. Fig. 6 is a vertical sectional view on line Z Z of Fig. 2 looking toward the feed-finger and button-raceway. Fig. 7 is an inverted plan view of the staple-registering device, showing the ratchet-and-pawl mechanism for operating the same. Fig. 8 is a plan view of the wire-feeding mechanism with a portion of the cam which operates the same. Fig. 9 is a side elevation of the fabric-feeding and spacing mechanism. Fig. 10 is a plan view of the foot or presser of the fabric-feeding and spacing mechanism. Fig. 11 is a side elevation of a pivoted arm and mechanism which automatically lifts the button-feed finger over the button in its reverse stroke or movement. Fig. 12 is a sectional view showing the center of the wire-feed and adjoining parts on a plane at right angles to the movement of the driver. Fig. 13 represents the gage for indicating the point where the machine attaches the button.

Similar letters and numerals refer to similar parts throughout the several views.

A represents the outer case or shell of what I shall term the "machine-head," which machine-head contains substantially all the mechanism excepting the power-feed. This machine-head is supported in any desired manner upon a table or other support, and the vertical reciprocating motion which operates the staple-forming and button-setting mechanism in the machine-head is conveyed thereto from a foot-treadle or from a revolving shaft in any suitable and customary manner.

A yoke 8, Figs. 3 and 5, is attached to the pitman connecting with the crank and shaft and to the bell-cranks 9 and 10. To the bell-cranks 9 and 10 are attached the connecting-bars 11 and 12, which connect the cranks to the sliding cam 13 and also to the cam 14, which said cam 14 moves with the sliding cam 13. The cam 14 operates the wire-feeding mechanism, as hereinafter described. The screw 15 is preferably used to connect the cam 13 to the connecting-bars 11 and 12 and also to the wire-operating cam 14. The bell-cranks 9 and 10 oscillate upon the main shaft 16, Figs. 3, 4, and 5, which shaft 16 is supported in the case A. The sliding cam 13 is supported and maintained in position within the case by means of the shaft 16 and the shaft 17, the shaft 16 having a roller 18 and the shaft 17 having a roller 19, Fig. 5. The

roller 18 is supported in the groove 20, and the roller 19 is supported in the groove 21. The parts of the cam-grooves 20 and 21 which support the rollers 18 and 19 are parallel, so that the reciprocal movement of the cam 13 is limited to a movement in a straight line. The staple-driver 22 in Figs. 3 and 4 is rigidly attached to the cam 13 and moves with it at all times.

The staple-bender 23, which also forms the staple cut-off and guide, is connected to bell-cranks 24 and 25 by the connections 26 and 27, Figs. 3 and 5. These bell-cranks 24 and 25 rock or oscillate on the main shaft 16 and are provided with the stud 28 and preferably with a roller 29, the roller 29 moving in the lower or front part of the cam-groove 20. The roller 29 being thus connected to the staple-forming mechanism operates the same in the following manner: Let the roller rest in the lower end of that part of the cam marked 30 and then move the sliding cam 13 downward by any suitable power. The roller will at first move along in the groove 30 until it passes the respective cam-surfaces 31, 32, and 33 on the forward stroke of the cam 13, and on the upward movement or stroke of the cam 13 the roller will pass respective cam-surfaces 34, 35, and 36. These cam-surfaces above described give the requisite movement to the staple bender, cut-off, and guide in its upward-and-downward movement. In order to adapt the machine to set buttons on both thick and thin fabric, it becomes desirable to have the staple-bender press upon the fabric with an elastic pressure, and I have provided for this by means of the cam-surface 37, which is supported by a spring 38, Fig. 4. When the lower end of the staple-bender comes in contact with the fabric, the roller 29 is in contact with the spring-surface 37, and a further downward pressure of the staple-bender brings into use the tension of the spring 38, thus grasping the fabric by a yielding grasp between the lower end of the staple-bender and the anvil.

