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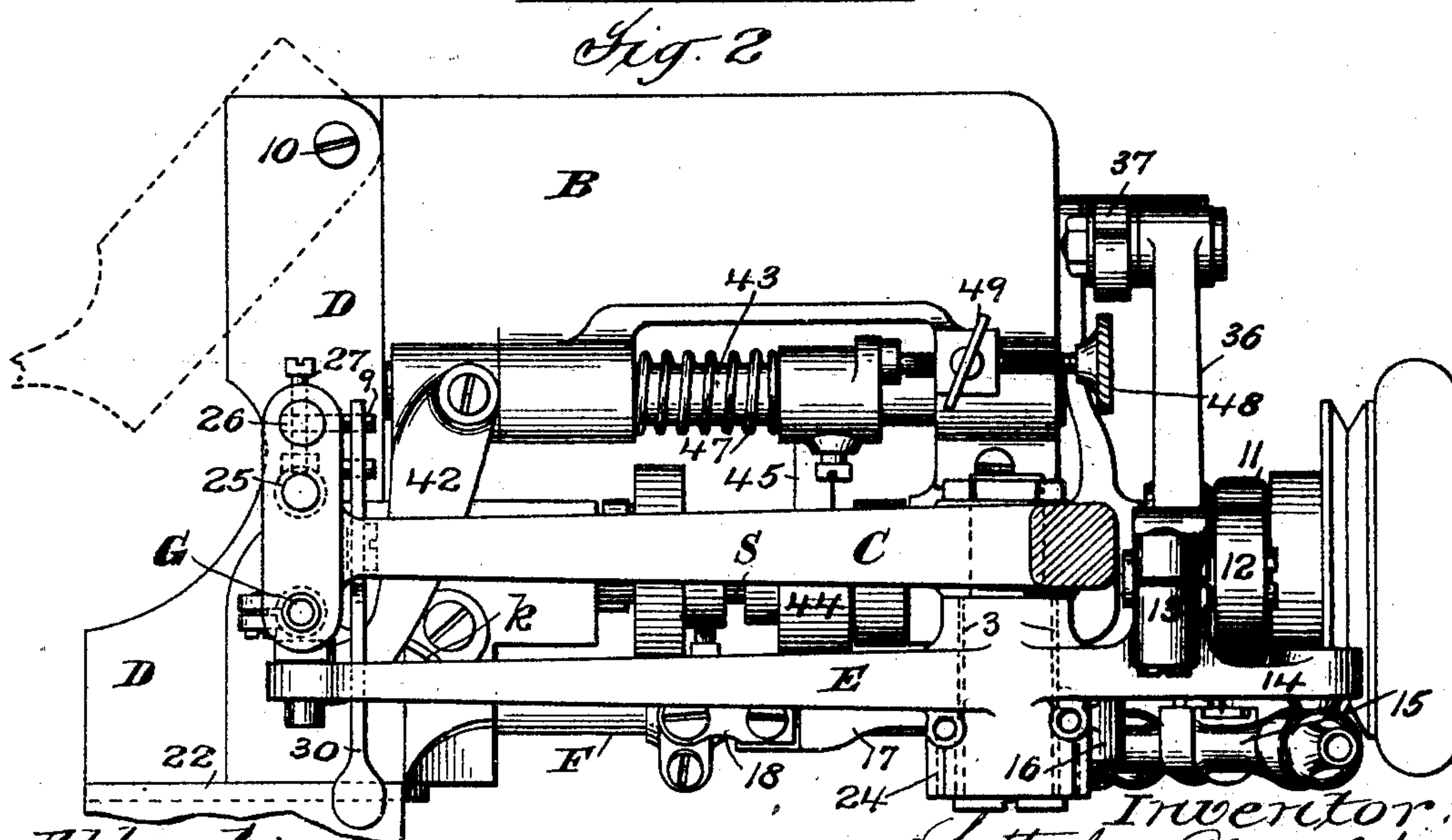
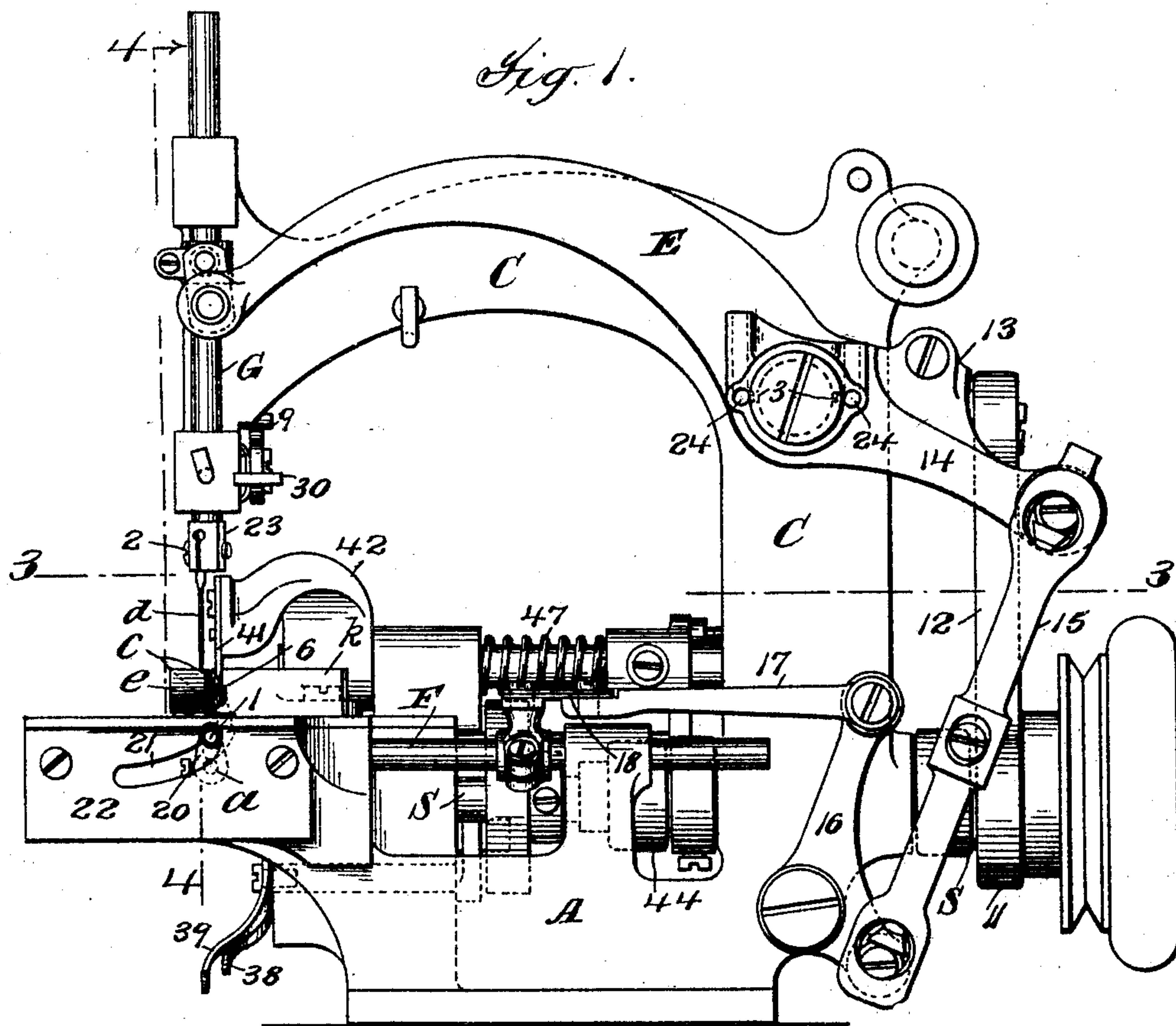
PATENTED FEB. 3, 1903.

S. ARNOLD.
