

No. 630,456.

Patented Aug. 8, 1899.

J. HENRY.

MACHINE FOR TURFING AND EMBROIDERING FABRICS.

(No Model.)

(Application filed Apr. 8, 1898.)

5 Sheets—Sheet 1.

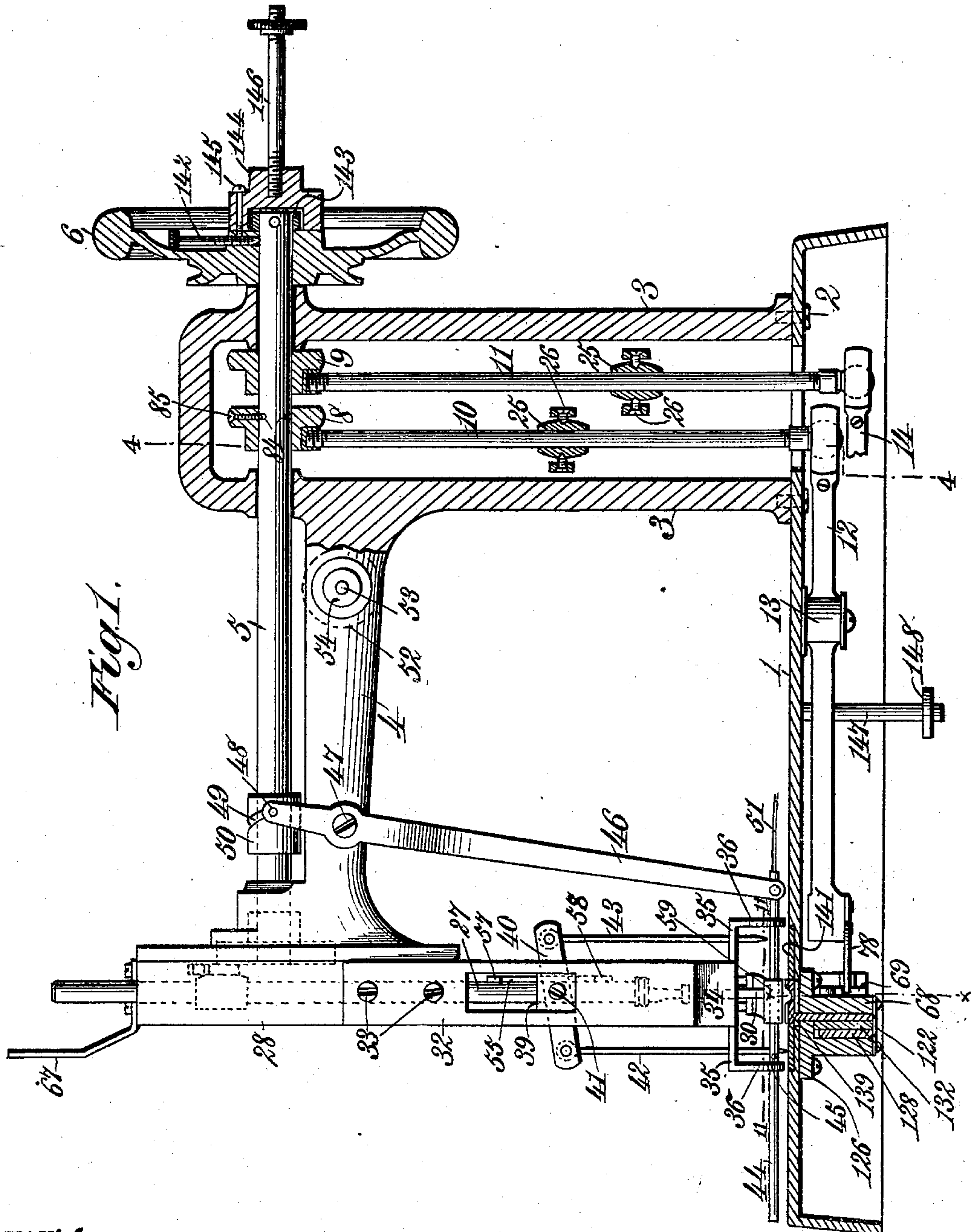


Fig. 1.

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J. B. Keefe

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Jennie Henry,  
By James L. Norris,  
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Fig. 2.

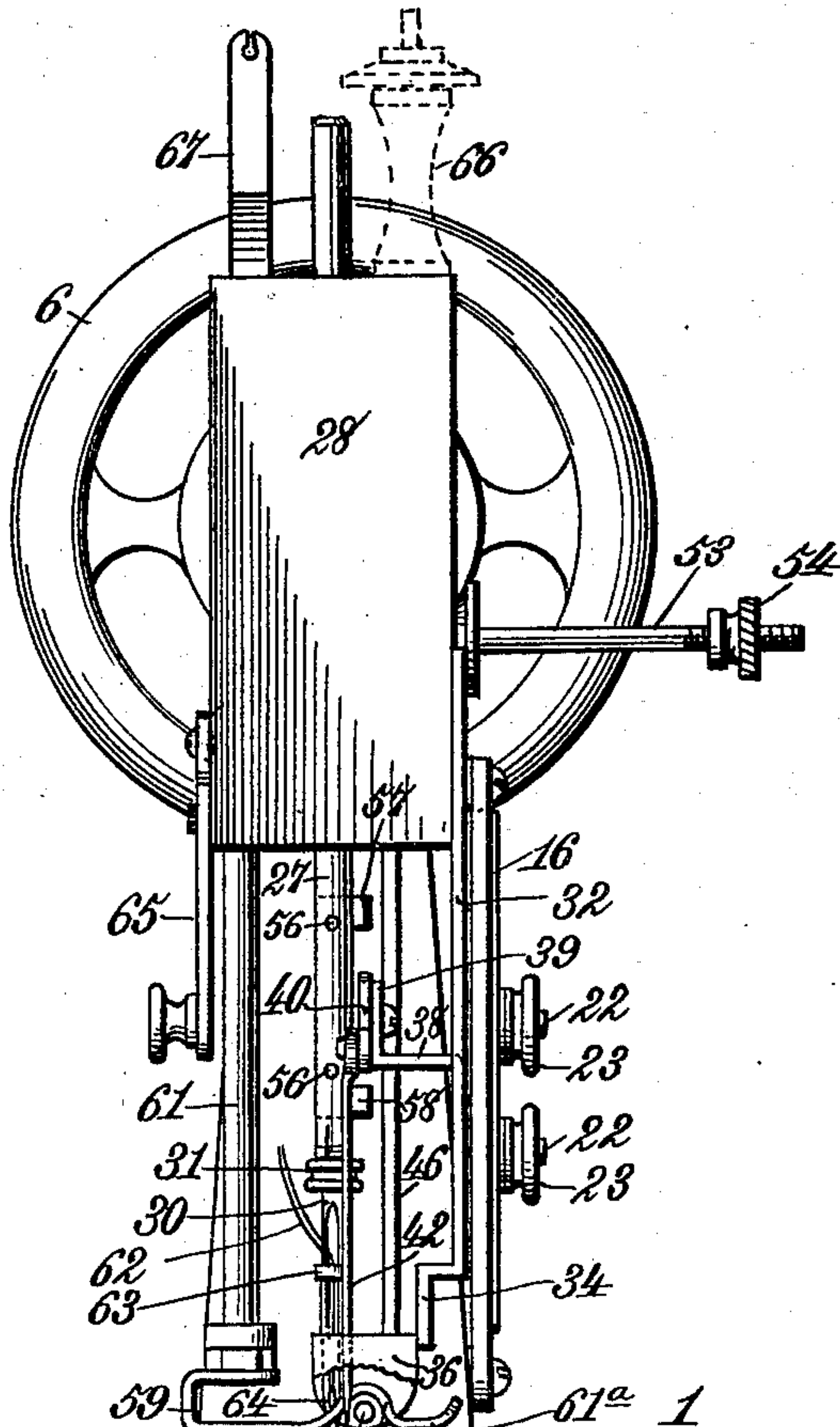
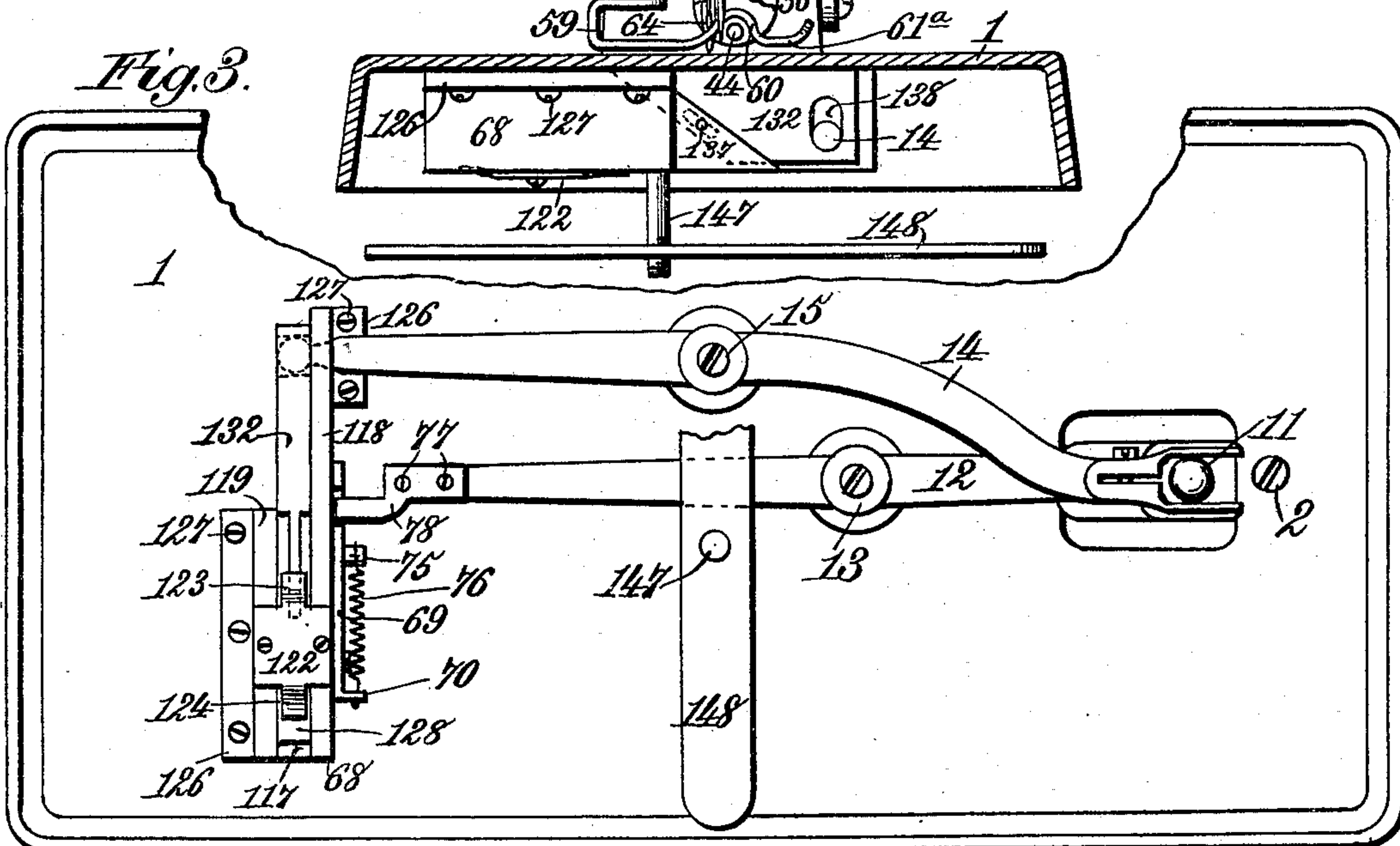


Fig. 3.



Witnesses.  
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Fig. 4.

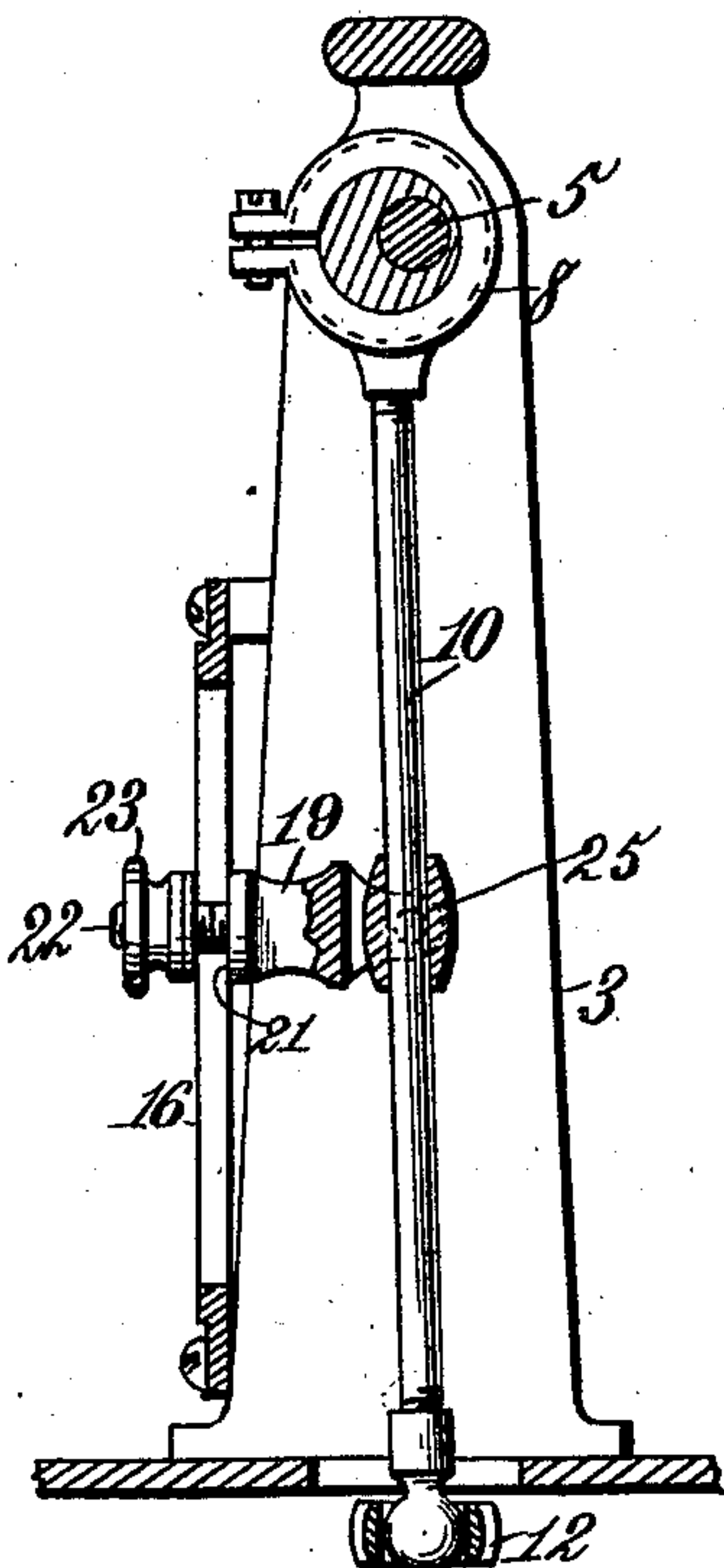


Fig. 5.

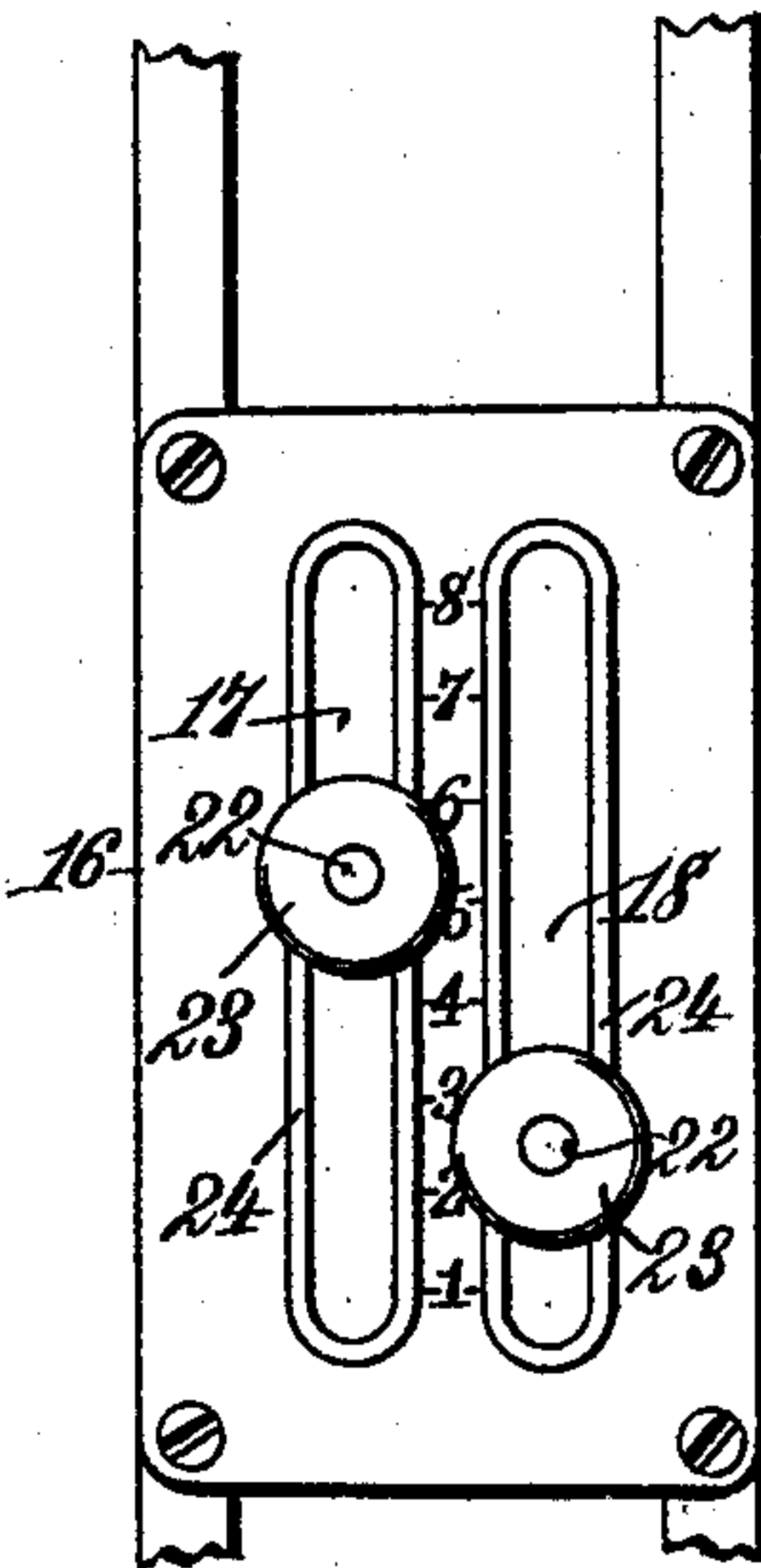


Fig. 28.