The staple cut-off or bender 23 is provided with an edge 39, Figs. 2 and 12, which in its downward movement severs a section of wire of sufficient length to make a staple, such wire having first passed through the feed-screw 40 and also through the button-eye and reached its proper position to be bent into the form of a staple by the staple-bender. The staple bender and cut-off is provided with an opening 41 for the reception of the staple-former 42, Figs. 4 and 5, and is preferably provided with a button-guide groove 43. In order to hold the severed section of wire in place as it is bent upon the staple-former into a staple, I provide guide-grooves 44, which extend up a short distance from the lower end of the staple bender and cut-off and which receive the legs of the bent staple after the wire has been bent over the former. The

former 42 is pivotally connected to the frame A by means of a shaft or pivot 45, Figs. 4 and 5. The former has a rocking motion upon this pivot 45 and is operated by contact with the staple-driver 22, said former having sufficient length to be rocked in one direction by the lower end of the driver and in the opposite direction by the other end of the driver, the staple-driver having a bevel or incline at either end, the upper end of the bevel adapted to drive back the upper end of the former in the upward motion of the driver, thereby swinging forward the lower end of the staple-former in position to receive and form the wire into a staple. The reverse of the driver retracts the lower end of the staple-former, allowing the driver to pass downward, carrying with it the staple and button in order to attach the same to the fabric. The staple-former proper is provided with a notch 91, which serves the purpose of retaining the button-eye, and consequently the button, in proper position to receive the wire from the wire-feed. The former also has a shoulder 47, Fig. 12, which serves as a wire-guide, lifting the end of the wire and directing the same into the button-eye.

48, Fig. 4, is a bevel or incline upon the upper end of the driver, which rocks the former so as to bring its lower end in proper position to receive the wire, and 49 represents the bevel or incline on the lower end of the driver, which retracts the lower end of the former when the staple has been completed. The wire is fed from the spool or from any suitable supply.

50 represents the wire which has passed through the feed-lever 51, which feed-lever is provided with a wire-grip composed of a jaw 52, which jaw is operated by a spring 53, and on the other side of the wire is a pin or stud, the enlarged head of which is shown by 56' and which coöperates with the jaw to grip the wire, Figs. 3 and 8. The wire then passes through a second grip composed of a jaw 54 and operative spring 55, coöperating with a pin or stud, the head of which is shown by 56. The wire also passes through the cut-off screw 40, Fig. 12, and over the end of the staple-former 42, when it is in position to be cut off or severed from the main body of wire in order to form a staple.

The feed-lever 51 is preferably fulcrumed on a screw or bolt 57 and is operated in its backward movement by a cam 14, engaging with the stud 150 on the feed-lever, and is returned to its forward or normal position by the spring 58. The wire is fed by the spring tension, which prevents the bending or buckling of the wire in case the end of the wire meets any obstruction or obstacle.

59 is a pivoted lever adapted to cut off or check the wire-feed, and it is controlled by the button-feeding mechanism.

60 is a stop, preferably adjustable, and is

adapted to come in contact with the feed-jaw 52 when the same is retracted by the feed-lever 51, as shown in Fig. 8, for the purpose of releasing the feed-jaw from engagement with the wire, and thereby preventing the wire-feeding mechanism from moving forward the wire to the staple-forming mechanism whenever there is no button in position to receive the wire. This operation is designed to prevent the machine from cutting off pieces of wire when no button is in position to receive the portion severed, and the operation of the machine is such that the stop-lever 59 is thrown in contact with the feed-lever whenever the button-feed fails for any reason to deliver a button in position to receive the wire, which action arrests the operation of the wire-feed. There would, however, still be a little motion to the feed-lever 51, and the stop-pin 60 lifts the feed-jaw 52 from contact with the wire, thereby absolutely preventing any forward movement of the wire, so that no wire is ever fed in to the staple-forming mechanism excepting when the machine has presented a button in proper position to receive the wire through the eye thereof. The button-feed finger 61 is adapted to feed the button as hereinafter described and is provided with a pin or projection 62, which comes in contact with the end of the pivoted lever 59 whenever the finger carries no button, and when it comes in contact with said lever 59 it swings the lever upon its pivot and cuts out the wire-feed. The object of this construction is to prevent the feeding of the wire or the making of a staple when no button has been brought down by the feed-finger in position to receive the staple-wire. The buttons are preferably fed from a button-hopper 63. The hopper, as shown in the drawings, is cylindrical in form and is provided with a curved or circular groove 64, opening from the hopper into the raceway 65. A feed-brush 66 is revolved intermittently within the hopper. The feed-brush turns upon a central shaft or pivot 67, Figs. 3 and 6, which shaft extends down and through and below the bottom of the hopper and there has rigidly attached to it a ratchet-wheel 68. The cam-slide 14 carries upon a common pivot two arms 70 70, projecting upon each side of the brush-shaft. At their outer ends these arms are pivoted to bent-lever pawls 69 69, which pawls thus engage in opposite directions with opposite sides of the ratchet-wheel. The pawls are respectively carried by and pivoted upon pawl-supports, the inner ends of which loosely surround the shaft below the ratchet and which are shown by 201 201. These pawl-supports are held up in frictional contact with the ratchet by a spiral spring 202, Fig. 6, whereby the pawls become, in effect, spring-actuated. The consequence of this construction is that one motion of the slide 14 actuates the ratchet through