OVERSEAMING SEWING MACHINE.

APPLICATION FILED MAY 19, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



Attest:
P. A. Schoe
J. E. Brown

Inventor:
Satterlee Arnold
by Philip Jacobson & Kennedy
Attys

No. 719,552.

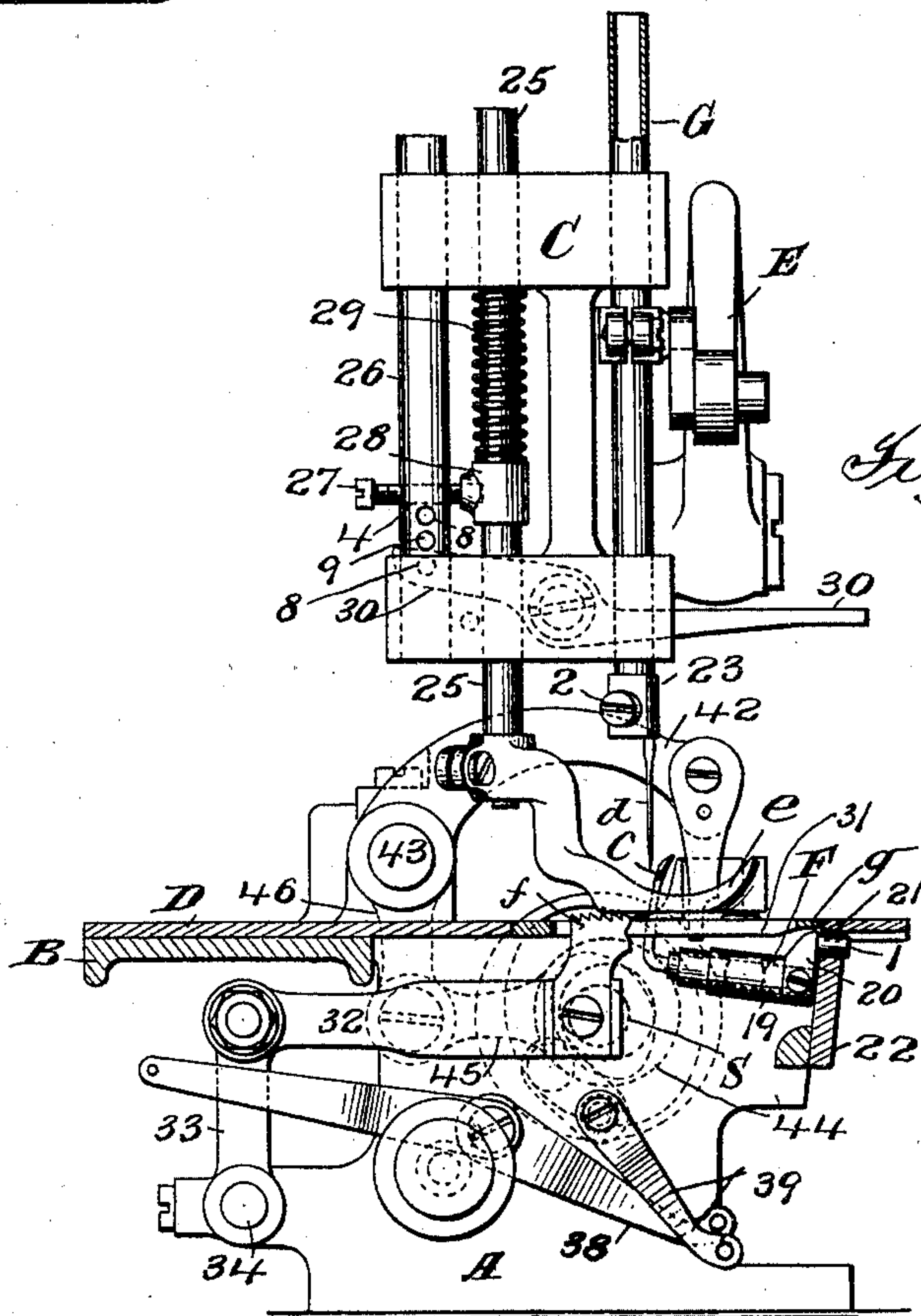
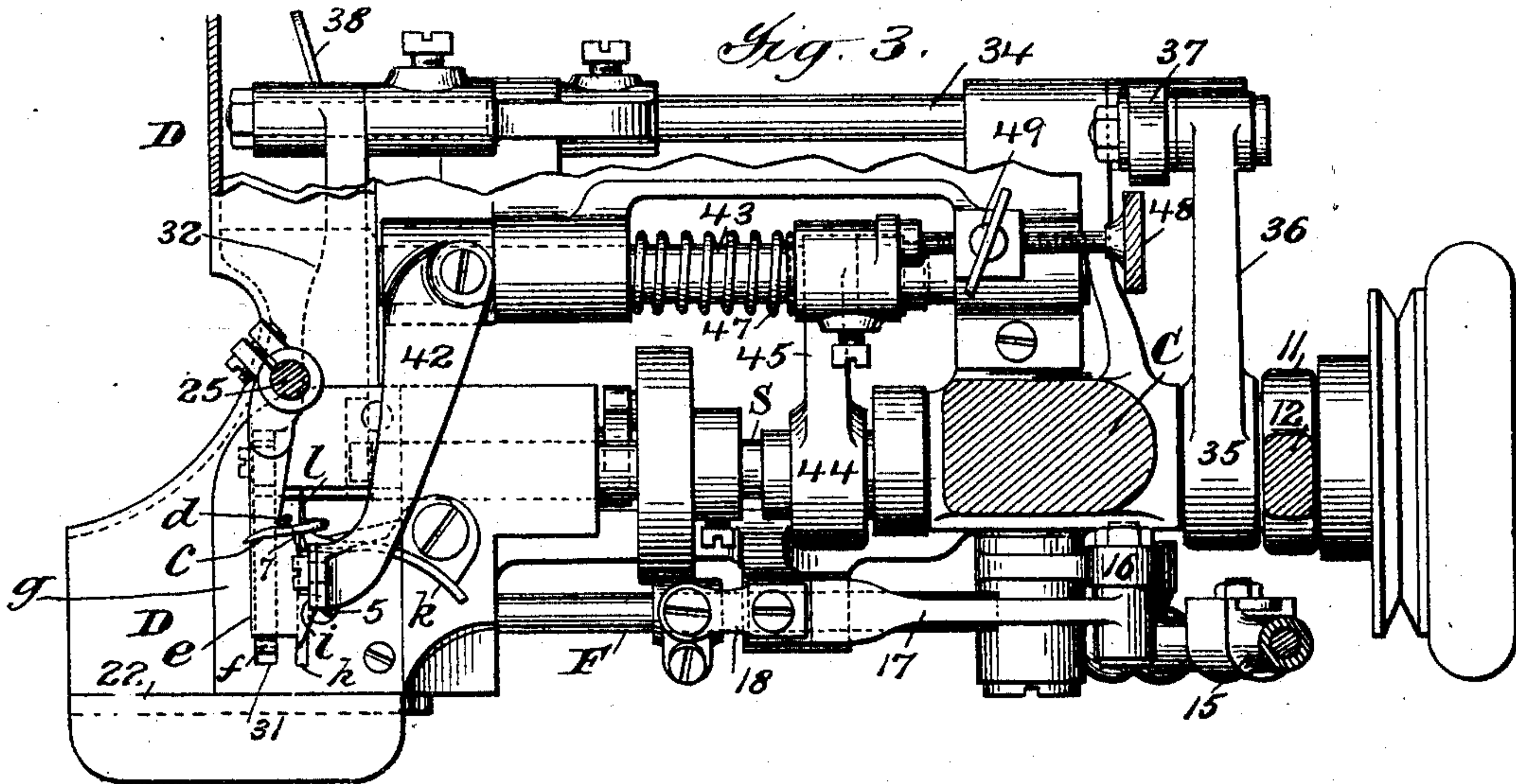
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4 SHEETS—SHEET 2.