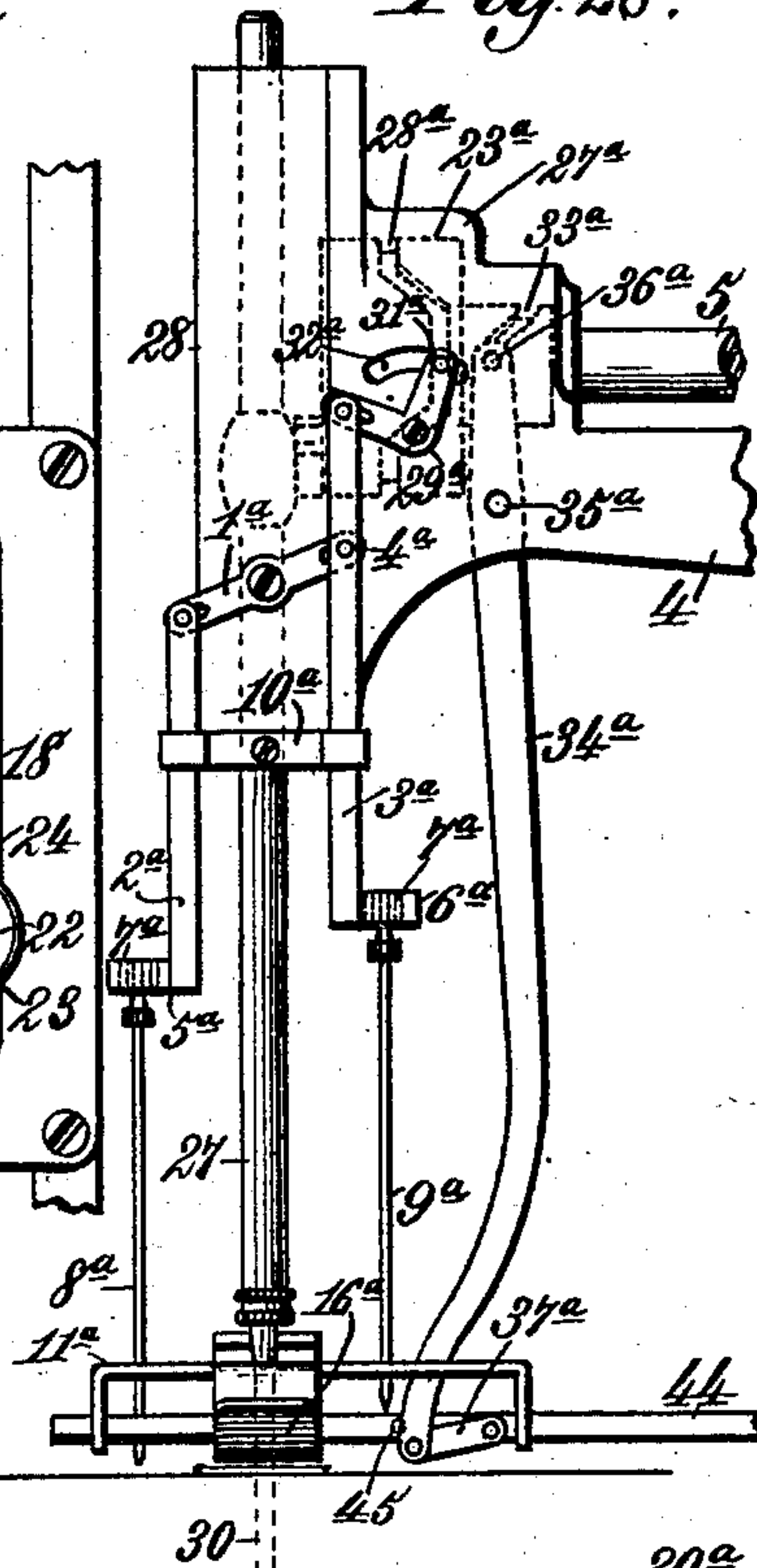


Fig. 7.

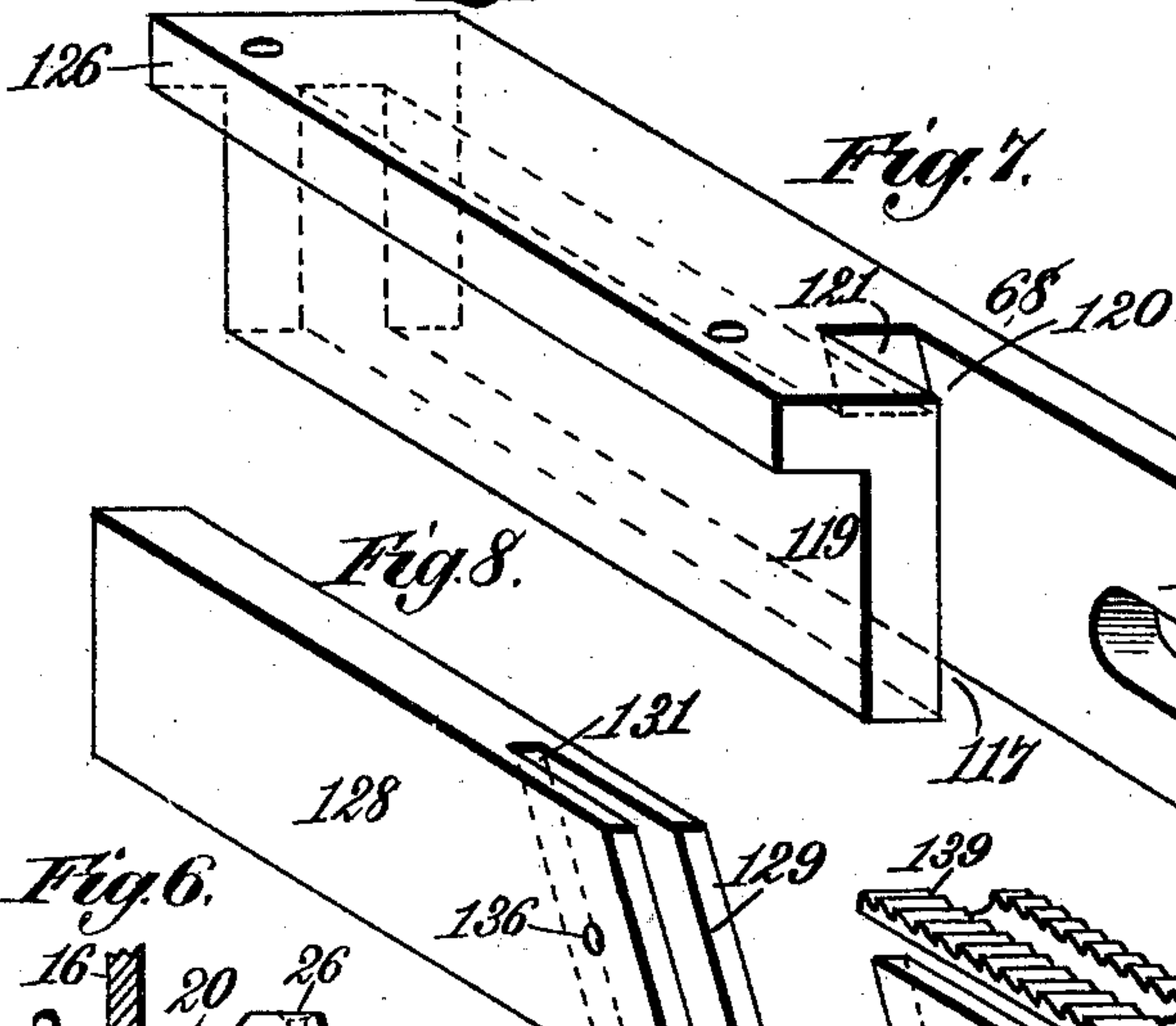


Fig. 8.

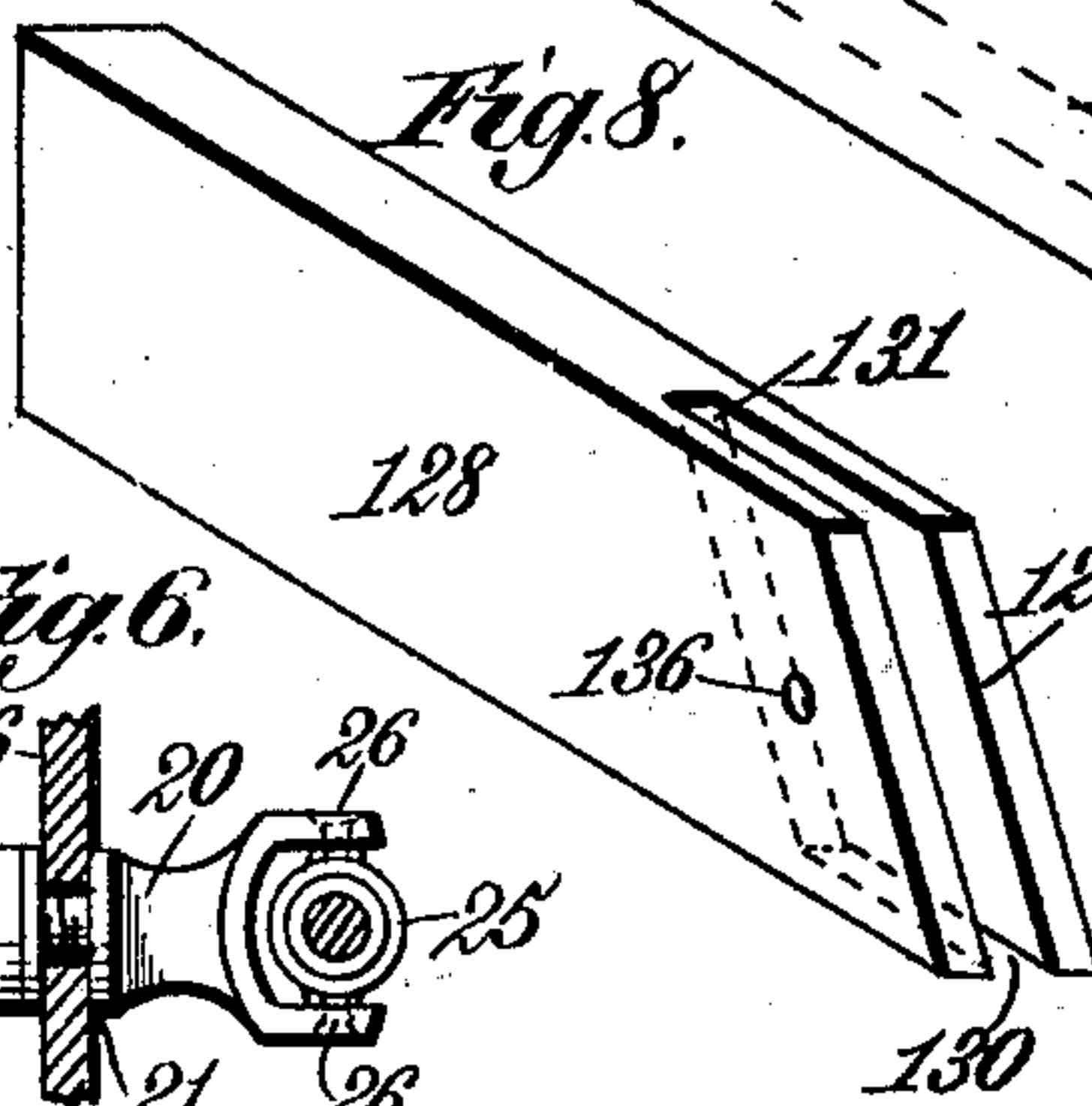
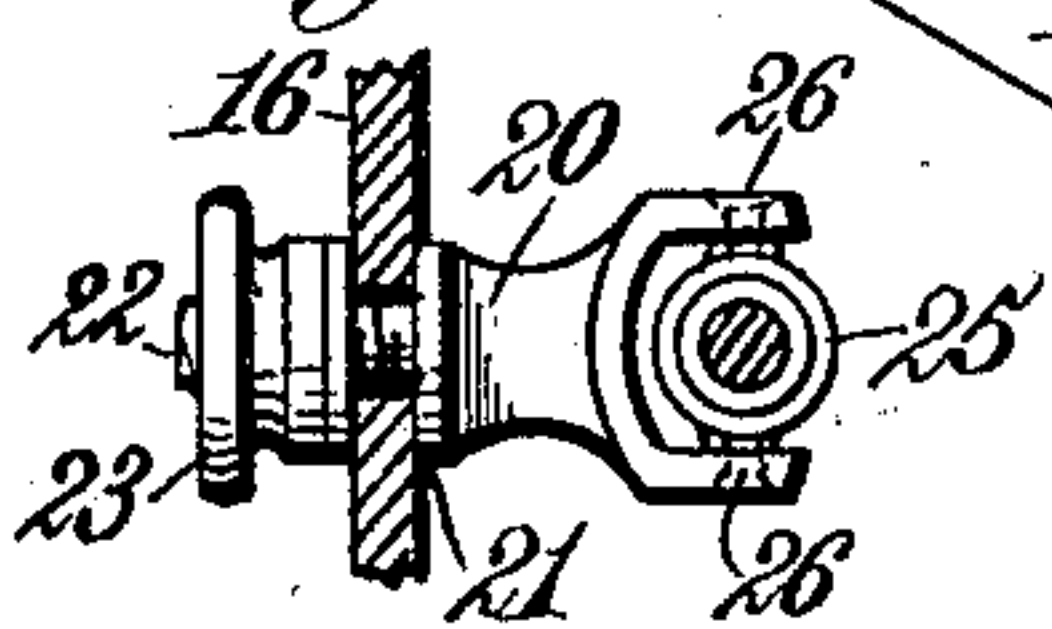


Fig. 6.



Witnesses.  
Robert G. Pratt,  
J. B. Kiefer

Fig. 9.