one pawl and the return motion further actuates the ratchet in the same direction through the other pawl. The buttons, being placed in the hopper, are carried by the brush around beneath the ledge 71, Figs. 2 and 6, which projects from the inner side of the hopper above the entrance to the raceway at such a height as to stop any button unless its eye is in the groove, and the buttons, with their eyes turned downward in the groove, pass downward in the raceway 65 until the forward button meets the pivoted button-retaining hooks 72. The retaining-hooks 72 are pivoted to the raceway 65 and are provided with actuating-springs 74, which hold said retaining-hooks in normal position and also the buttons until the button is removed therefrom by the button-feed finger 61, said buttons being removed one at a time and one for each downward stroke of the button-setting mechanism.

The brush moving within the hopper, as above described, has a tendency to place the buttons in proper position with their eyes in the groove 64; but not all the buttons will be so placed, and as the buttons are moved around the stationary brush 75 removes the greater part of the misplaced buttons from the groove. In case, however, a misplaced button passes beyond the stationary brush 75 such button is carried along until it comes in contact with a projection 71 and is there retained until it is removed from its position over or in proximity to the groove by a button-feed plate or slide 76. This allows the following button, which has its eye properly placed in the groove, to be fed into the button-raceway. The bottom of the hopper is provided with a depression 73, which also assists in removing misplaced buttons from the groove 64. The button-feed plate or slide has a scalloped or serrated side which comes in contact with the top or upper part of the buttons, Figs. 4 and 5, and feeds or assists in feeding the buttons into the button-raceway.

The button-feed plate or slide 76 is supported by and receives its reciprocating movement from a carrier composed of a frame or plate 77. The feed plate or slide 76 is provided with cam-grooves 78, and passing through the grooves are the stationary pins 79. The feed plate or slide is also provided with pins or screws 80, which are engaged by the carrier 77. This carrier is constructed with slots 81, through which the pins 79 pass. The front end of the carrier 77 is provided with a notch 82, Fig. 5, the said notch being provided with a shoulder 83, and the rear end of the carrier is provided with a notch 84, as shown in the drawings. The carrier and the connecting parts are operated from the rod or bar 85, which bar 85 is provided with a projection 86, held in place by lock-nuts 87 or other suitable means. This projection 86 comes in contact alternately with

the projection or arms 88 and 89 of the carrier 77. Above the button-feed 76 is an adjustable spring 90, which presses against the button-feed 76 and holds it in contact with the buttons.