Attest:
O. F. Kehoe
J. H. Brown

Inventor:
Satterlee Arnold
by Philip Sawyer Rice Kennedy
Atty.

No. 719,552.

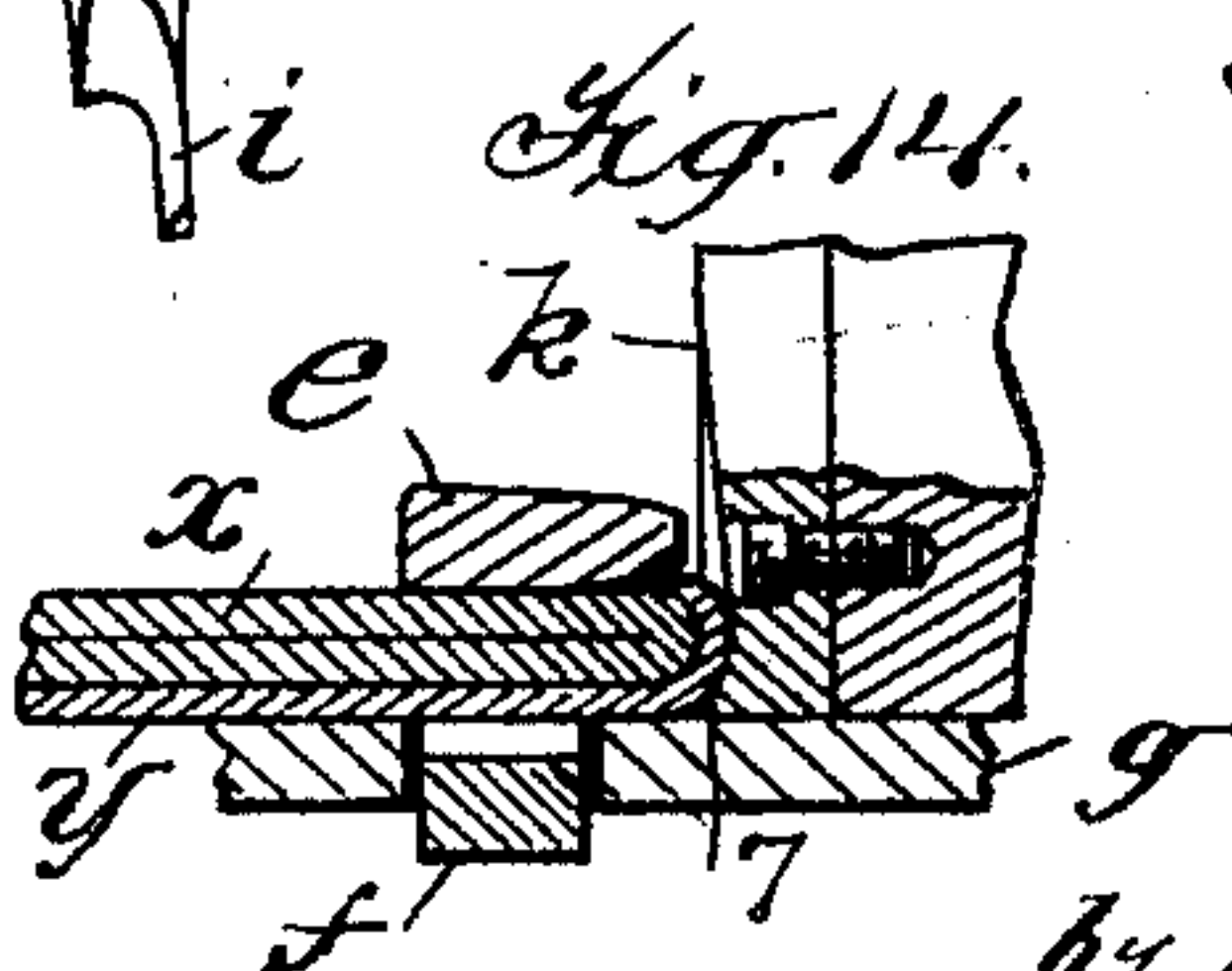