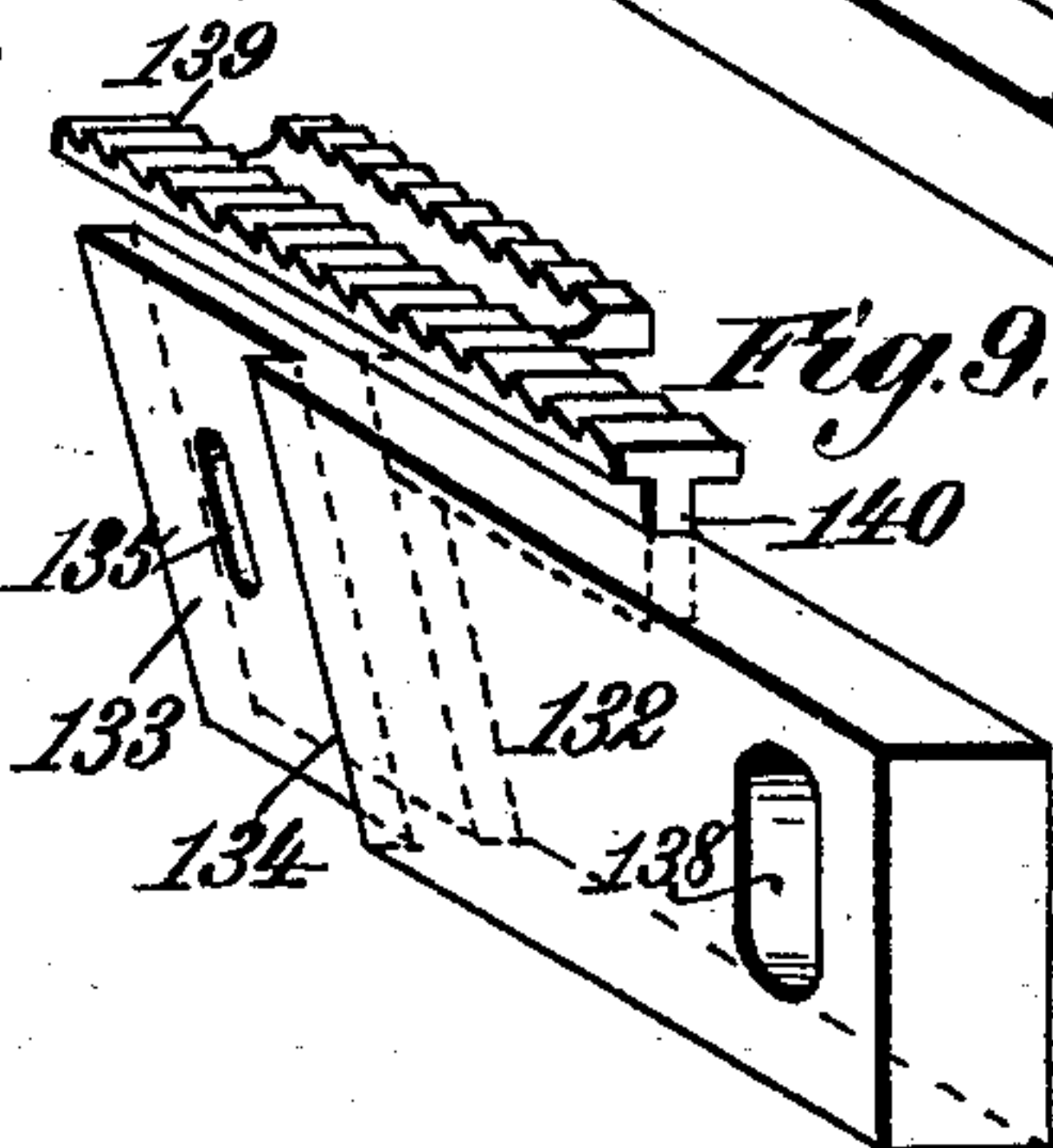
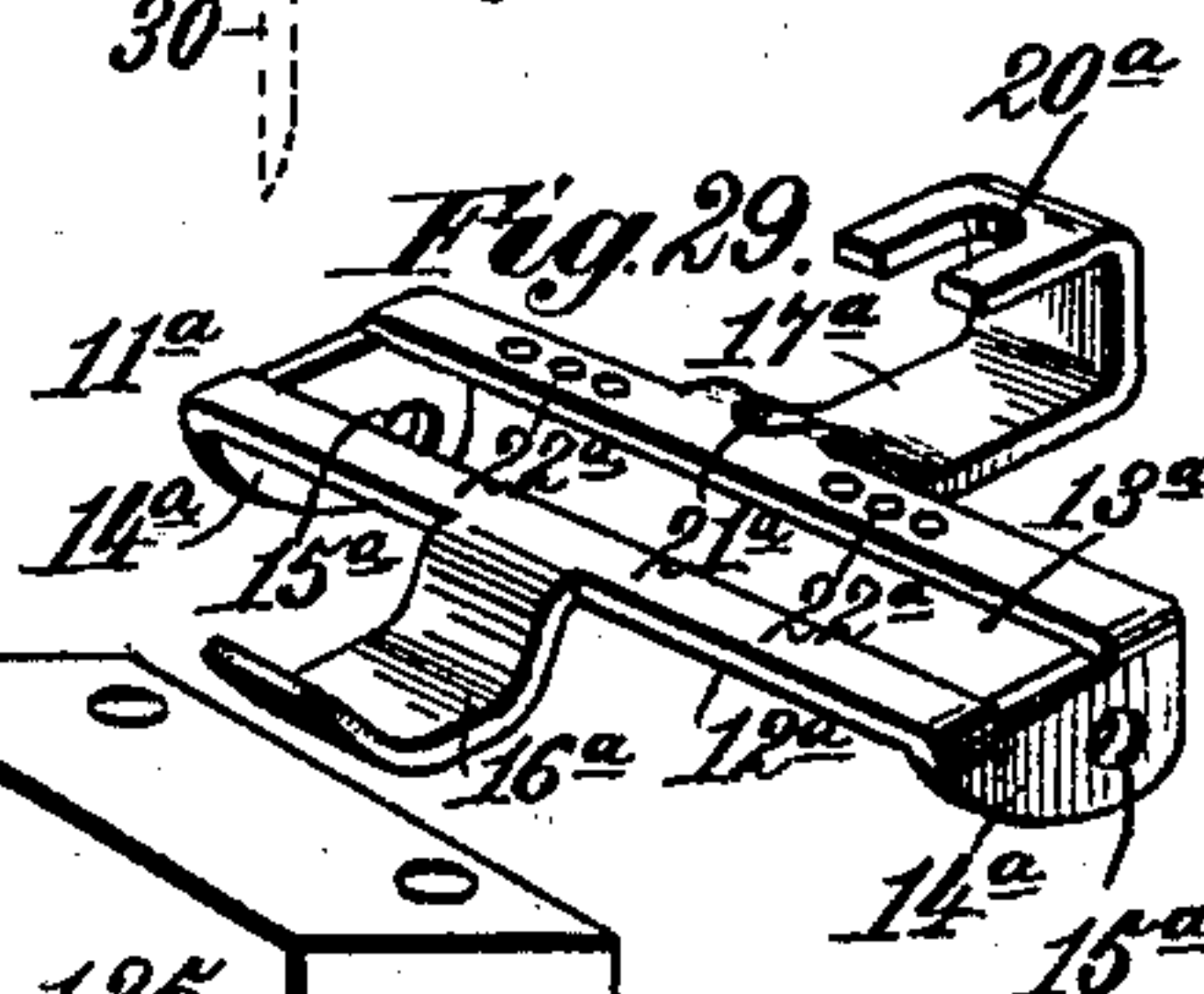


Fig. 29.



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5 Sheets—Sheet 4.

Fig. 10.

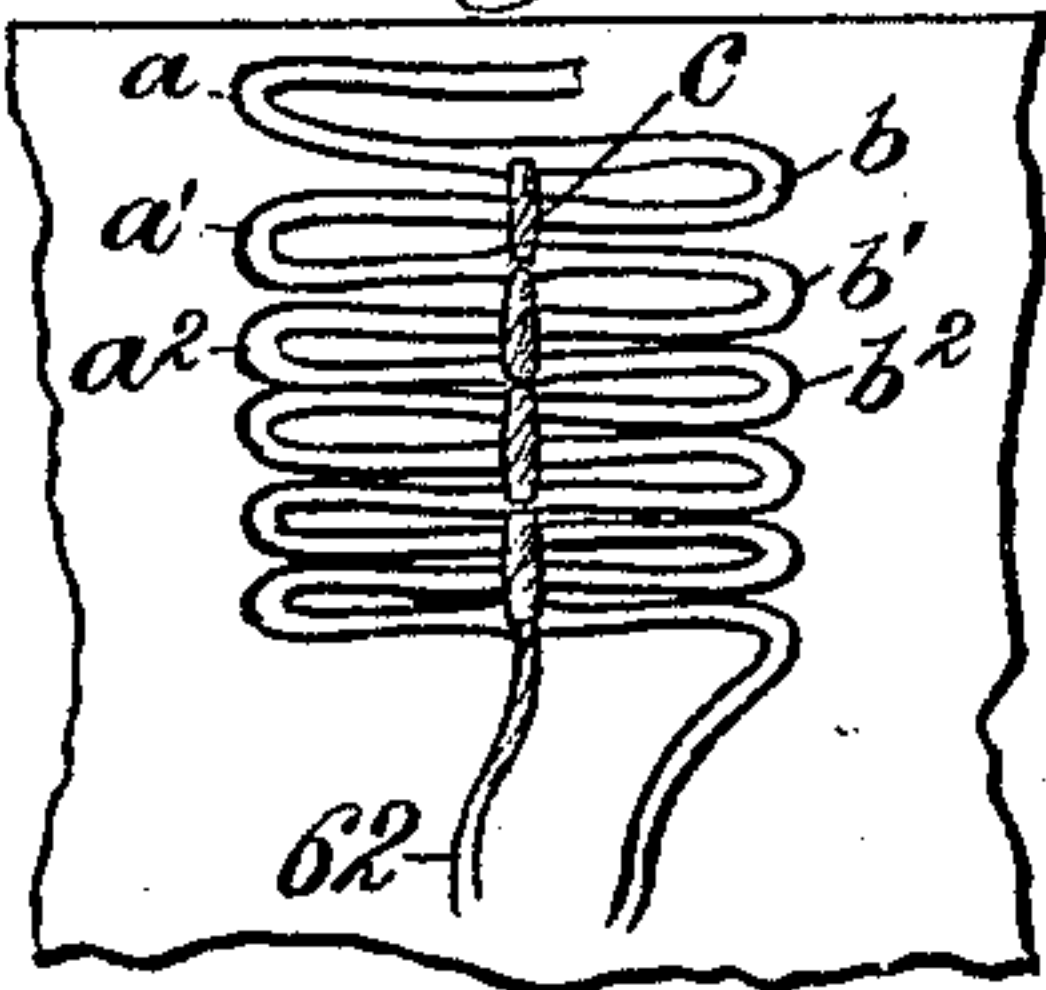


Fig. 11.

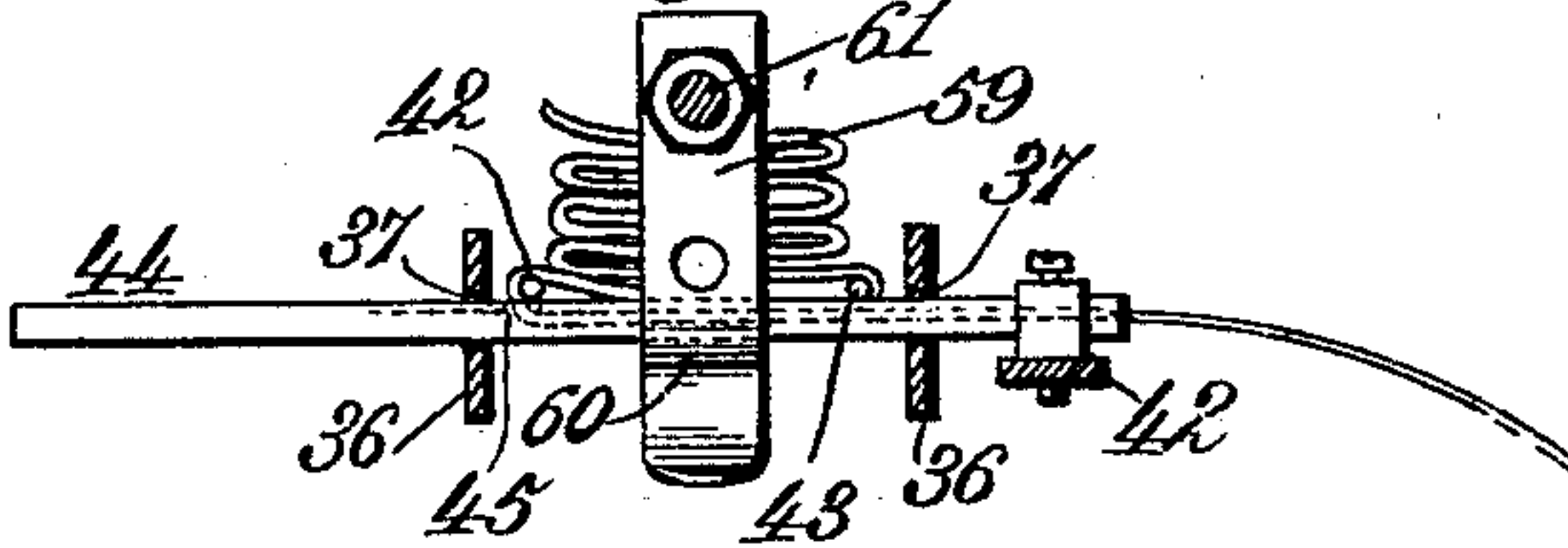


Fig. 12.

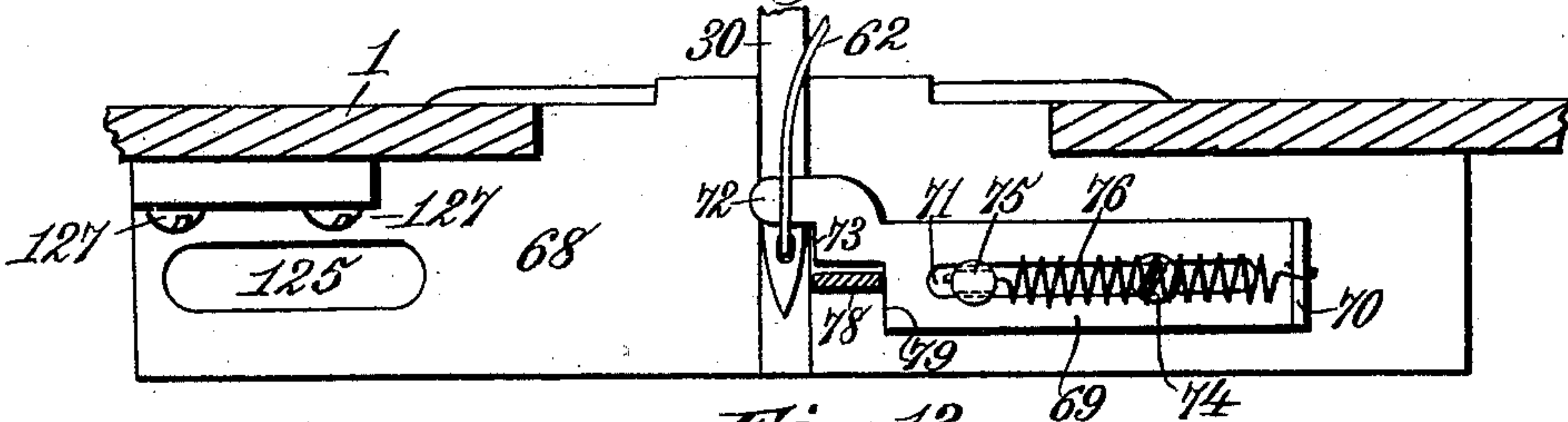
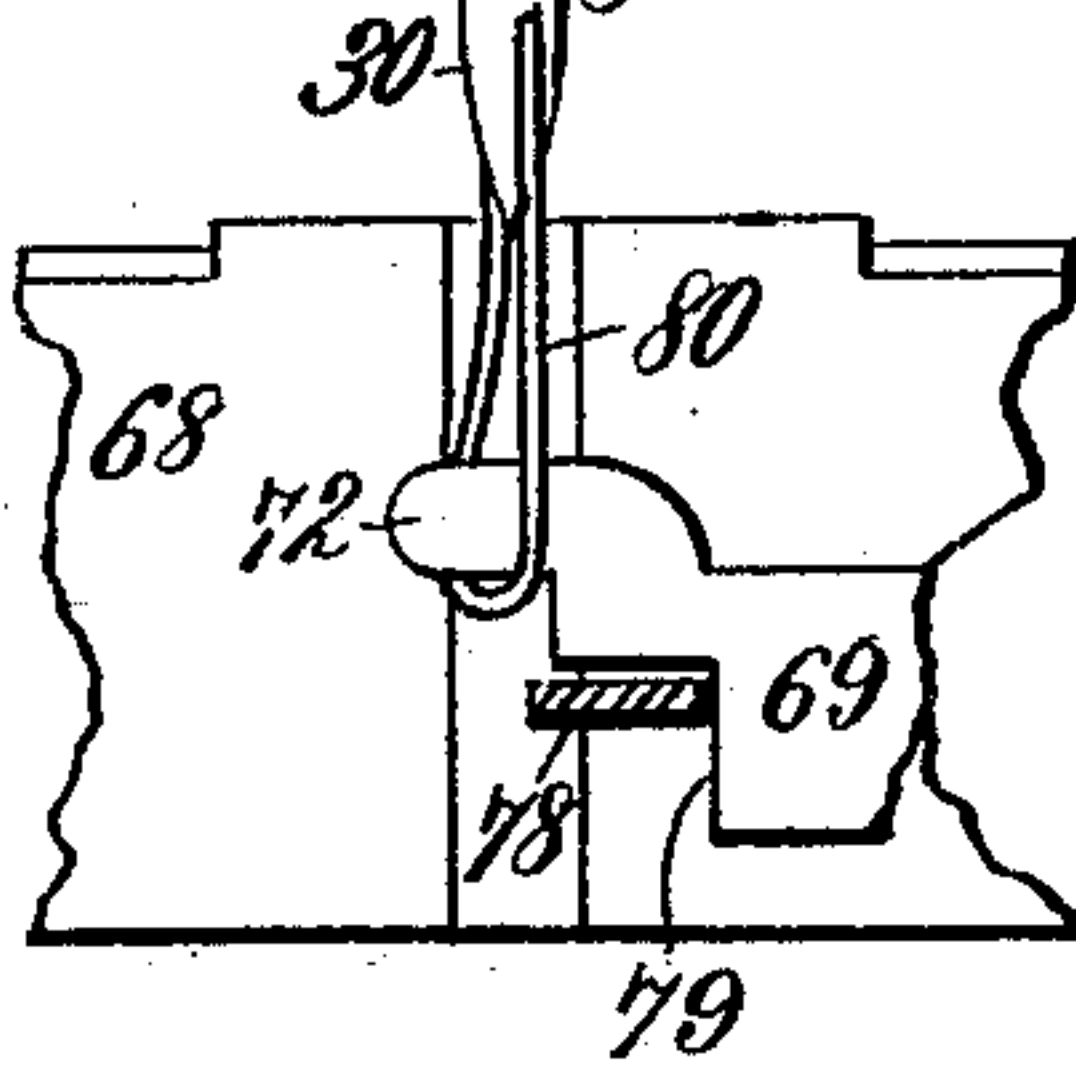


Fig. 13.