The movement of the button-feed is as follows: The bolts 79 79 are within the cam-grooves 78 78 in the position shown in Fig. 4 when the button-feed plate is at the upper part of the upstroke. In passing forward in the downstroke as the cam-grooves 78 78 reach the bolts 79 79 the angle part of these grooves allows the button-feed plate 76 to lower and rest upon the buttons at or about the middle of the stroke. This carries forward the buttons in a column in the button-raceway. After passing the buttons beyond the middle of its downward stroke the feed is lifted from the buttons by the upper incline of the cam-grooves and continues its movement until it has reached the limit of the downward stroke. The return movement differs from the downward stroke in this respect: The pin 80 in the lower end of the button-feeder 76 at the initial movement of the return stroke comes in contact with the stop or shoulder 83 (in Fig. 5) of the carrier 77, and the lower end of the button-feed is held up and away from the buttons during the entire return stroke, while the upper end of the button-feed has precisely the same movement on its return stroke that it had on its downward stroke, and it acts upon the buttons in the hopper as a button-picker. The notches 82 and 84 are of sufficient width to allow of a small amount of longitudinal movement to the button-feed independent of the button-feed carrier 77. The buttons being thus fed into and along the button-raceway, the lower button rests against the retaining-hook 72, Fig. 2, from whence it is carried by the feed-finger 61 to the former 42 and there securely held in position until it receives the wire fed through the button-eye, as above described. The button-feed finger is adapted to receive the button from the button-raceway, carry the button and place it against the staple-former with the button-eye resting in the slot 91, Figs. 4 and 5, of the former, and to retain it there until the staple-wire has been fed through the button-eye, cut-off, and bent into a staple. The button-feeder 76 is held down in contact with the buttons by means of a spring 90, Fig. 4. The feed-finger 61 is provided with a slot 95 and a cam-surface 94. The lever 92, Figs. 2 and 3, is provided with an arm or lateral projection 97, which passes through the slot 95 of the feed-finger and forms a pivot, upon which the feed-finger turns and slides for the purpose of obtaining an automatic adjustment for holding buttons of various sizes and shapes. A pivoted guide 93, having for its pivotal connection the arm 97, supports the feed-finger on each side, said guide being provided with a bearing-pin 100,

which is held in contact with the cam-surface 94 by means of the spring 96. The supporting-lever 92 is preferably rigid with the bell-crank 98, Fig. 5, one part of which bell-crank passes through the case of the machine-head forming the fulcrum. The other end of the bell-crank 98 is provided with a roller 99, which roller 99 moves in the rear part of the cam-groove 21.

The movement of the feed-finger and its adjunctive mechanism is as follows: In Figs. 4 and 5 the finger is shown at the end of the upstroke of the machine, with a button held by the feed-finger against the former 42 and having received the wire from the wire-feed mechanism. When the eye of the button strikes the former 42, the bolt 97 slides or moves forward in the slot 95, thereby adjusting the finger to the size of the button and holding the said button under spring tension, the spring 96, Fig. 2, holding the guide 93 with its bolt 100 in contact with the cam-surface of the feed-finger, retaining it securely upon the button. The downward stroke moves the feed-finger as follows: The roller 99 moving from the position shown in Figs. 4 and 5 as the sliding cam 13 moves forward and downward passes into the inclined upper part of the cam-groove 21, turning the bell-crank 98 of the lever 92 upon its fulcrum, thus retracting the upper end of the lever 92, carrying with it the feed-finger to the position shown in Fig. 2. The pin 62, Fig. 8, moves along a guide 101, Figs. 4, 8, and 11, which holds the end of the feed-finger above the raceway. In order to lift the feed-finger over the ends of the lowermost buttons, I provide a forked arm 102, Fig. 11, pivoted at 103 to the frame and provided with two pins or stops 104 and 104. Bearing against these stops is a lever 105, pivoted at 106 and held in contact with the stops or pins by the spring 107. As the feed-finger moves upwardly along the guide 101 the pin 62 engages with the forked arm 102, which is turned upon its pivot or fulcrum 103 and which thereby raises the feed-finger and carries it in the direction shown by the dotted lines in Fig. 11. When the feed-finger reaches a given point in its upward movement, the pin 62 escapes from the fork of the arm 102 and the spring 107 returns the lever 105, and thereby the arm 102, to their normal position. The downward movement of the feed-finger merely pushes the arm 102 out of its road and passes by the same into a position to again be lifted by the arm when said finger is again carried upward.

It will be noticed that the feed-finger is moved upward by the downward stroke of the machine.