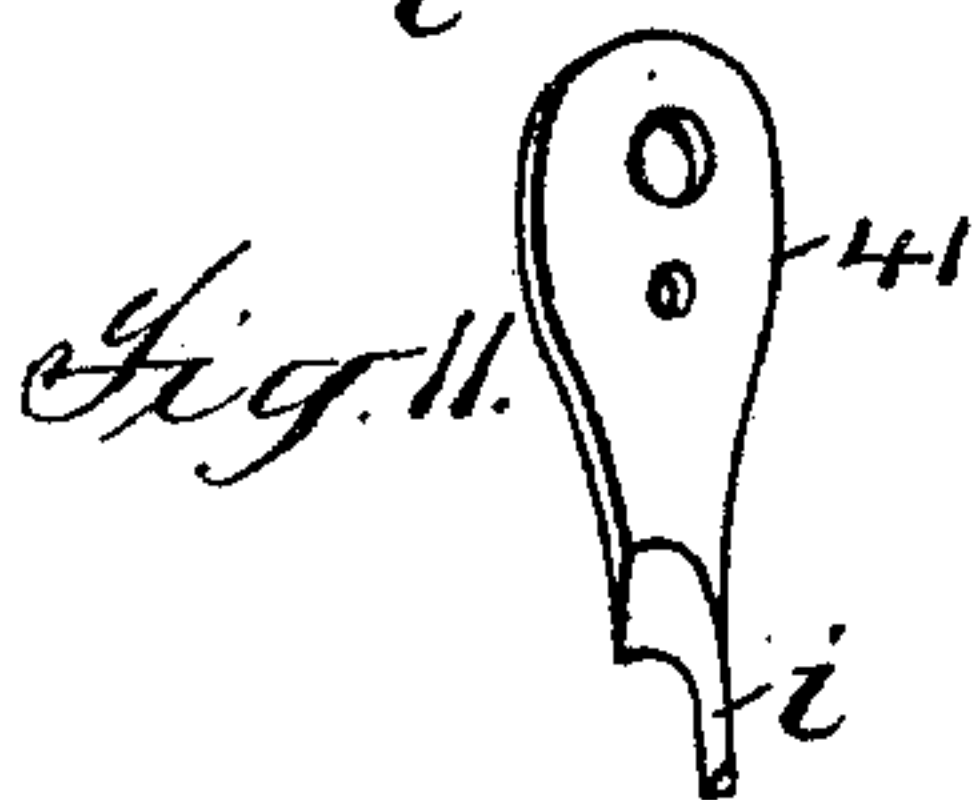
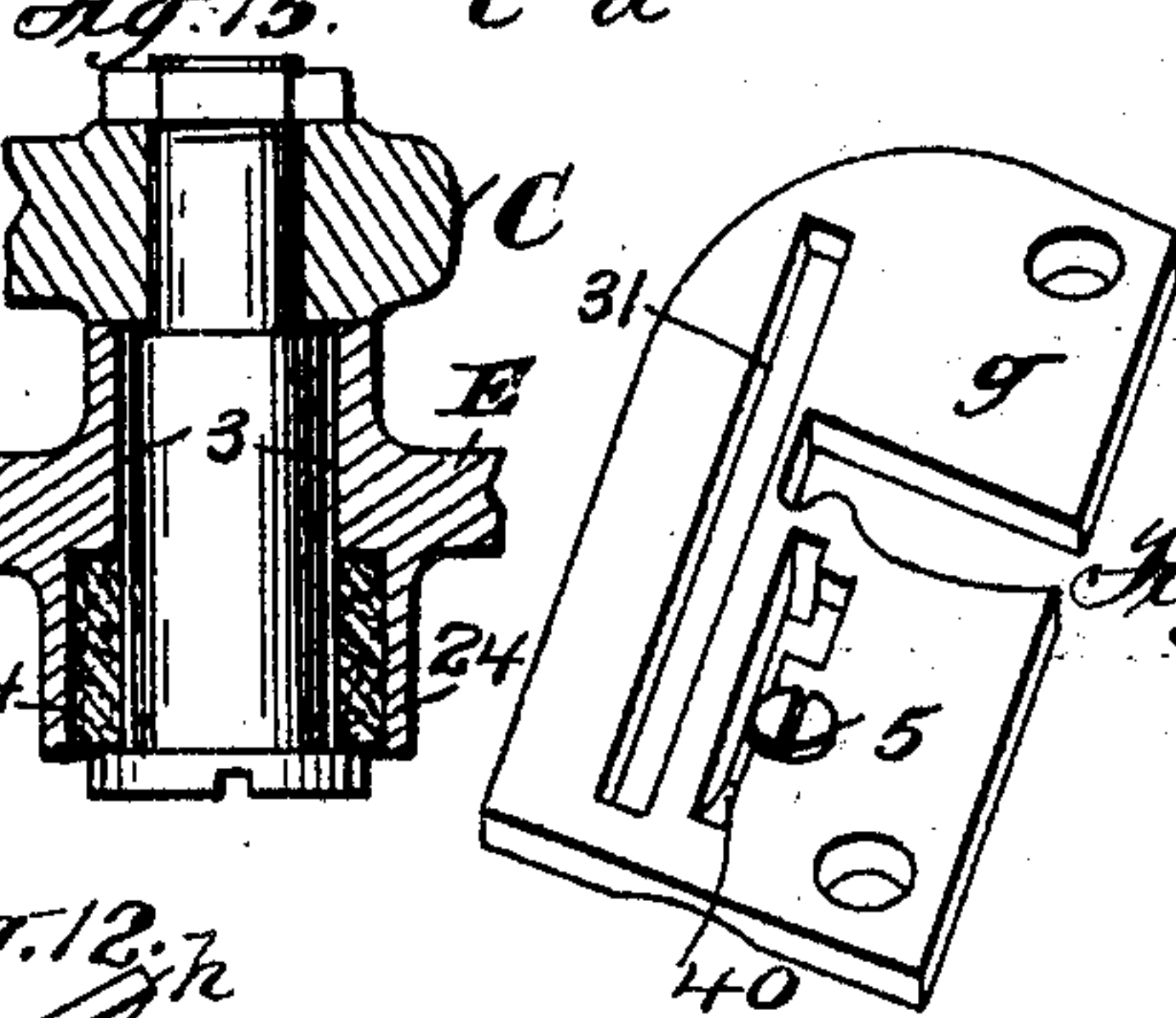