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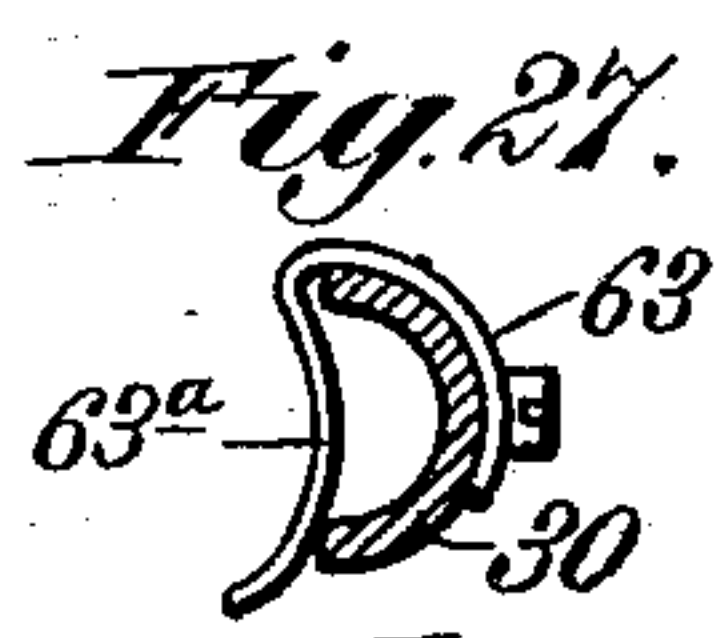
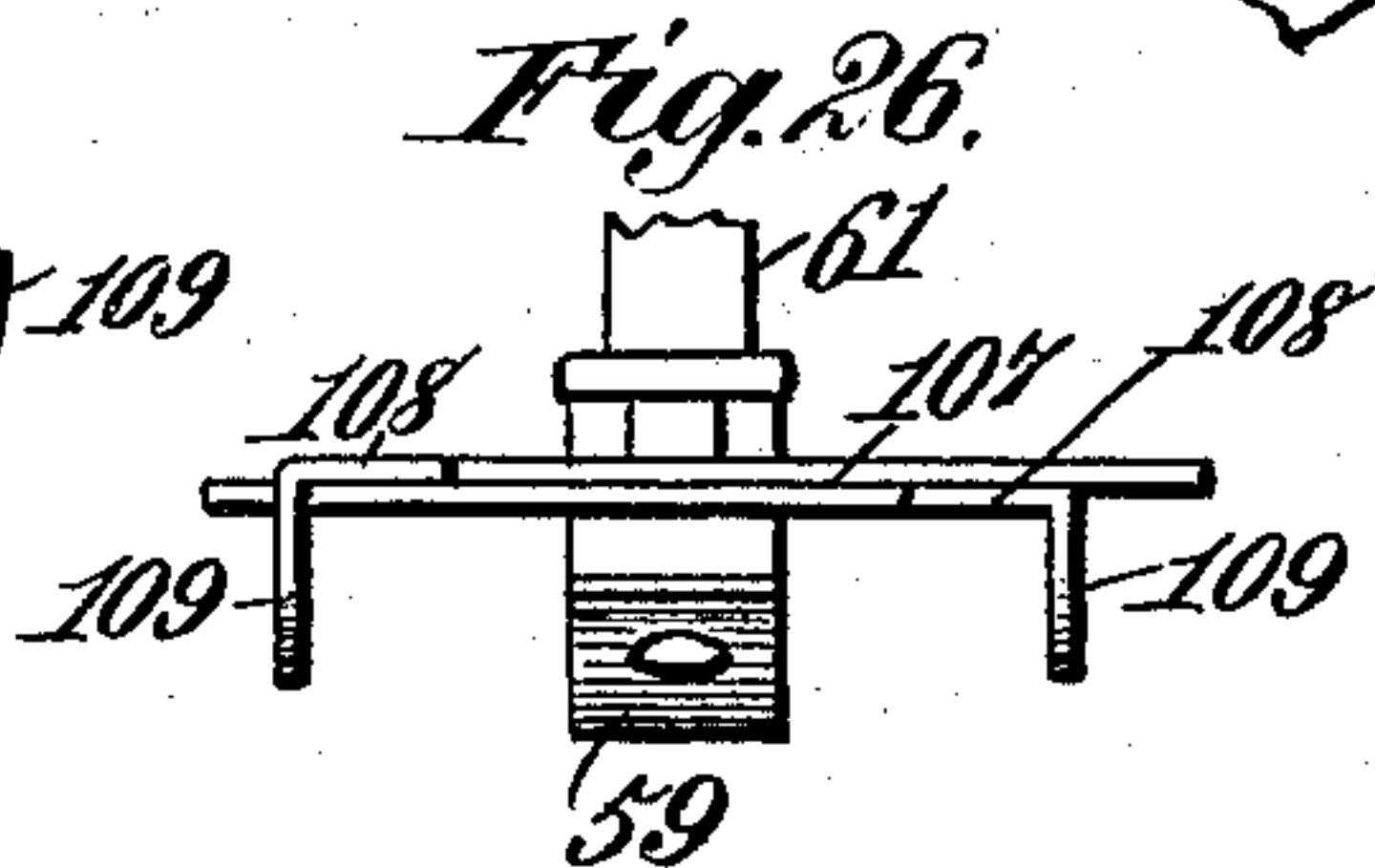
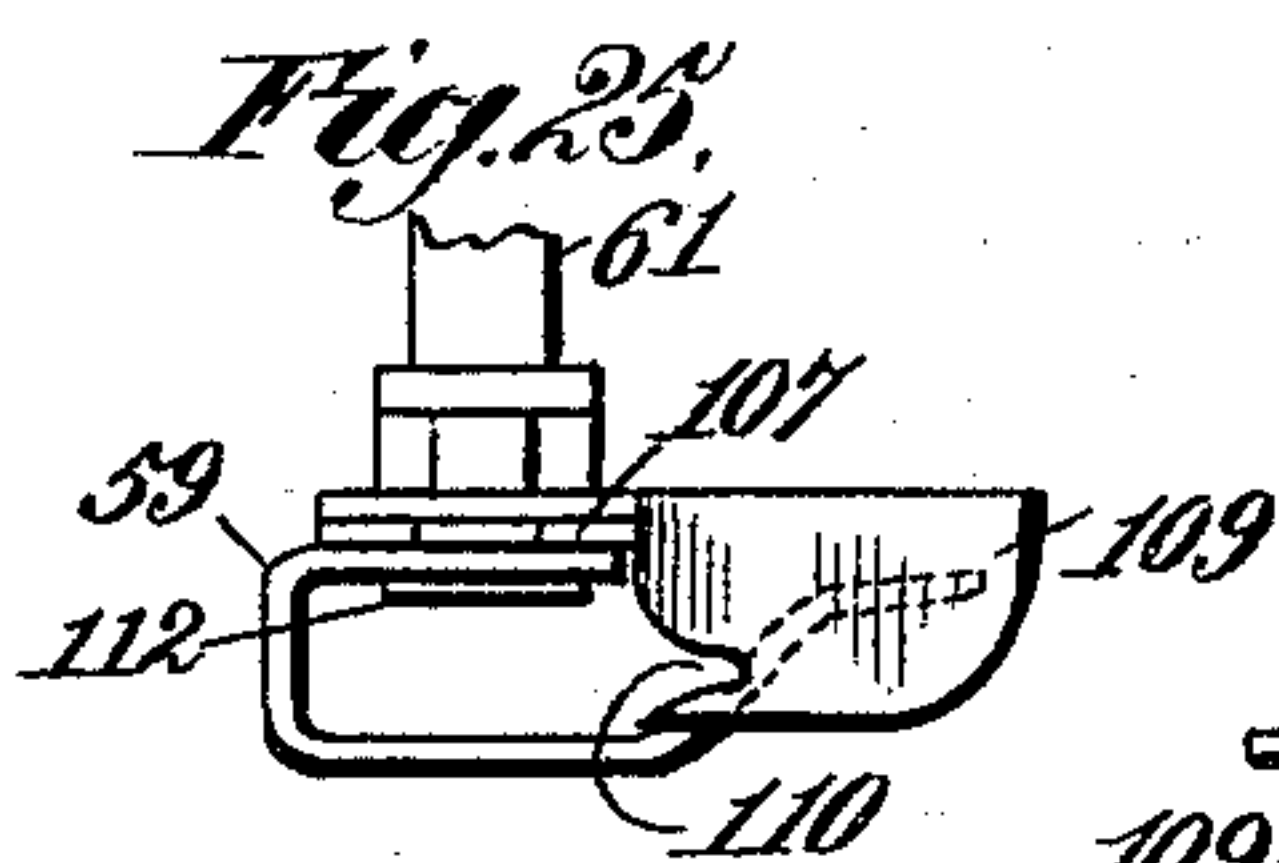
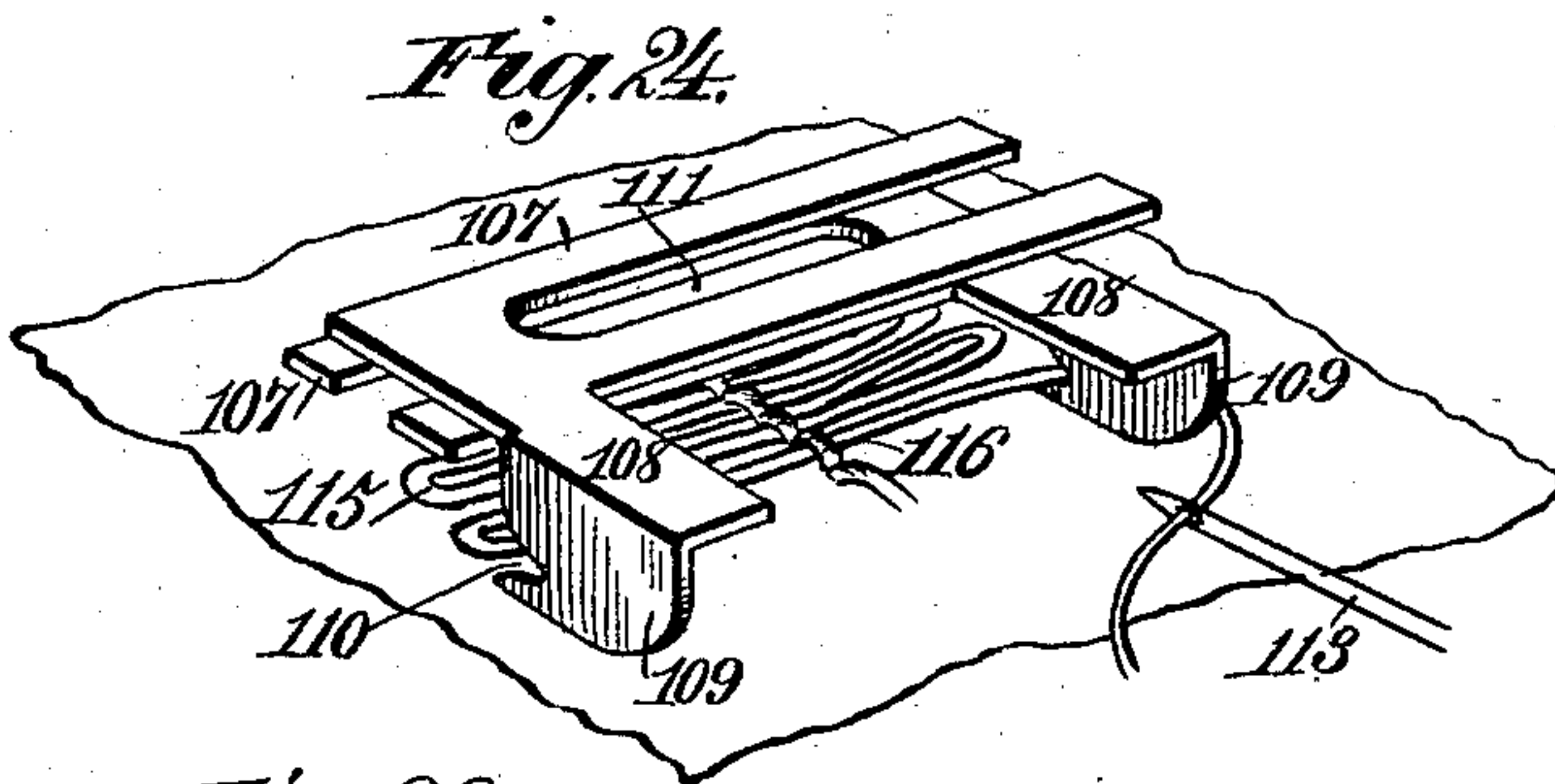
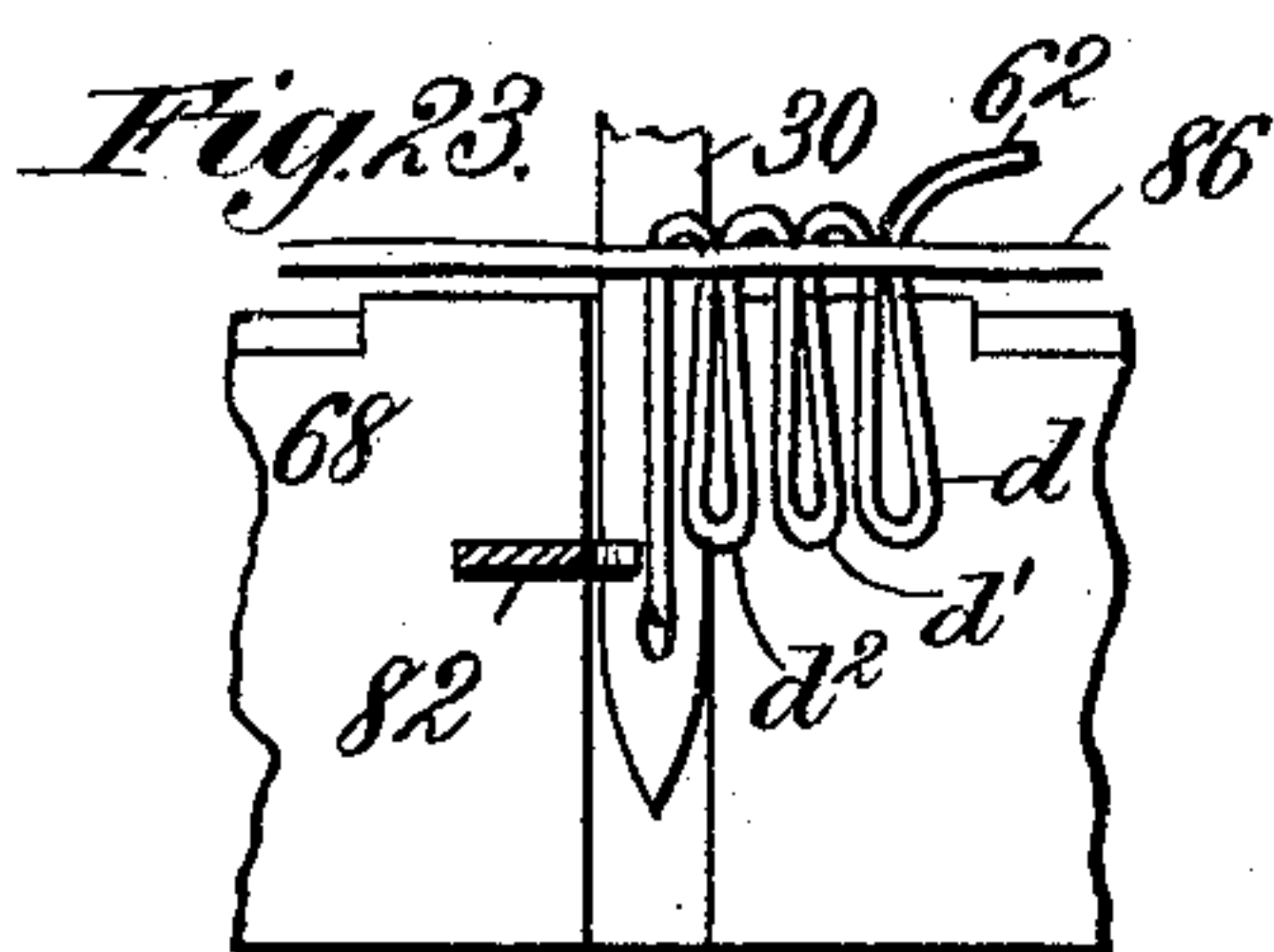
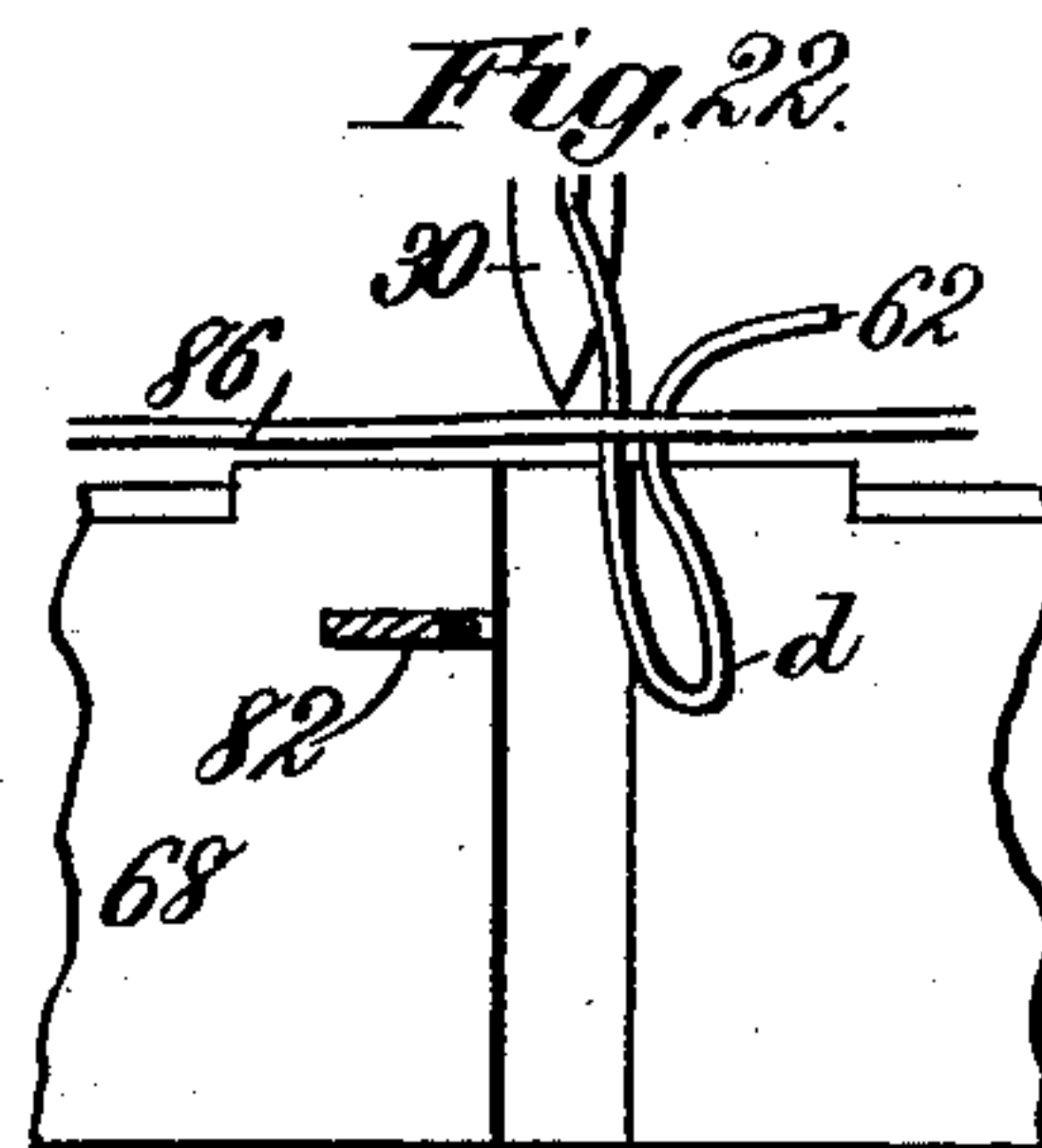
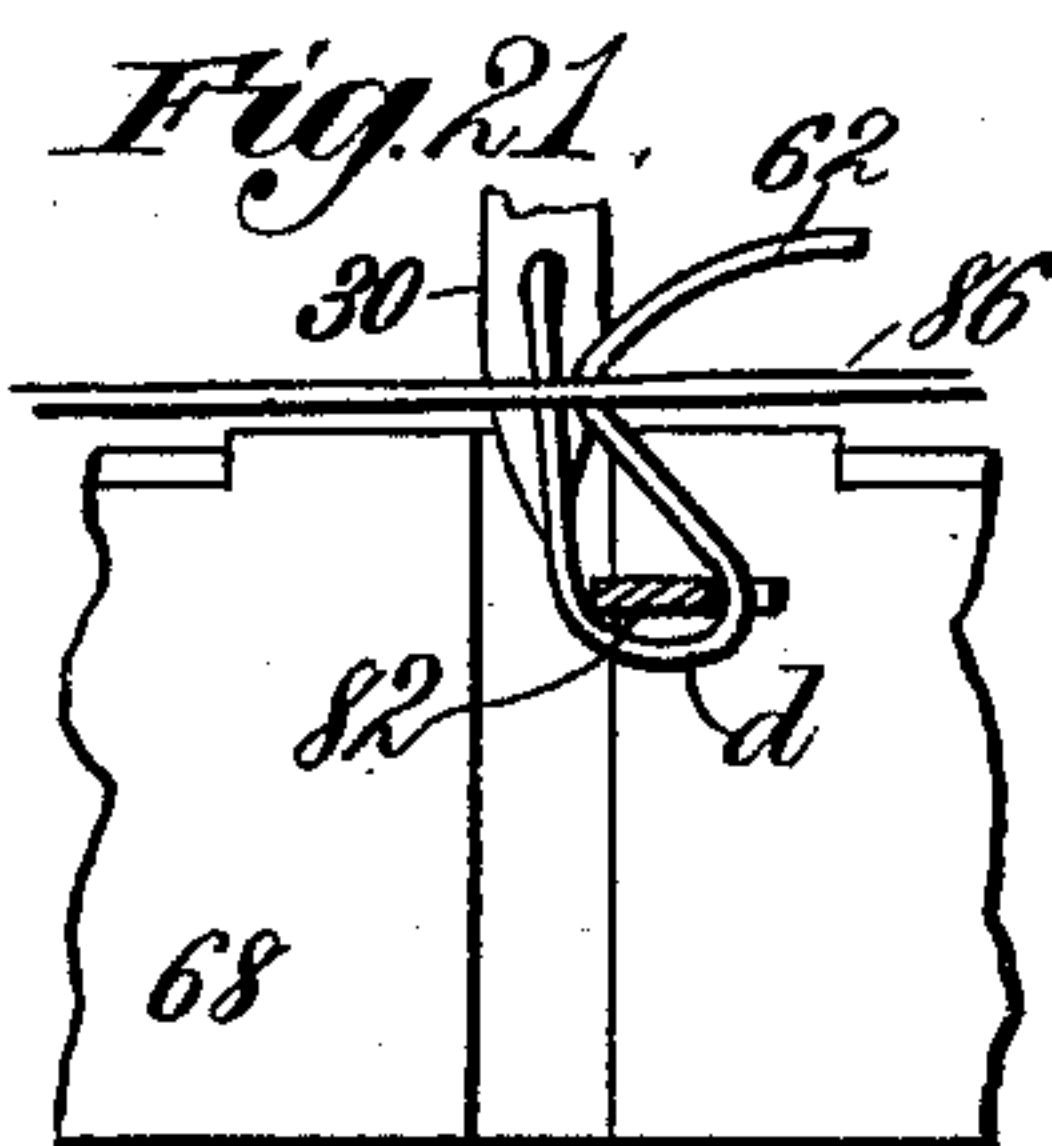