The staple-register is operated by the movement of the wire-feed lever 51. A pin 108 on feed-lever 51, Figs. 3, 6, and 8, is brought in contact with the pivoted lever 109 on the

register, Fig. 7; but the pin 108 is so located that it cannot make contact with the lever 109 until just as lever 51 reaches the limit of its stroke, so that if an imperfect eye or any
 5 other obstacle arrests the wire before the normal feed movement is completed this contact will not be made. This lever 109 is preferably provided with a slot 110 or some similar device, which serves as a stop by coming
 10 in contact with the shaft 111 of the ratchet-wheel 112. The pivoted lever 109 is provided with a pawl 113, which is operated by a spring 114. This pawl engages with the teeth of the ratchet-wheel 112, thereby giving it its rotary motion. A stationary pawl
 15 115, with its operative spring 116, serves to retain the forward or rotary motion given by the pawl 113. In order to prevent the pawl 113 from moving the ratchet-wheel more than
 20 one notch at a time, I provide a cam 151, which lifts the pawl from the engagement with the ratchet-wheel, so that it can take but one tooth at each forward movement or move the ratchet-wheel one notch at a time. This
 25 construction is rendered desirable for the reason that the strokes made by the lever 51 are not uniform in length. The register, Fig. 6, consists of gears arranged upon two parallel shafts with cylindrical faces adapted
 30 to contain the suitable numbering. Inasmuch as the form of these gears is old, it is unnecessary to describe them in detail.

I do not claim, broadly, the application of the registering device to a button-attaching
 35 machine. Such devices which register every downward stroke of a treadle or every revolution of a shaft are old. In this machine there will often be such strokes or revolutions which do not operate to attach a button
 40 to the fabric, because the eye of the button is imperfect or imperfectly presented or for some other reason, and I desire to register only the number of perfect staples actually formed. By the construction which I have
 45 shown the register will not operate if the wire strikes the eye of the button or a button fails to feed or if for any reason the wire is not fed to the full limit of its intended position for forming a complete staple.

50 The mechanism which prevents any wire-feed, and therefore any registering, if a button fails to be fed is hereinafter described. The device will not register if the wire strikes the imperfect eye of a button, since in that
 55 case the wire will be stopped before it is fully fed, and it is only the last fraction of movement of the wire-feeding mechanism which actuates the register.

60 In order to prevent injury by a partial stroke of the button-setting and staple-forming device, I provide a double-acting trip-dog, (shown by 117, Figs. 3, 4, and 6.)

In using my invention it is desirable that when the machine is put in operation each
 65 downward stroke be completely finished and

each upward stroke completely finished; otherwise a staple might be cut from the wire and before the same was formed into a staple and set upon the fabric another section of wire might be severed, and in that way the
 70 machine would be injured, and it frequently happens that persons not acquainted with the machine will set the same in operation without understanding the nature of the machine, and in order to prevent injury by a partial
 75 stroke of the staple-making and button-setting devices I have provided this double-acting trip-dog. It is pivoted at 118 to the sliding cam 13 and is provided with a V-shaped
 80 cam 119 and is operated by means of a pivoted arm 120, which arm is pivoted at 121, Fig. 4, and is held in its operative position relative to the V-shaped cam 119 by means of the spring 122. Said arm 120 has a face of
 85 suitable shape to correspond with the V-shaped cam, by means of which it assists in operating the said trip-dog 117. Said dog 117 is at its ends constructed so as to engage with notches on the under side of the button-
 90 raceway, Fig. 4, the lower notch being shown by 123 and the upper notch by 124, the dog being reversed at or near each end of the stroke by a stud 125. This stud 125 projects
 95 downward from the under side of the button-raceway, and as the cam-slide 13, carrying the trip-dog 117, reaches nearly the limit of its stroke the stud 125 engages the end of the trip-dog. As the stroke continues this end
 100 of the dog is forced toward the cam-slide and the V-shaped cam on the dog forced past the engaging V-shaped cam of the lever 120. Thus the opposite ends of the dog are presented alternately to the notches 123 and 124 and the stroke limited.