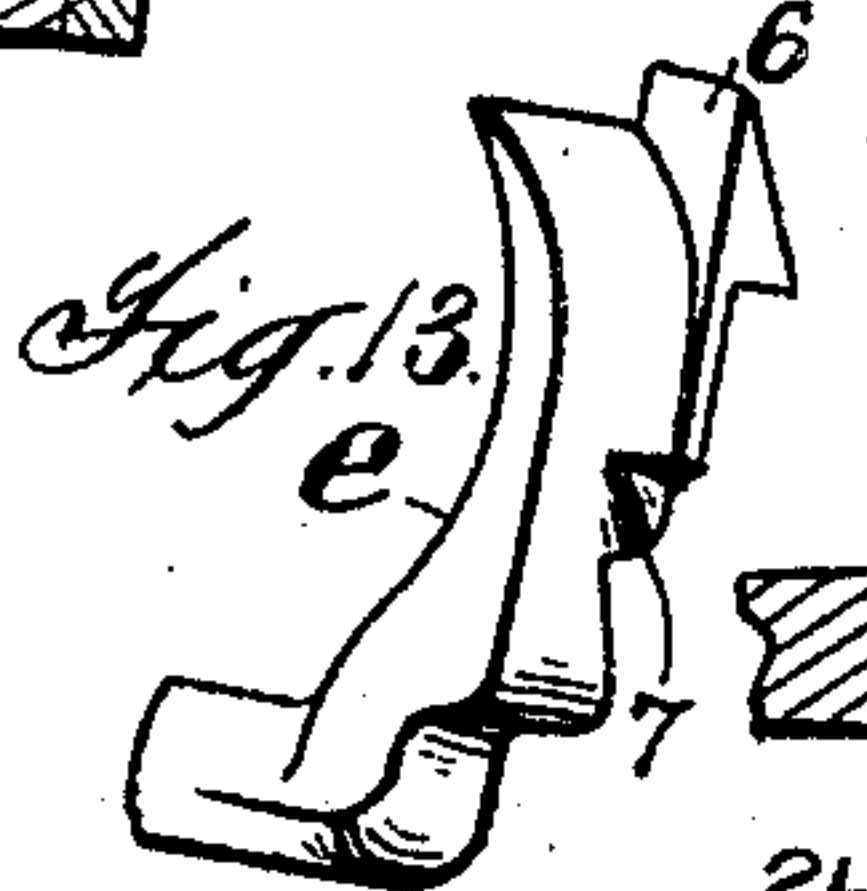
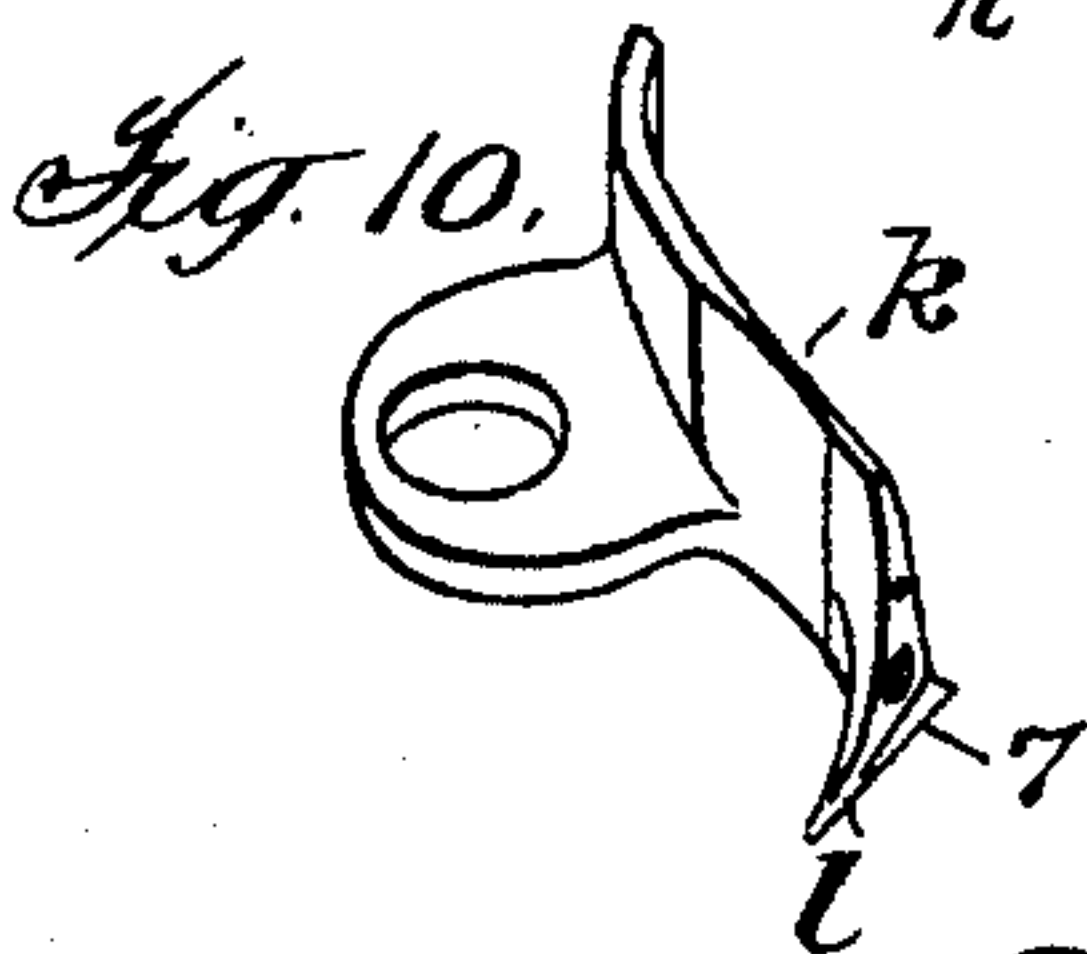