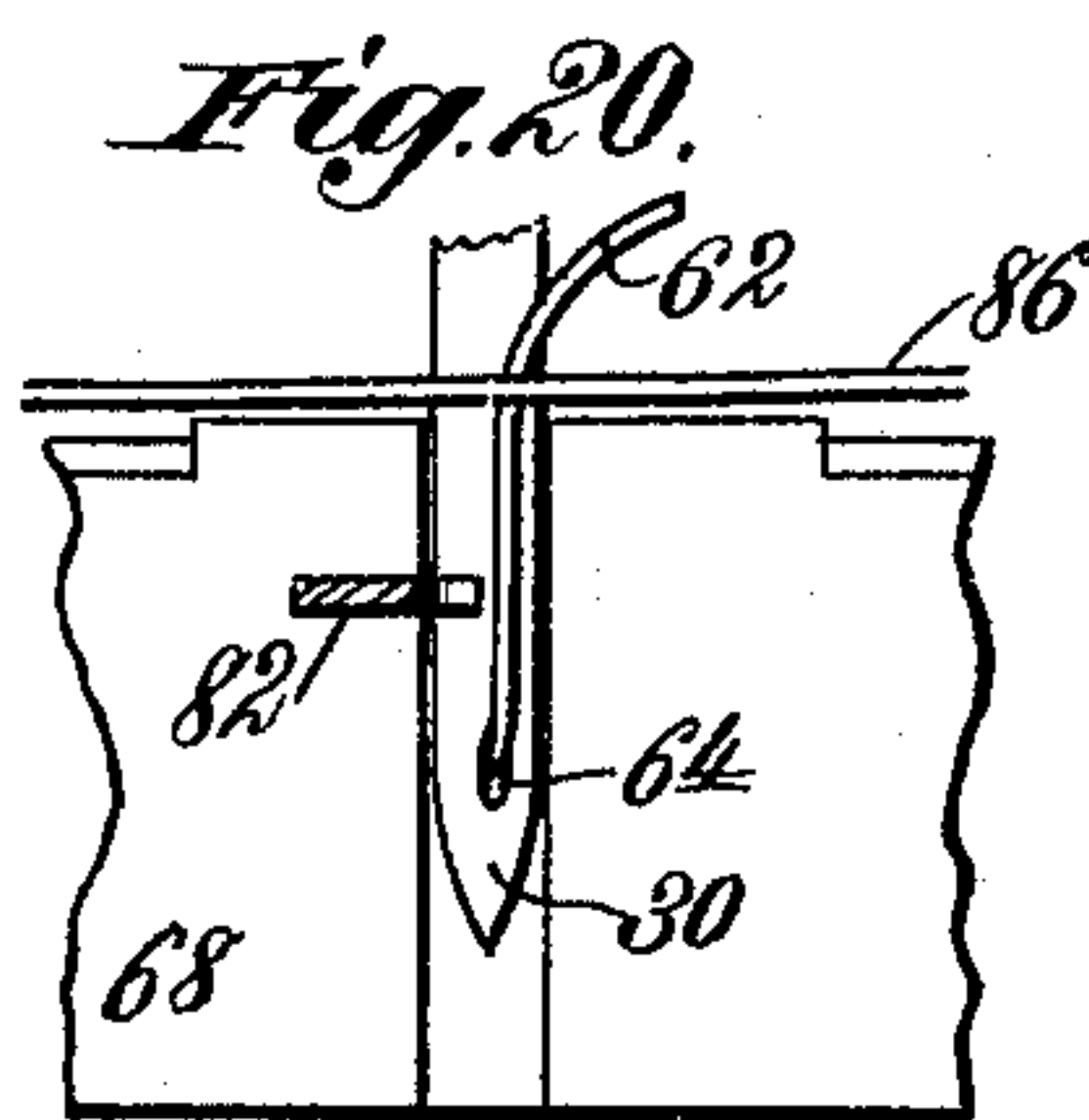
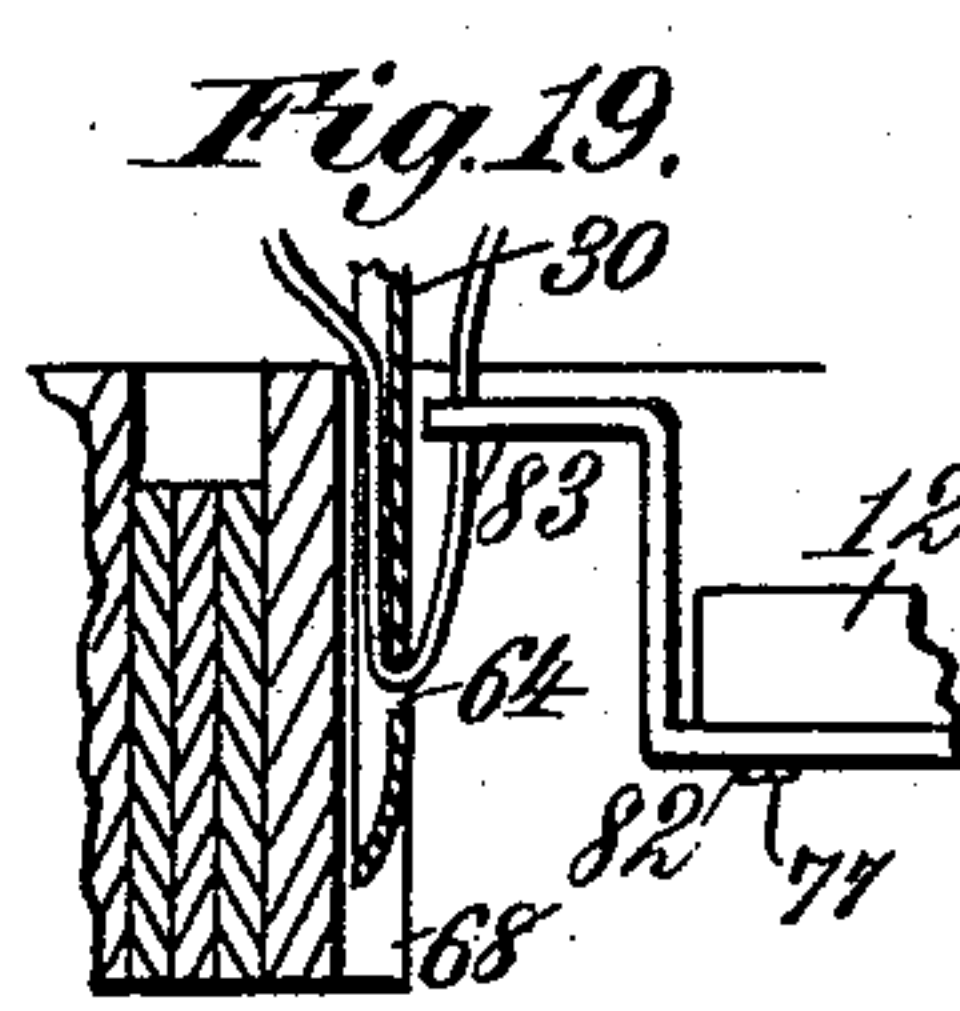
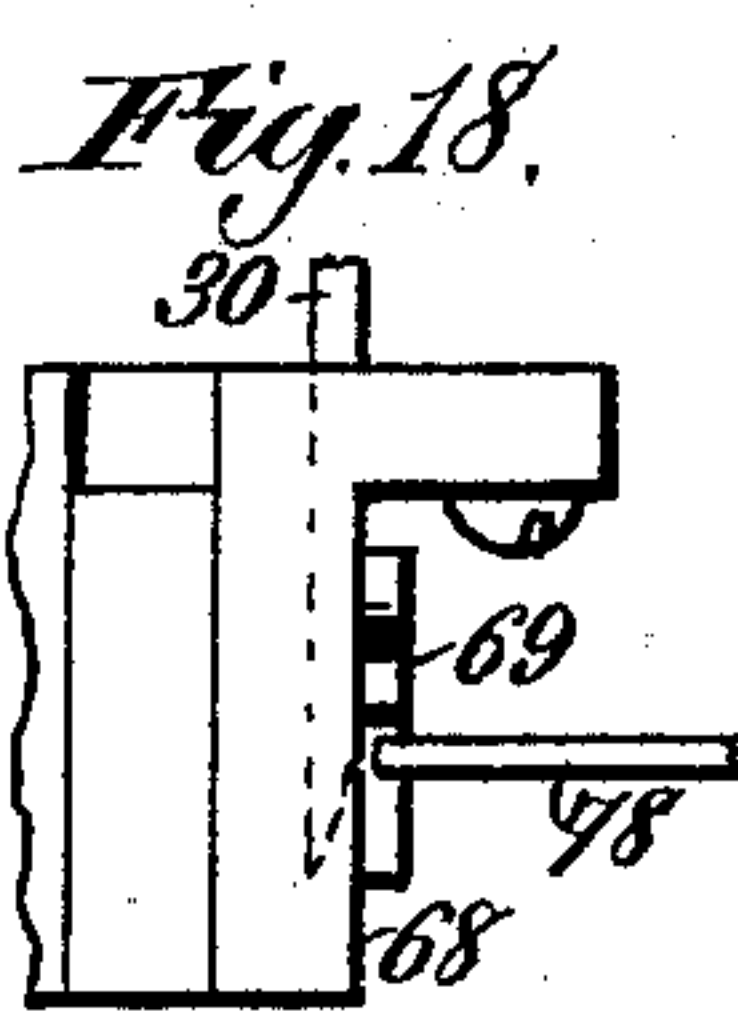
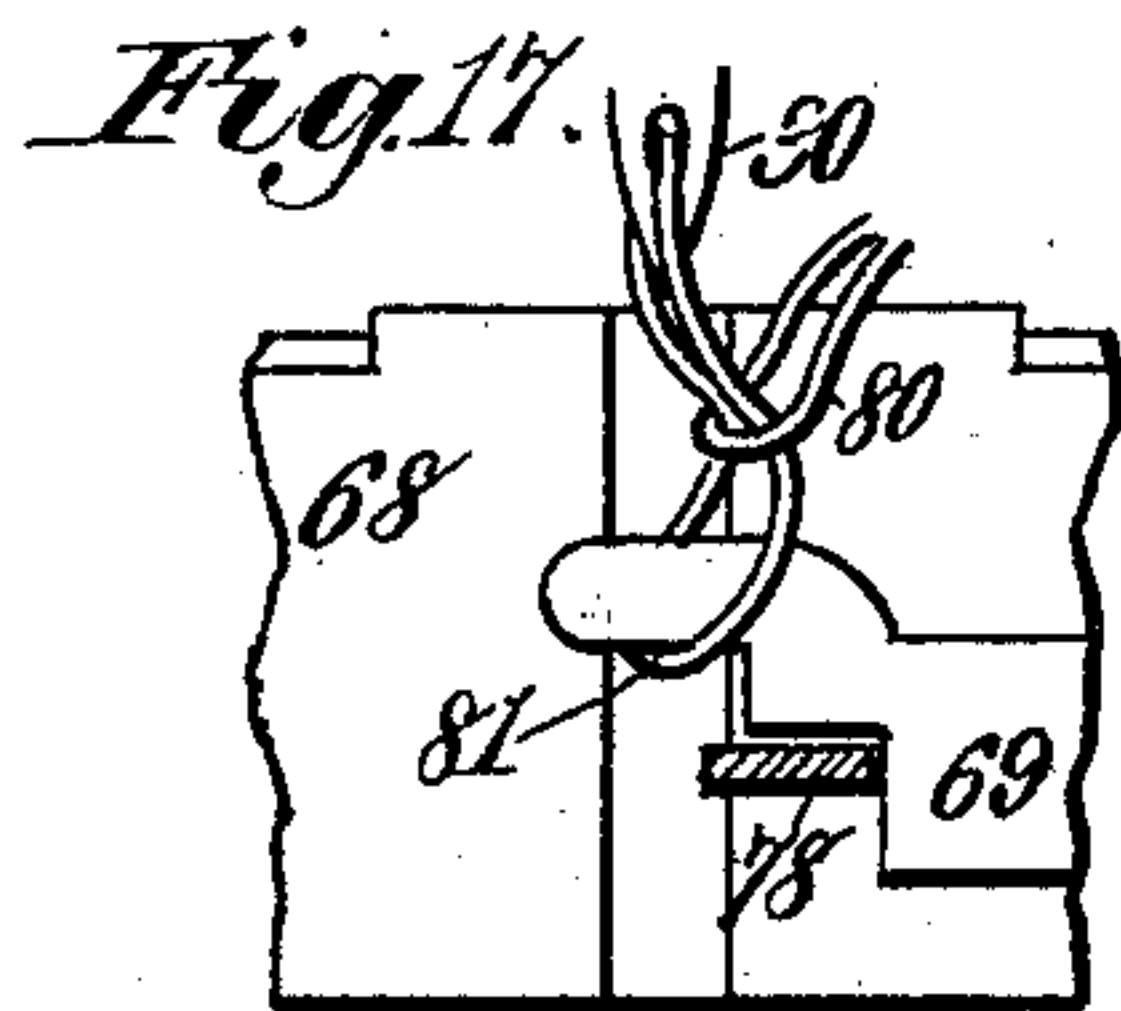
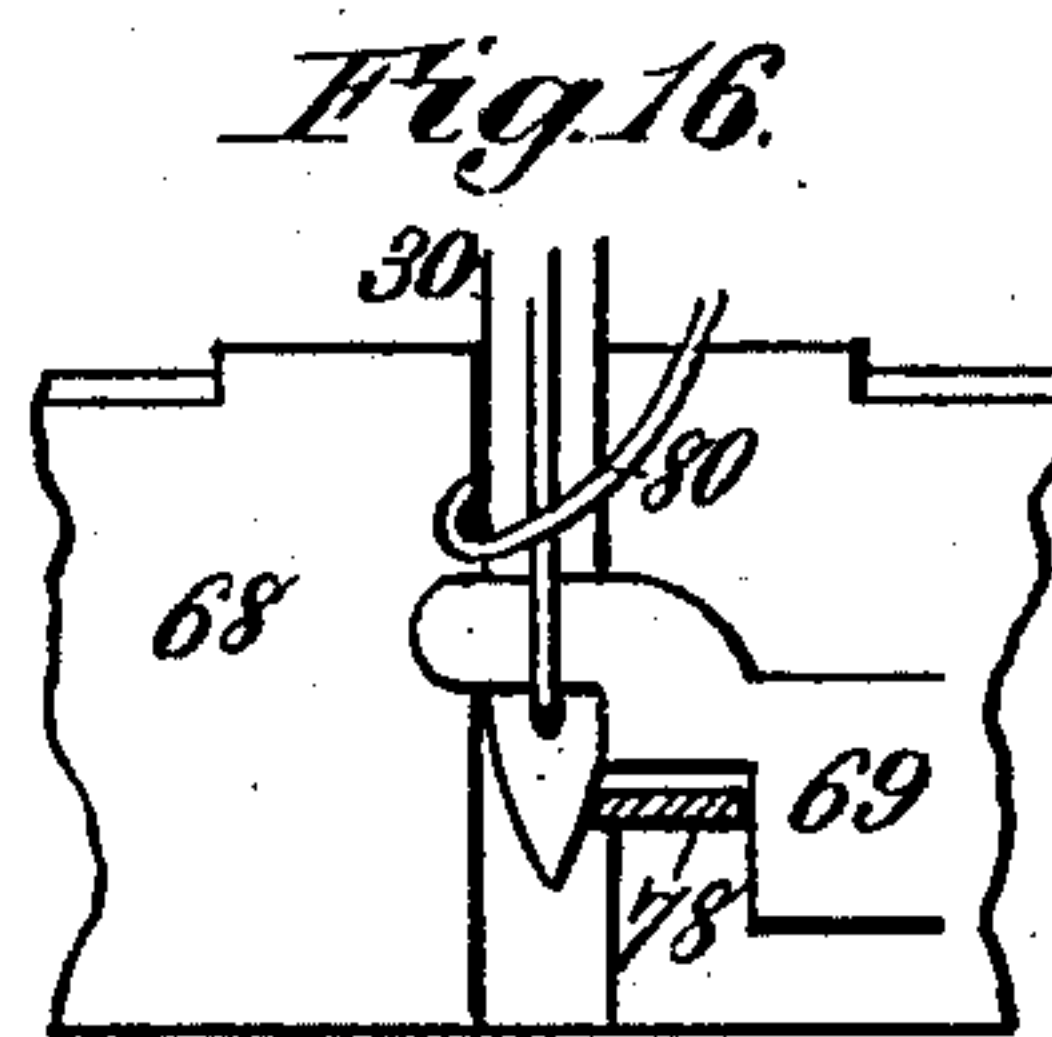
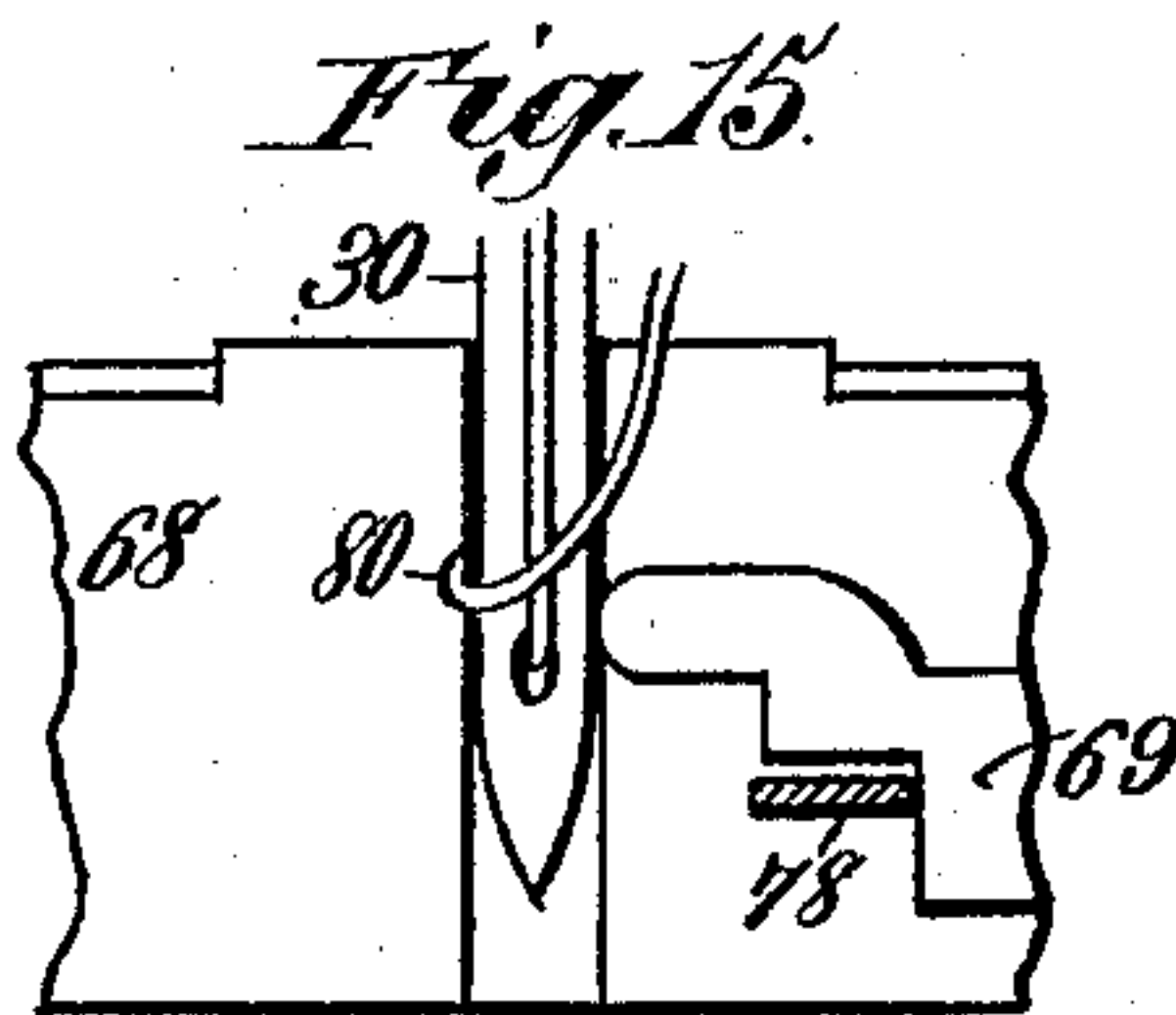
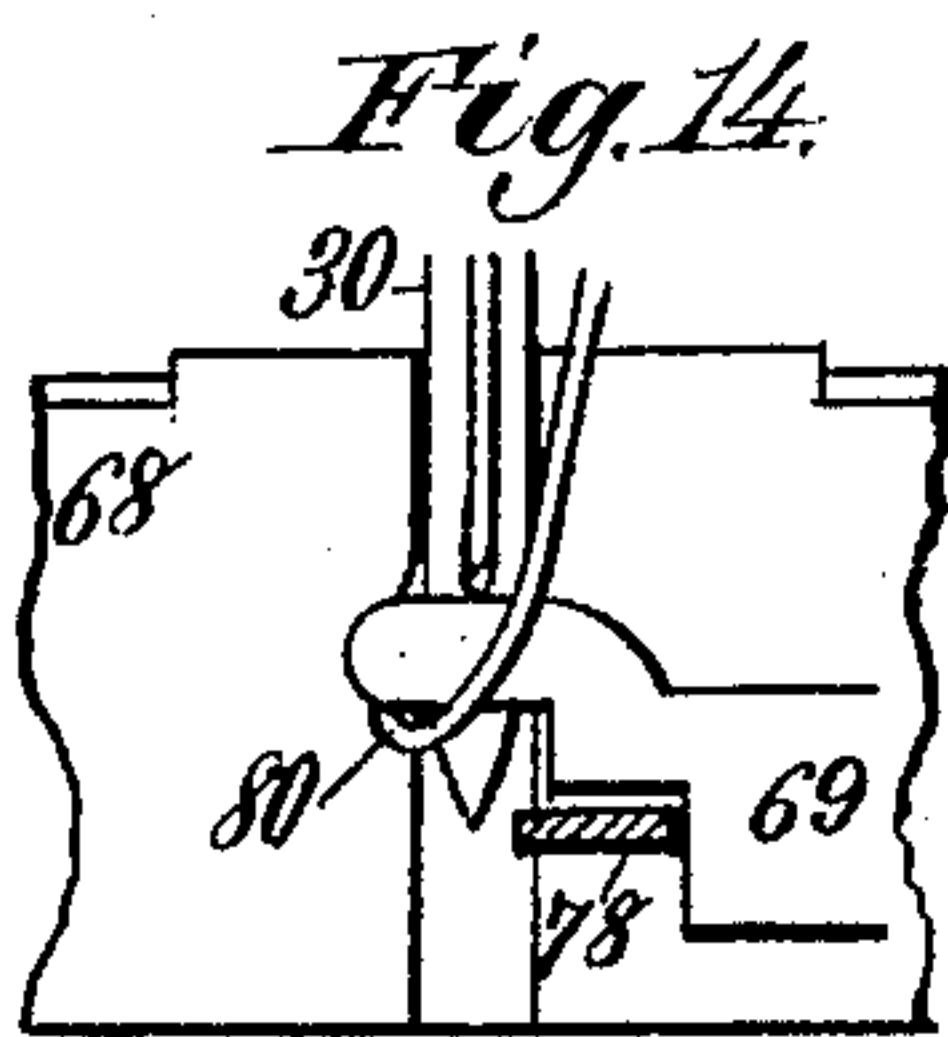
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(No Model.)