More in detail the operation of the dog is
 105 as follows: Let the cam-slide 13 stand in the position shown in Fig. 4 with the upper end of the dog 117 at its upper point. As the slide 13 is passed downward it carries the dog with it in its downward stroke, and the upper end
 110 of the dog passes into the notch 124 and after passing said notch cannot be passed backward or upward or given its backward stroke, for the reason that the dog will engage with said notch 124; but by continuing its down-
 115 ward stroke the dog comes in contact with the stud 125 and is thereby reversed. Thus the upper end of the dog is depressed and the lower end is raised, leaving the dog in position not to engage with the notch 124. On
 120 the return stroke the lower end of the dog 117 having been carried beyond the notch 123 this end of the dog will engage with said notch if a downward stroke is attempted before the dog 117 is carried beyond the trip-
 125 pin 125, thereby again reversing the dog.

I will now describe the fabric-feed and button-spacing attachment which may be used in connection with the mechanism above described. A sleeve 127 is attached to the upper
 130

end of the anvil-supporting post 132. (Shown in Figs. 4 and 9.) The sleeve has at its respective ends two parallel plates 128 and 129, provided with openings or slots near their lower sides, in which slots is placed a laterally-movable slide 130, Fig. 10. This slide is provided with teeth or roughened surfaces which engage with and move the fabric held in contact therewith by means of a pressure-plate 137, which pressure-plate is provided with a spring-arm 138. This spring-arm is forced back by means of a pivoted lever 139, Figs. 3, 8, and 9, in order to lift said pressure-plate. 141 is a gage adapted to indicate the point where the machine will attach the button. 141 is attached, by means of the screw 142, to the frame of the machine. (See Fig. 13.) When the fabric is placed in position to receive the buttons from the button-setting device, the slide 130 is moved by means of a pivoted arm 134, which is moved to the right (upward in Fig. 3) on the back stroke by a spring 133 and is moved forward (downward in Fig. 3) by means of an adjustable wedge or cam 136, which wedge is placed on the rod 135, which rod is suitably connected to the main cam 13. The upper end of the lever 134 engages with an inclined slot 140 in the slide 130, Fig. 10. Its movement in the slot alternately raises and lowers the slide in the forward and backward stroke of the lever 134, whereby the slide is retracted from the fabric as the lever moves to the end of the slot nearest the same to make the backward stroke. To effect such movement of the arm 134 in the slot 140, a spring 131 engages the slide 130 and prevents its moving too freely in the plates 128 and 129.

The operation of my invention in making a staple, setting a button, and registering the same is briefly as follows: As the machine stands, as shown in Figs. 1 and 3, the wire has been fed through the eye of the button and the sliding cam 13 is at the upper end of the stroke. If the sliding cam is now started on its downward stroke by the foot or any suitable power, it carries with it the cam 14, giving a backward movement to the wire-feed lever 51 to the point where it can again grasp the wire for the next following staple. As the cam 13 is carried farther the roller 29 meets the cam-face 31, Fig. 4, moving forward the cutter and bender 23, severing a piece of wire of suitable length for a staple, and bending it into a staple around the staple-former 42. The movement of the bender is now arrested by the cam 32, and the staple-driver 22 is carried forward, and the bevel end 49 retracts the staple-former 42, and the driver continues its downward movement, meeting the crown of the staple. At this point the roller 29 comes in contact with the cam-groove 33, Fig. 4, and the staple-bender 23 and driver 22 are carried downward together to the clenching die or anvil 126, the fabric which is to receive the button and staple having been

placed upon said die. The staple-bender when it meets the fabric begins to exert pressure thereon, and to prevent injury from this pressure a spring-lever tension 37 allows the bender to adjust itself automatically to any thickness of fabric. After the staple-bender 23 has reached its lowest point the sliding cam 13 continues the downward movement of the driver 22 until it clenches the staple with the button attached upon the fabric. The downward stroke above described revolves the hopper-brush 66, as described above, and returns the feed-finger 61 to the position shown in Fig. 2. The return of the sliding cam 13 upon the upward stroke brings the roller 29 in contact with the cam-surface 34, Fig. 4, which carries the cutter and bender 23 to the first part of its upward stroke, where it remains stationary while the roller 29 remains on cam-surface 35. At this time the upper end 48 of the driver 22 meets the upper end of the former 42 and returns the lower end of said former to the position to receive the eye of the button and wire. After the former is in the position last described the feed-finger 61 receives and carries the button from the raceway and places it with its eye in groove 91 of the former 42 and by its spring adjustment adjusts itself to hold the button securely in position. The roller 29 comes in contact with the cam-surface 36, Fig. 4, and returns the cutter and bender 23 to the position as described. The wire is now carried or fed through the eye of the button by the spring 58, Fig. 3, and registered by the registering mechanism above described. It will be noted that when the end of the feed-finger is held by the button which is stopped by the former the button prevents the stud 62 on the button-feed finger from coming in contact with the pivoted switch-lever 59, which controls the wire-feed. If by accident or otherwise the button is not brought down against the staple-former by the button-feed finger, the stud 62 meets the pivoted lever 59, locking the wire-feed lever 51, so that no wire is fed to the machine and the registering device fails to operate. By this contrivance no staples are registered excepting such as are fed through the eye of the button and attached to the fabric.

The other parts of my invention have been sufficiently described above and a description need not be given here.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. The combination of a button-feed mechanism, a staple forming and setting mechanism whereby the buttons fed are attached to a fabric, a wire-feed mechanism whereby wire sufficient for a staple is normally fed to the staple-fastener, means for arresting the wire-feed mechanism if a button is not fed, a registering mechanism, and means carried by

the wire-feed for operating the register at the limit of the forward stroke of the wire-feed, whereby the register will not operate unless a button and wire for a complete staple are presented to the setting mechanism.

2. The combination with a button-raceway of a button-feed finger, a swinging arm, means for operating the feed-finger, a device connected with the feed-finger and engaging said arm to swing the latter and cause it to lift the feed-finger over the lowermost button in the raceway, and a spring-actuated arm for restoring the swinging arm to normal position after it has lifted the feed-finger, substantially as described.

3. The combination with a button-raceway of a button-feed finger, a swinging arm 102 for lifting the feed-finger over the lowermost button in the raceway and having projecting pins 104 for making contact with the spring-actuated arm, the spring-pressed arm 105 having contact with such pins for restoring the swinging arm to and retaining the same in normal position, and a device connected with the feed-finger for engaging and swinging the arm 102, substantially as described.

4. In a button-attaching machine, the combination of longitudinally-reciprocating actuating mechanism, a button-hopper, a button-raceway leading therefrom, a rotary shaft passing down through the hopper, a rotary brush carried by such shaft, a ratchet-wheel attached to such shaft below the hopper, a pair of oppositely-disposed pawls on opposite sides of the ratchet adapted intermittently to engage the same and to actuate it in the same direction, arms making pivotal connection between the pawls and the reciprocating actuating mechanism, and a spring operating upon the pawls to maintain them in operative contact with the ratchet.

5. In a button-attaching machine having a raceway carrying a column of buttons, a longitudinally-reciprocating feeder parallel with the raceway, means for moving the feeder to-

ward the raceway until it grips the heads of the buttons, means for moving the feeder in contact with the button-heads parallel with the raceway, thereby advancing the column of buttons therein, means for moving the feeder away from the raceway thereby releasing the buttons, and means for returning the feeder to its first position, all substantially as described.

6. In a button-attaching machine having a raceway carrying a column of buttons, a longitudinally-reciprocating feeder parallel with the raceway, spring-actuated means for moving the feeder toward the raceway until it yieldingly grips the heads of the buttons, means for moving the feeder in contact with the button-heads parallel with the raceway, thereby advancing the column of buttons therein, means for moving the feeder away from the raceway, thereby releasing the buttons, and means for returning the feeder to its first position, all substantially as described.

7. In a button-attaching machine having a raceway carrying a column of buttons, a longitudinally-reciprocating feeder parallel with the raceway and having a scalloped or serrated edge adapted to engage and hold the buttons and properly space them with reference to each other, means for moving the feeder toward the raceway until it grips the heads of the buttons, means for moving the feeder in contact with the button-heads parallel with the raceway, thereby advancing the column of buttons therein, means for moving the feeder away from the raceway, thereby releasing the buttons, and means for returning the feeder to its first position, all substantially as described.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

WILLIAM E. ELLIOTT. [L. s.]

Witnesses:

ARTHUR C. DENISON,
CHRISTOPHER HONDELINK.