5 Sheets—Sheet 5.



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# UNITED STATES PATENT OFFICE.

JENNIE HENRY, OF SEYMOUR, TEXAS.

## MACHINE FOR TURFING AND EMBROIDERING FABRICS.

SPECIFICATION forming part of Letters Patent No. 630,456, dated August 8, 1899.

Application filed April 8, 1898. Serial No. 676,892. (No model.)

*To all whom it may concern:*

Be it known that I, JENNIE HENRY, a citizen of the United States, residing at Seymour, in the county of Baylor and State of Texas, have invented new and useful Improvements in Machines for Turfing and Embroidering Fabrics, of which the following is a specification.

My invention relates to an improved machine for turfing and embroidering fabrics, and designed more especially for the manufacture of such articles as rugs and carpets, but capable of certain adjustments and manipulation whereby to vary the character of the stitch or loop and render the machine capable of making various kinds of fancy work.

It is the general object of my invention to provide an improved machine of the character outlined and one which shall be simple in construction and operation and comparatively cheap to manufacture.

Specific objects of the invention relate to certain details of construction and operation of parts, which will more clearly hereinafter appear.

In the accompanying drawings, illustrating the invention, Figure 1 is a part-sectional elevation of a machine constructed according to my invention, showing one form of mechanism for forming a double surface loop. Fig. 2 is an end view of the same, partly in section. Fig. 3 is a bottom plan view. Fig. 4 is a sectional view on the line 4 4 of Fig. 1. Fig. 5 is a face view of the slide-plate in which are secured adjustable fulcrums. Fig. 6 is a plan view of one of the adjustable fulcrums for the eccentric-rod. Figs. 7, 8, and 9 are detached views of the feed-plate mechanism. Fig. 10 is a plan view showing a fabric provided with double surface loops and held thereon by the stitch of the needle. Fig. 11 is a sectional plan view on the line 11 11 of Fig. 1. Figs. 12, 13, 14, 15, 16, and 17 are views taken, respectively, on the line *xx* of Fig. 1 and viewed in the direction of the arrow, showing different positions of the mechanism for forming a chain-stitch on the under side of the fabric with relation to the needle. Fig. 18 is a sectional view on the line 18 18 of Fig. 12 and viewed in the direction of the arrow. Fig. 19 is a sectional elevation

of a portion of the machine shown in Fig. 1 and showing the application of my improved turfing mechanism. Figs. 20, 21, 22, and 23 are views taken, respectively, on the line *xx* of Fig. 1 and showing different positions of the turf-former with respect to the needle in forming the turfs. Fig. 24 is a perspective view of a modification of certain of the parts shown in Fig. 1. Fig. 25 is an end view of the presser-foot, showing this part applied thereto; and Fig. 26 is a front view of the same. Fig. 27 is a sectional detail view; and Fig. 28 is an elevation of the head of the machine, illustrating a different manner of assembling and operating certain of the parts shown in Fig. 1. Fig. 29 is a detail view of a presser-foot used in connection with the device shown in Fig. 28.

The reference-numeral 1 indicates the bed-plate of the machine, which may be secured upon the table of an ordinary sewing-machine or upon a table or other support suitably constructed for the purpose. Supported on the bed-plate 1 and secured thereon, as by screws 2, are the uprights 3 3, which constitute, with the arm 4, what I will term the "main frame" of the machine. Supported in suitable bearings in this frame is the main shaft 5, having secured on one end a combined fly and belt wheel 6 and on its other end carrying suitable means for reciprocating the needle-bar.

The numerals 8 and 9 indicate two cams, which are secured on the shaft 5 between the uprights 3 3. Upon each of said cams is journaled the upper end, respectively, of two levers 10 11, the lever 10 being pivotally connected at its lower end to the inner end of a vibrating arm 12, which is pivotally connected to the bed-plate at 13. In like manner the lower end of the lever 11 is pivotally connected to the inner end of an arm 14, pivoted to the bed-plate at 15, which arm I term the "feed-arm." In order that the eccentric motion of cams 8 and 9 may transmit a vibratory movement to the lower ends of the levers 10 and 11, I provide the following adjustable fulcrum mechanism for said levers.

The numeral 16 indicates what I term a "slide-plate," which is secured to the front sides of the uprights 3 3 and is provided with two vertically-extending guide-slots 17 18.

The numerals 19 and 20 indicate, respec-



tively, two bearing-lugs, one for each slot 17 18, and each of which is provided with a shoulder 21, designed to bear on the inner side of the slide-plate 16, and with a shank 22, screw-threaded at its outer end and extending through a slot 17 or 18. The numerals 23 indicate binding-nuts engaging the threads of said shanks. The edges of each slot 17 18 may be surrounded by a beading 24, against which the inner face of the binding-nuts 23 bear when screwed to clamp the bearing-lugs 19 20 in their adjusted positions in the slots 17 18. On each lever 10 11 is a sleeve 25, which sleeves fit the levers snugly, but are capable of being moved thereon to any desired height. The ends of the bearing-lugs 19 and 20 are bifurcated to receive the sleeves 25, and in each arm of the bifurcation is a screw 26, having a pointed end engaging opposite sides of said sleeves, respectively, and forming the fulcrum-bearing of the levers 10 11. It will thus be seen that by the construction described the bearing-lugs 19 and 20, carrying in their outer ends the sleeves 25, may be secured in various adjusted positions in the slide-plate 16, and as the sleeves 25 are raised or lowered the throw of the lower ends of the levers 10 11 will be correspondingly increased or diminished and that the movements of the vibrating arm 12 and the feed-arm 14 will be affected accordingly, for a purpose to be presently described.

The numeral 27 indicates the needle-bar, which reciprocates in suitable bearings in the head 28 and is actuated from the shaft 5 in the usual or any preferred manner. The lower end of this needle-bar is made hollow to receive the needle 30 and is split and provided with exterior screw-threads. When the needle has been inserted in the needle-bar, a nut 31 is screwed on said lower end and clamps the needle-bar about the needle, as will be readily understood.

Secured on the front edge of the head 28 is the mechanism for forming, in combination with other parts hereinafter described for making a chain-stitch, what I will term a "double surface loop and stitch." This mechanism comprises a metal plate 32, secured at its upper end to the front face of the head 28, as by screws 33. This plate extends downward to a point above the table of the machine and at its lower end is bent inward and downward, as shown at 34. The lower extremity of the downward depending portion 34 is extended laterally at each side to provide an integral guide-plate 35. Said guide-plate has its outer ends bent downward at right angles to itself to form two parallel guide-arms 36, which are provided in their lower extremities, respectively, with an aperture 37. Intermediate its ends the plate 32 has stamped from its body a tongue 38, which is bent inward at right angles to said plate and then upward at right angles to itself to form a bearing-arm 39, upon which is centrally pivoted a rock-arm 40, as by means of

a screw 41. Pivotaly secured at the upper ends, near each outer end of said rock-arm, respectively, are two rods 42 43, which extend downward through apertures near opposite ends of the plate 35 and at their lower ends are pointed to enable them to pass readily between the thread-carrier hereinafter described and the thread carried thereby and also to enable them to pierce the fabric, if desired. These rods 42 43 will hereinafter be termed "thread-catchers." Slidably supported in the apertures 37 in the guide-arms 36 is a hollow rod 44, which has near one end an eye 45. At its opposite end said rod 44 is pivotaly connected to the lower end of a lever-arm 46, which near its upper end is fulcrumed at 47 to the arm 4 of the machine and at said upper end is provided with a stud 48, which works in a cam-groove 49 of a cam 50, secured on the main shaft 5. By this means said lever-arm is designed to be rocked to and fro in the operation of the machine to cause the rod 44 to be reciprocated back and forth in the guide-arms 36. The rod 44 I term a "thread-carrier," the thread 51 being inserted at the end adjacent to lever-arm 46 and passed through the rod and out of eye 45. This thread is supplied from a spool 52, revolvably mounted on a spindle 53, secured on the front face of arm 4, which spool is secured on the spindle by a thumb-nut 54.

The numeral 55 indicates what I will term an "impact-plate," which comprises a rectangular piece of metal secured on the side of the needle-bar, as by screws 56, and having at its upper and lower ends, respectively, the projections 57 58, which in the reciprocation of the needle-bar are caused to contact alternately with the upper and lower edge of the rock-arm 40 at one side of its fulcrum-point 41, whereby to cause the ends of said rock-arm to be alternately moved up and down and impart a like motion to the thread-catcher 42 43, as will be apparent.

The numeral 59 indicates the presser-foot used in connection with the device above described, which presser-foot is secured to the presser-foot bar 61 in the usual manner. Said presser-foot is of the shape shown in Fig. 2, having its central portion bent upward, as shown at 60, to extend over the rod 44 and on either side of said elevated portion having a bearing-surface 61<sup>a</sup>. This arrangement permits the vertical movement of the presser-foot, the thread-carrier 44 reciprocating beneath it in the recess afforded by the elevated portion 60.

The needle 30 is made from a round piece of metal, preferably steel, and has one side cut away and provided with a deep groove to receive the thread 62, which is retained in said groove by means of a spring 63, one end of which is secured on the reverse side of the needle and the free end 63<sup>a</sup> of which is bent around the needle to extend across the groove therein, as shown in Fig. 27. The thread can readily be inserted beneath this spring



end, as will be understood. The lower end of the needle is pointed, as usual, and toward its lower end is provided with an eye 64. The numeral 65 indicates the hand-lever for raising the presser-foot and is of the construction commonly employed on sewing-machines. The thread for the needle is supplied from a spool located on the spool-holder 66, which is secured on the top of the head 28.

10 The numeral 67 indicates a guide device of the ordinary or any preferred construction for the thread to the needle.

The operation of the parts just described for forming the double surface loops is as follows: The thread 62 being passed through the eye of the needle and the thread 51 through the rod 44 and out of the eye 45 of the thread-carrier, the fabric to be ornamented is placed on the machine and the latter is started in motion. It will be assumed in the position of the parts shown in Fig. 1 that the first movement of the needle-bar 27 has been upward and that the projection 58 has contacted with the under side of the rock-arm 40 to throw the pointed end of the thread-catcher 42 between the thread 51 and the thread-carrier 44 and that the needle-bar has started on its downward stroke. Through the medium of the lever-arm 46, actuated by the cam 50, the thread-carrier 44 will be drawn inward across the plane bounded by the guide-arms 36, so that the eye 45 will be moved beyond the opposite thread-catcher 43. In this movement the thread-catcher 42 holds the thread which is thereby drawn through the eye 45 and laid, as it were, on the surface of the fabric, forming the loop *a*. When the eye 45 has reached a position beyond the thread-catcher 43, the projection 57 will contact with the upper side of the rock-arm 40, and said thread-catcher 43 will be moved down between the thread 51 and the thread-carrier 44. The thread-carrier is now moved outward and the thread is held by the thread-catcher 43 and drawn through the eye 45 to form the loop *b* in the manner previously described. In the continued operation of the machine the loops *a' b'*, *a<sup>2</sup> b<sup>2</sup>*, &c., are made in rapid succession, as will be understood. While these loops are being laid on the fabric, the needle 30 is operating simultaneously to stitch said loops centrally of their length by means of the thread 62, this line of stitches being indicated by the letter *c* in Fig. 10, which shows the loops *a b*, &c., spread apart farther than actually occurs in practice to render the illustration clearer.

The mechanism cooperating with the needle to form the stitches *c* will now be described, reference being had to Figs. 12, 13, 14, 15, 16, 17, and 18. The numeral 68 indicates a metal casting constituting the feed-plate housing, to be hereinafter described. The numeral 69 indicates a slide-plate, herein termed a "stitch-former," which comprises a rectangular metal plate having its rear end

bent outward at a right angle to form an arm 70 and is provided in its body portion with a longitudinally-extending slot 71. At its forward end said slide-plate is provided in its upper portion with a projecting finger 72, affording on its under surface the stop 73. The plate 69 is slidably supported on the inner side of the housing 68 by means of a set-screw 74, passing through the slot 71 and screwed in the said housing. The numeral 75 indicates a stud which is removably secured on the housing and projects through the slot 71. To this stud is secured one end of a coiled spring 76, which at its opposite end is secured in the arm 70 of said plate. Removably secured on the outer end of the vibratory arm 12, as by means of screws 77, is a rectangular metal plate 78, which I will term an "impact-finger," and which projects beyond the end of arm 12 and at its outer end is adapted to contact in its movement in one direction with the outer end 79 of the plate 69, as plainly shown in the figures referred to. The spring 76 tends normally to hold the finger 72 in the path of the needle, and the impact-finger 78 operates to move the plate 69, carrying said finger, away from the needle. The operation of these parts is as follows: As shown in Fig. 12, the needle 30 has moved downward, carrying the thread 62 through the fabric, the impact-finger 78 has been moved by the arm 12 outward or in a direction away from the end 79 of the stitch-former, and the spring 76 has drawn the stitch-former forward, so that the finger 72 has passed between the thread 62 and the needle, but has not completed its forward movement. The needle now ascends, as shown in Fig. 13, leaving the thread caught around or under the finger 72, which still continues its forward movement. A loop 80 is thus formed beneath the fabric. As the finger continues its forward movement the stop 73 engages the lower end of the loop and carries it forward. The needle now descends and passes through the loop, and the impact-finger at the same time engages the end 79 of the stitch-former and moves it backward, as shown in Fig. 14. In Fig. 15 this backward movement of the stitch-former has been completed and the finger 72 is about to be moved forward by the spring 76 to pass between the thread 62 and the needle beneath the loop 80. In Fig. 16 this movement has been completed, the parts occupying the same relative positions shown in Fig. 12. In Fig. 17 the needle has ascended and a second loop 81 has been formed, the parts being in the same relative positions shown in Fig. 13. It will be readily seen that a continuation of these movements will form the ordinary chain-stitch familiar to those acquainted with this art.

The combined use of the two devices described will form the double surface loop and stitch, a number of which are shown in Fig. 10. By employing different-colored threads,



such as of worsted, for the needle and thread-carrier, respectively, a highly ornamental embroidery can be applied to the fabric.

In Figs. 19, 20, 21, 22, and 23 I have illustrated the operation of the mechanism for turfing the fabric. When this kind of work is to be done, the mechanism for forming the double surface loops and that for forming the chain-stitch are removed from the machine. The bar or finger 78 is also removed from the end of the vibratory arm 12, and in its place is secured on said arm by the screws 77 the turfing-finger 82. This turfing-finger comprises a flat rectangular metal bar, having in its body portion suitable apertures for the screws 77 and at its outer end being bent upwardly and outwardly at right angles to itself, as shown in Fig. 19, to form the hooked end 83, which is adapted to engage the thread of the needle. In forming the chain-stitch previously described the finger 78 was moved toward the operator as the needle descended in order to permit the spring 76 to draw the stitch-former forward, so that the finger 72 would pass between the thread and the needle. In turfing the fabric with the attachment 82 it is necessary that the arm 12, carrying said attachment, should be moved in a direction away from the operator at the time the needle descends in order that the loop formed by the hooked end 83 engaging the thread may be pulled backward to prevent the needle passing through said loop and forming a chain-stitch. To this end the shaft 5 is provided on diametrically opposite sides with sockets 84, designed to receive the end of a screw 85, passing through the cam 8. By releasing the screw from engagement with one of these sockets and turning the cam 8 around on shaft 5 and screwing the screw 85 into engagement with the opposite socket the movement of the looper-arm 12 will be reversed relative to the movement of the other parts, as will be clearly understood. The operation of the turfing attachment is shown in Figs. 20 to 23, inclusive. As the needle 30 reaches the limit of its downward movement the hooked end 83 is moved inward and engages the thread 62, passing between said thread and the needle. The hooked end continues moving in this direction, as shown in Fig. 21, and the needle ascends, leaving the thread caught on the hook 83, and thereby forming a loop *d*. As the needle descends, the hook 83 is moved forward or toward the operator and out of engagement with the loop *d*, as shown in Fig. 22, and is again ready to engage between the thread and the needle when the latter reaches the limit of its downward movement. This operation being continued, a series of loops *d d' d''*, &c., will be formed, as shown in Fig. 23. The entire surface of the fabric (indicated by 86) may be covered with these loops, if desired, the ends of which may subsequently be cut off to form a turfed fabric, as will be understood by those conversant with the art. By adjusting the fulcrum of

lever-arm 10 to vary the throw of the arm 12 the size of the loops formed by the hook 83 may be varied accordingly. The greater the throw of the arm 12 the greater will be the size of the loop formed and the less the throw of arm 12 the smaller will be the size of the loop.

In Figs. 24, 25, and 26 I have shown a modification in the means for forming the double surface loop described with reference to the mechanism shown in Fig. 1. This mechanism is formed in two parts, each of which comprises a metal plate having an elongated bifurcated arm 107, the base of which is extended outward at right angles to said arm, as shown at 108, said projecting portion 108 having a downward-depending arm 109, provided on its inner edge with a slot 110, affording a thread-catcher. The two arms 107 are placed one upon the other, as shown in Fig. 24, affording thereby the aperture 111, and are applied to the bottom of the presser-foot bar 47 above the presser-foot, being secured thereon by a thumb-nut 112, engaging a screw-threaded end of said bar, which projects through the aperture 111 and a suitable aperture in the presser-foot. This attachment is designed to operate in connection with a long needle held by the hand of the operator and threaded with the material of which it is designed the surface loops shall be formed. The needle of the machine being threaded, the machine is started, and the operator by means of a long needle, such as indicated by the numeral 113, passes the thread for the loops through a slot 110 and around the arm 109 to the opposite slot 110 and then around its arm 109, thereby forming the loops 115, which are secured on the fabric by the stitches 116 of the needle. This attachment is intended for use with coarser fabrics—such as braids and the like—than would be used with the attachment shown in Fig. 1 and possesses the advantage that the operator can vary the distance apart of the loops at pleasure by manipulating the needle in the hand more or less rapidly, as the case may be. By loosening the nut 112 the arms 109 may be moved toward or from each other to decrease or increase, respectively, the length of loop formed.

In Fig. 28 I have shown the parts comprising the mechanism for forming the double surface loop and stitch shown in Fig. 1 assembled and operated in a different manner from that shown in said Fig. 1. In this figure the numeral 1<sup>a</sup> indicates a rock-arm which is centrally pivoted on the head of the machine. The numerals 2<sup>a</sup> and 3<sup>a</sup> indicate, respectively, two arms, the arm 2<sup>a</sup> having a slotted connection at its upper end with one end of the rock-arm 1<sup>a</sup> and the arm 3<sup>a</sup> having a slotted connection at a point intermediate its ends, as at 4<sup>a</sup>, with the opposite end of said rock-arm. At their lower ends each of said arms 2<sup>a</sup> 3<sup>a</sup> carries a head 5<sup>a</sup> 6<sup>a</sup>, respectively, which are provided with a series of screw-threaded apertures 7<sup>a</sup>. These apertures are designed to



receive the upper screw-threaded ends of thread-catchers 8<sup>a</sup> 9<sup>a</sup>, located, respectively, on either side of the needle. The numeral 10<sup>a</sup> indicates a plate secured at the lower extremity of the head of the machine and having at its ends apertures affording guides for the arms 2<sup>a</sup> 3<sup>a</sup>. The numeral 11<sup>a</sup> indicates an improved form of presser-foot. (Shown in detail in Fig. 29.) This presser-foot is preferably stamped from a single piece of metal and comprises the rectangular body portion 12<sup>a</sup>, provided with a longitudinal slot 13<sup>a</sup> and having its end portions bent downward at right angles to form the guide-arms 14<sup>a</sup>, each of which is provided with an aperture 15<sup>a</sup>, in which works the threaded carrier 44. At either side of said body portion and centrally thereof are two arms 16<sup>a</sup> 17<sup>a</sup>, which extend at right angles to said rectangular portion and are curved downward to form bearing-surfaces at either side of the thread-carrier. The arm 17<sup>a</sup> is bent upward and inward and in said inward-extending portion is provided with a slot 20<sup>a</sup> for securing the same by means of a suitable screw or otherwise to the presser-foot bar. At the base of said arm 17<sup>a</sup> is provided an aperture 21<sup>a</sup> for the needle. At either side of the needle-aperture 21<sup>a</sup> is provided a series of apertures 22<sup>a</sup>, which aline with the apertures 7<sup>a</sup> and afford guides for the thread-catchers 8<sup>a</sup> 9<sup>a</sup>. The numeral 23<sup>a</sup> indicates a cam secured on one end of shaft 5, which cam on its outer face is provided with stud or roller for operating the needle-bar in the ordinary manner. Said cam is provided with an enlarged portion and a reduced portion, which parts, however, are made integral. The numeral 27<sup>a</sup> indicates an enlargement of the head of the machine, which provides a housing for the cam 23<sup>a</sup> and the parts operatively connected thereto. In the periphery of the enlarged portion of the cam is provided a cam-groove 28<sup>a</sup>, having an inclined and a straight portion. Pivotaly secured on the outer side of the enlargement 27<sup>a</sup> is a bell-crank lever 29<sup>a</sup>, to one arm of which is pivotally secured the upper end of the arm 3<sup>a</sup>. The other arm of the bell-crank lever is provided with a stud 31<sup>a</sup>, which passes through a slot 32<sup>a</sup> in the enlargement 27<sup>a</sup> and works in the cam-groove 28<sup>a</sup>. The periphery of the reduced portion is also provided with a cam-groove 33<sup>a</sup>. The numeral 34<sup>a</sup> indicates a lever-arm, the upper portion of which passes upward in a slot formed in the under side of the arm 4 and is pivotally secured therein by a pin 35<sup>a</sup>. At its upper end the lever-arm is provided with a stud 36<sup>a</sup>, which works in the cam-groove 33<sup>a</sup>. In its lower portion the lever-arm 34<sup>a</sup> is bent inward, as shown, so that its lower end may work in the slot 13<sup>a</sup> of the presser-foot. A link 37<sup>a</sup> pivotally connects the lower end of the lever-arm 34<sup>a</sup> with the thread-carrier 44 at a point beyond the eye 45 in the latter.

The operation of the parts described is as follows: In the position of the parts shown

in Fig. 28 the inclined portion of the cam-groove 28<sup>a</sup> has operated in the revolution of shaft 5 through the medium of stud 31<sup>a</sup>, bell-crank lever 29<sup>a</sup>, the extension of arm 3<sup>a</sup>, and rock-arm 1<sup>a</sup> to lower the arm 2<sup>a</sup>, carrying the thread-catcher 8<sup>a</sup>, thereby causing said thread-catcher to pass between the thread-carrier 44 and the thread 51 and raising the thread-catcher 9<sup>a</sup>, and said stud 31<sup>a</sup> has reached the straight portion of the cam-groove, whereby the thread-catchers are momentarily held in the relative positions shown, while the thread-carrier 44 has been drawn across the machine to the position shown by means of the lever-arm 34<sup>a</sup>, operated by the cam-groove 33<sup>a</sup>. In this operation the thread 51 will have been held by the catcher 8<sup>a</sup> and drawn through the carrier 44 to cause a loop to be laid on the surface of the fabric in the manner previously described. The revolution of the cam continuing, an inclined portion of the cam-groove 28<sup>a</sup> will engage the stud 31<sup>a</sup>, and the thread-catcher 9<sup>a</sup> will be lowered to engage between the thread and the needle and the thread-catcher 8<sup>a</sup> be raised. A straight portion of the cam-groove 28<sup>a</sup> will now be reached and the parts held in position while the thread-carrier is being moved across the machine in the opposite direction to that just described, the thread in this movement being held by the thread-catcher 9<sup>a</sup>. It will be understood, of course, that in this device, as well as in that shown in Fig. 1, the eye 45 is in each reciprocation of the thread-carrier carried beyond a thread-catcher, so that the thread may be engaged thereby. The continued operation of these parts forms a series of loops, such as shown in Fig. 10, and the needle will operate to secure these loops centrally of their length on the fabric, as previously described.

By inserting the thread-catchers in any two corresponding apertures 7<sup>a</sup> and passing them through corresponding apertures 22<sup>a</sup> in the guide-plates I provide for adjusting the size of the loops by diminishing or increasing the distance between said thread-catchers.

In Figs. 7, 8, and 9 I have shown details of the feed mechanism. Fig. 7 is a perspective view of the feed-plate housing. This comprises a polished-metal casting 68, having provided in one end a longitudinal slot 117, open at the bottom and ends and closed at the top. At its other end the casting is provided with a long arm 118 and a short arm 119 and intermediate said arms is provided with a short slot 120, having at its inner end an inclined surface 121. On the bottom of the casting 68 is secured a metal plate 122, having two opposite spring ends 123 124, projecting upward into the slot 117. The long arm 118 of the casting 68 is provided with a longitudinal slot 125, in which vibrates and is guided the end of feed-arm 14. The casting 68 is provided on opposite sides with flanged extensions 126, provided with screw-holes, whereby the casting may be secured



to the under side of the bed-plate 1 by means of screws 127, as shown in Fig. 1. In Fig. 8 I have shown one member of the feed-plate carrier. This comprises a rectangular metal plate 128, having an inclined end 129 and provided at said end with a deep groove 130, having at its inner extremity an inclined surface 131. The other member of the feed-plate carrier comprises a rectangular metal plate 132, (shown in Fig. 9,) provided with a tongue 133, adapted to slidably engage in the groove 130 and having its end inclined to correspond with the incline 131. At the base of the tongue 133 are provided shoulders 134, inclined to correspond with the inclined end 129 of the plate 128. In the tongue 133 is provided a slot 135, which extends parallel with the incline of the tongue 133. The plate 128 near its inclined end is provided with a bolt-hole 136, which when the tongue 133 is inserted in the groove 130 registers with the slot 135. A bolt 137, inserted in the hole 136 and extending through the slot 135, serves to hold the plates 128 and 132 in engagement, the slot 135 permitting the inclined surfaces of plate 132 to slide on the corresponding inclines provided in the plate 128 in the operation of the device to be presently described. In the rear end of the bar 132 is located a vertically-disposed slot 138, which receives the end of feed-arm 14. The reference-numeral 139 indicates the feed-plate proper, having the usual serrated upper surface and secured to the feed-plate carrier 132 by means of a tongue 140 fitting in a socket provided in the side of the carrier 132. The plate 128 is placed in the slot 117 and rests upon the spring ends 123 and 124, which will press the plate against the under side of the top of the casting 68, and thereby offer a slight resistance to the sliding of said plate in said slot. The feed-plate 139 works in a recess provided in a plate 141, secured on the top of the bed-plate beneath the presser-foot 59.

The operation of the feed mechanism is as follows: The outer end of feed-arm 14 is moved back and forth through the action of cam 9 and lever 11. The outer end of this feed-arm, engaging in the slot 138, will operate to move the connected plates 128 132, constituting the feed-plate carrier, back and forth. Owing to the resistance offered by the spring ends 123 124 to the sliding of plate 128, however, the plate 132, carrying the feed-plate 139, will in its initial movement slide upward on the inclines afforded at the end of plate 128 until the bottom of slot 135 engages bolt 137, when the plate 128 will move with plate 132 and slide in the slot 117. In the reverse movement the plate 132 will first slide down the inclines on plate 128 until the top of slot 135 contacts with bolt 137, when the two plates will again be moved together in a direction reverse to that previously described. The effect of these combined movements is to produce an upward-and-forward movement of feed-plate 139, whereby

the fabric being operated upon will be fed forward beneath the needle 30. This feed is regulated by adjusting the fulcrum of lever 11, whereby the throw of the lower end of said lever and of the outer end of the feed-arm 14 may be lengthened or shortened to increase or diminish, respectively, the play of the feed-plate. In like manner the movement of the outer end of the vibrating arm 12 is controlled by the adjustable fulcrum on the lever 10.

I provide the following arrangement for the purpose of winding spools with the threads to be employed in the machine: The wheel 6 is secured to the shaft 5 by means of a thumb-screw 142 passing through the hub of said wheel and engaging said shaft. By unscrewing the thumb-screw 142 the wheel 6 may be independently revolved on said shaft. A collar 143, secured on the end of shaft 5 and bearing against the hub of wheel 6, prevents lateral displacement of the latter. A cap 144, recessed to fit over the end of shaft 5 and collar 143, is secured to the hub of wheel 6 by means of screws 145. Said cap is provided with a screw-threaded recess adapted to receive the screw-threaded shank of a thumb-screw 146, which shank can be passed through the hole in a spool and be screwed into its recess to clamp the spool between the head of said thumb-screw and the cap 144. By releasing the screw 142 from engagement with shaft 5 the wheel 6 can be revolved to wind threads upon the spool without revolving said shaft, as will be clearly understood.

For securing the bed-plate on a table I provide a depending shank 147, screw-threaded at its lower end, which is designed to pass through an opening in the table and to engage a screw-threaded aperture in a clamping-arm 148, whereby to draw said clamping-arm against the under side of the table and hold the bed-plate firmly clamped on top of the table.

It will be seen that my machine provides for four different kinds of stitches or loops—viz., the double surface loop and stitch, the ordinary chain-stitch, the ordinary turving-loop, and the combined turving-loop and chain-stitch. It will be further noted that the parts are simple in construction and operation, that the various attachments described are readily applied to the machine, and that the machine as a whole permits of a large variety of work being done, all of which will be readily appreciated by those skilled in the art.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A fabric turving and embroidering machine comprising a main shaft, a needle-bar reciprocated thereby and carrying a needle, a feed-plate and a housing therefor, a feed-arm for actuating said feed-plate, a stitch-former slidably supported on said housing, a vibratory arm for actuating said stitch-former, means operated by the main shaft for actu-



ating said feed-arm and vibratory arm, and means operated by the main shaft for passing a thread back and forth across the plane of movement of the fabric to form loops designed to be stitched thereon by the combined operation of the needle and stitch-former, substantially as described.

2. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a slide-plate having a projecting finger, a spring tending normally to draw said finger into operative relation with the needle and a vibrating arm operating at intervals to move said finger out of operative relation with the needle, substantially as described.

3. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a stitch-former slidably supported on the feed-plate housing and having a projecting finger, a spring connected to said stitch-former and tending normally to draw said finger into engagement with the thread of the needle, a vibrating arm, an impact-finger removably secured on said arm and contacting with the end of the stitch-former and operating at intervals to move the said finger out of engagement with the thread of the needle, substantially as described.

4. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of thread-catchers located at either side of and at a distance from the needle respectively, means for passing a thread back and forth across the plane of movement of the fabric and on the upper surface thereof and alternately into engagement with each thread-catcher, whereby to form on the fabric a series of double loops and stitch-forming mechanism operating in conjunction with the needle to secure said loops upon the fabric, substantially as described.

5. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, rods pivotally secured at their upper ends, respectively, to the outer ends of said rock-arm and having lower pointed ends, a reciprocating thread-carrier operating to carry a thread back and forth across the plane of movement of the fabric and on the upper surface thereof, means for rocking said rock-arm whereby to cause the rods carried thereby to alternately engage with the thread of the thread-carrier at the limit of each of its movements, to form loops, and stitch-forming mechanism operating in conjunction with the needle to secure said loops upon the fabric, substantially as described.

6. In a fabric turving and embroidering ma-

chine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, thread-catchers carried by said rock-arm at either side of the needle, respectively, a reciprocating thread-carrier moving in a plane parallel to the surface of the fabric, means for rocking said rock-arm whereby to cause the thread-catchers to engage alternately the thread of the thread-carrier, to form loops, and stitch-forming mechanism operating in conjunction with the needle to secure said loops upon the fabric, substantially as described.

7. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, thread-catchers carried by said rock-arm at either side of the needle respectively, a reciprocating thread-carrier moving in a plane parallel to the surface of the fabric, means for rocking said rock-arm whereby to cause the thread-catchers to engage alternately the thread of the thread-carrier to form double loops on the upper surface of the fabric, and stitch-forming mechanism operating in conjunction with the needle to secure said loops centrally of their lengths upon the fabric, substantially as described.

8. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, thread-catchers carried by said rock-arm at either side of the needle respectively, a reciprocating thread-carrier moving in a plane parallel to the surface of the fabric, a cam on the main shaft having a cam-groove, means operatively connecting said rock-arm and cam-groove whereby in the revolution of the shaft, said rock-arm will be rocked to cause the thread-catchers to engage alternately the thread of the thread-carrier, to form loops, and stitch-forming mechanism operating in conjunction with the needle to secure said loops upon the fabric, substantially as described.

9. In a fabric turving and embroidering machine, the combination with the main shaft, a needle-bar reciprocated thereby and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, thread-catchers carried by said rock-arm at either side of the needle, respectively, means for rocking said rock-arm, a thread-carrier moving in a plane parallel to the surface of the fabric and means for reciprocating the thread-carrier comprising a cam on the main shaft having a cam-groove, a lever-arm pivoted on the arm of the machine and having at its upper end a stud working in said cam-groove, a link pivotally connecting the lower end of said lever-arm with the thread-



carrier, and stitch-forming mechanism operating in conjunction with the needle, the combination operating substantially as described.

10. In a fabric turving and embroidering machine, the combination with the arm of the machine, a shaft journaled therein, a needle-bar reciprocated by said shaft and carrying a needle and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, arms carried by said rock-arm at either side of the needle, respectively, one of said arms having an upward extension, a cam on the main shaft having a cam-groove, a bell-crank lever pivoted on the head of the machine, and having one arm pivotally connected with said upward extension and on its other arm a stud working in said cam-groove thread-catchers carried by said arms, a thread-carrier slidably supported in parallel relation to the surface of the fabric and in operative relation with said thread-catchers, means for reciprocating said thread-carrier, and stitch-forming mechanism operating in conjunction with the needle, the combination operating, substantially as described.

11. In a fabric turving and embroidering machine, the combination with the arm of the machine, a shaft journaled therein, a needle-bar reciprocated by said shaft and carrying a needle and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, arms carried by said rock-arm at either side of the needle, respectively, thread-catchers removably secured in said arms, means for rocking said rock-arm, a thread-carrier slidably supported in parallel relation to the surface of the fabric and in operative relation with said thread-catchers, means for reciprocating said thread-carrier and stitch-forming mechanism operating in conjunction with the needle, the combination operating substantially as described.

12. In a fabric turving and embroidering machine, the combination with the arm of the machine, a shaft journaled therein, a needle-bar reciprocated by said shaft and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, arms carried by said rock-arm at either side of the needle, respectively, each of said arms having at its lower end a head provided with a series of apertures, thread-catchers removably secured in said apertures, a presser-foot secured on the presser-foot bar and having apertures alining with the apertures in said heads and adapted to form guides for said thread-catchers, a thread-carrier slidably supported in parallel relation to the surface of the fabric and in operative relation with said thread-catchers, means for rocking said rock-arm and for reciprocating said thread-carrier and stitch-forming mechanism operating in conjunction with the needle, the combination operating substantially as described.

13. In a fabric turving and embroidering machine, the combination with the arm of the

machine, a shaft journaled therein, a needle-bar reciprocated by said shaft and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, arms carried by said rock-arm at either side of the needle, respectively, each of said arms having at its lower end a head provided with a series of apertures, thread-catchers removably secured in said apertures, a presser-foot secured on the presser-foot bar and having apertures alining with the apertures in said heads and adapted to form guides for said thread-catchers, guide-arms extending downward from said presser-foot, a thread-carrier slidably supported in said guide-arms, a cam on the main shaft having cam-grooves, means operatively connecting the rock-arm with one of said grooves and the thread-carrier with the other of said grooves, whereby, in the revolution of the cam, the thread-carrier will be reciprocated and the rock-arm will be rocked to bring the thread-catchers alternately into engagement with the thread of the thread-carrier, to form loops, and stitch-forming mechanism operating in conjunction with the needle to secure said loops upon the fabric, substantially as described.

14. In a fabric turving and embroidering machine, the combination with the arm of the machine, a shaft journaled therein, a needle-bar reciprocated by said shaft and carrying a needle, and with the feed mechanism, of a rock-arm centrally pivoted above the table of the machine, a presser-foot secured on the presser-foot bar and having apertures, guide-arms extending downward from said presser-foot, thread-catchers carried by said rock-arm at either side of the needle, respectively, and working in said apertures, a thread-carrier slidably supported in said guide-arms, means operated by the main shaft for rocking the rock-arm and for reciprocating the thread-carrier, and stitch-forming mechanism operating in conjunction with the needle, the combination operating substantially as described.

15. In a fabric turving and embroidering machine, a main shaft, a needle-bar reciprocated thereby and carrying a needle, a vibratory arm adapted to have interchangeably applied thereto an impact-finger and a turving-hook, means for vibrating said arm comprising a lever pivoted thereto and actuated by a cam on the main shaft, and means for securing said cam in adjusted positions on the main shaft whereby to reverse the throw of the arm relative to the movement of the needle according as the impact-finger or the turving-hook is applied to said arm, substantially as described.

16. In a fabric turving and embroidering machine, the combination with a main shaft, a needle-bar reciprocated by said main shaft and carrying a needle, and with the feed mechanism, of a vibratory arm pivoted to the bed-plate, and adapted to have interchangeably applied thereto an impact-finger and a turving-hook, means for vibrating said arm



comprising a lever actuated by a cam on the main shaft and pivotally connected at its lower end to said arm, a fulcrum for said lever, and means for securing said cam in adjusted positions on the main shaft whereby to reverse the throw of said arm, relative to the movement of the needle according as the impact-finger or the turving-hook is applied to the arm, substantially as described.

17. In a fabric turving and embroidering machine, the combination with a main shaft, a needle-bar reciprocated by said main shaft and carrying a needle, and with the feed-plate, of a feed-arm for actuating said feed-plate, a vibratory arm adapted to have interchangeably applied thereto an impact-finger and a turving-hook, and means for actuating said feed-arm and vibratory arm comprising levers operated by cams on the main shaft and pivotally connected at their lower ends, respectively, to the ends of said vibratory and feed arms, an adjustable fulcrum for each of said levers, and means for securing the cam operating the lever of the vibratory arm in adjusted positions on the main shaft, whereby to reverse the throw of said vibratory arm, relative to the movement of the needle, according as the impact-finger or the turving-

hook is applied thereto, substantially as described.

18. A presser-foot comprising a rectangular body portion having at its ends apertured guide-arms, arms extending from either side of said rectangular portion affording bearing-surfaces, one of said arms having a needle-aperture and being provided with means for attachment to the presser-foot bar, substantially as described.

19. A presser-foot comprising a rectangular body portion provided with a longitudinal slot and having its ends bent downward to afford guide-arms, arms extending from either side of said rectangular portion affording bearing-surfaces, one of said arms having a needle-aperture, a series of apertures provided in the body portion on either side of said needle-aperture, and means for securing said presser-foot to the presser-foot bar, substantially as described.

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

JENNIE HENRY.

Witnesses:

BRUCE S. ELLIOTT,  
F. B. KEEFER.