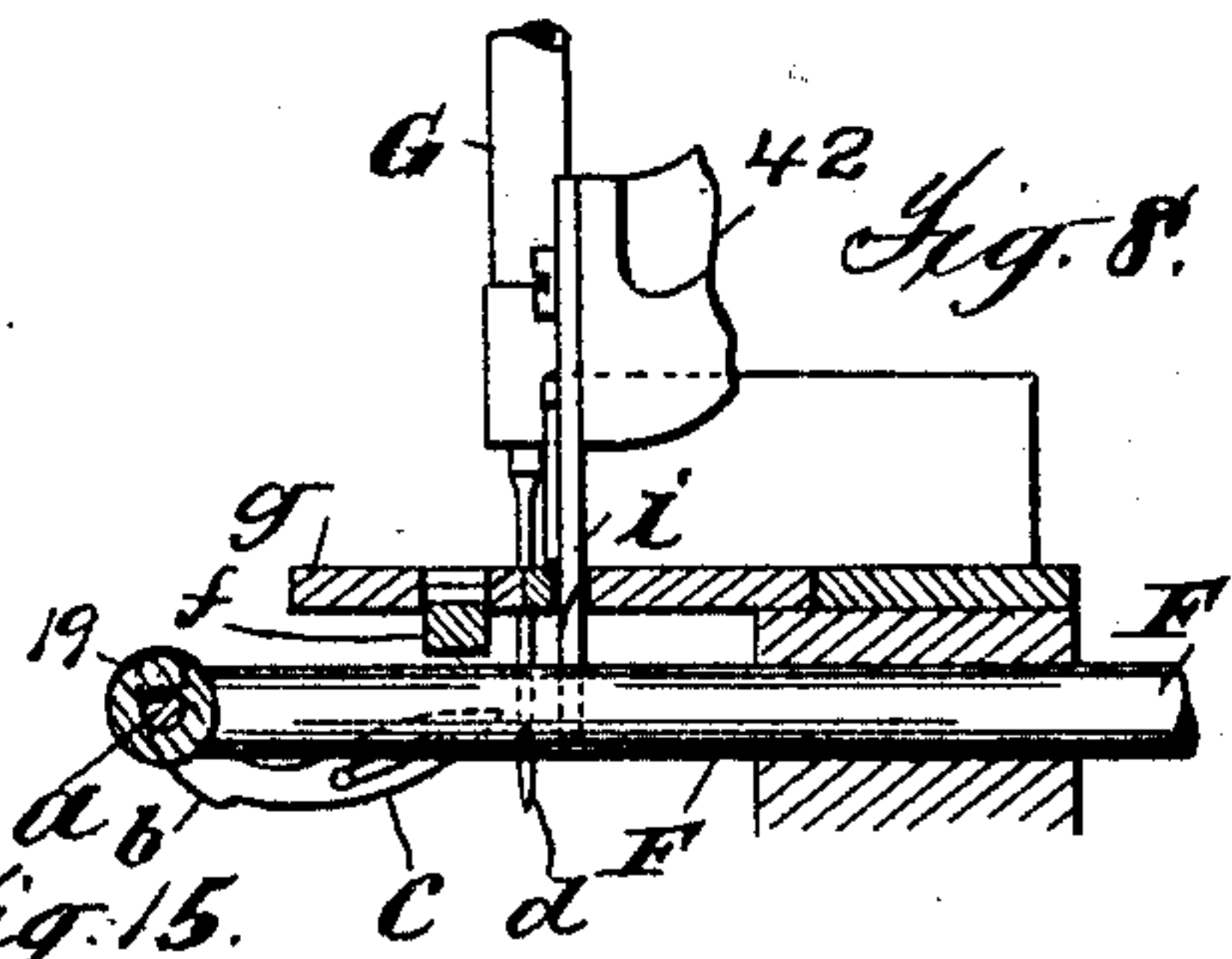
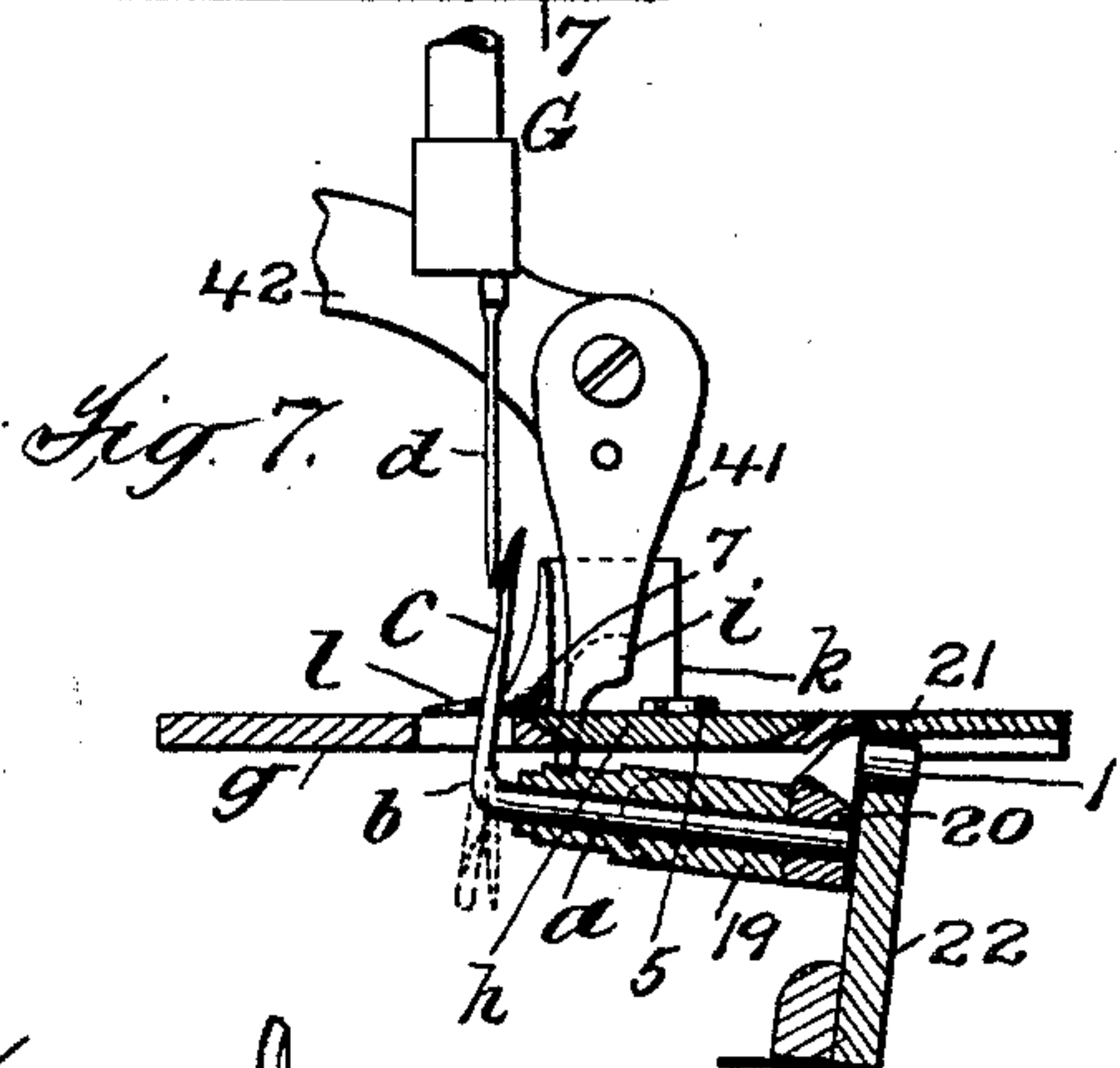
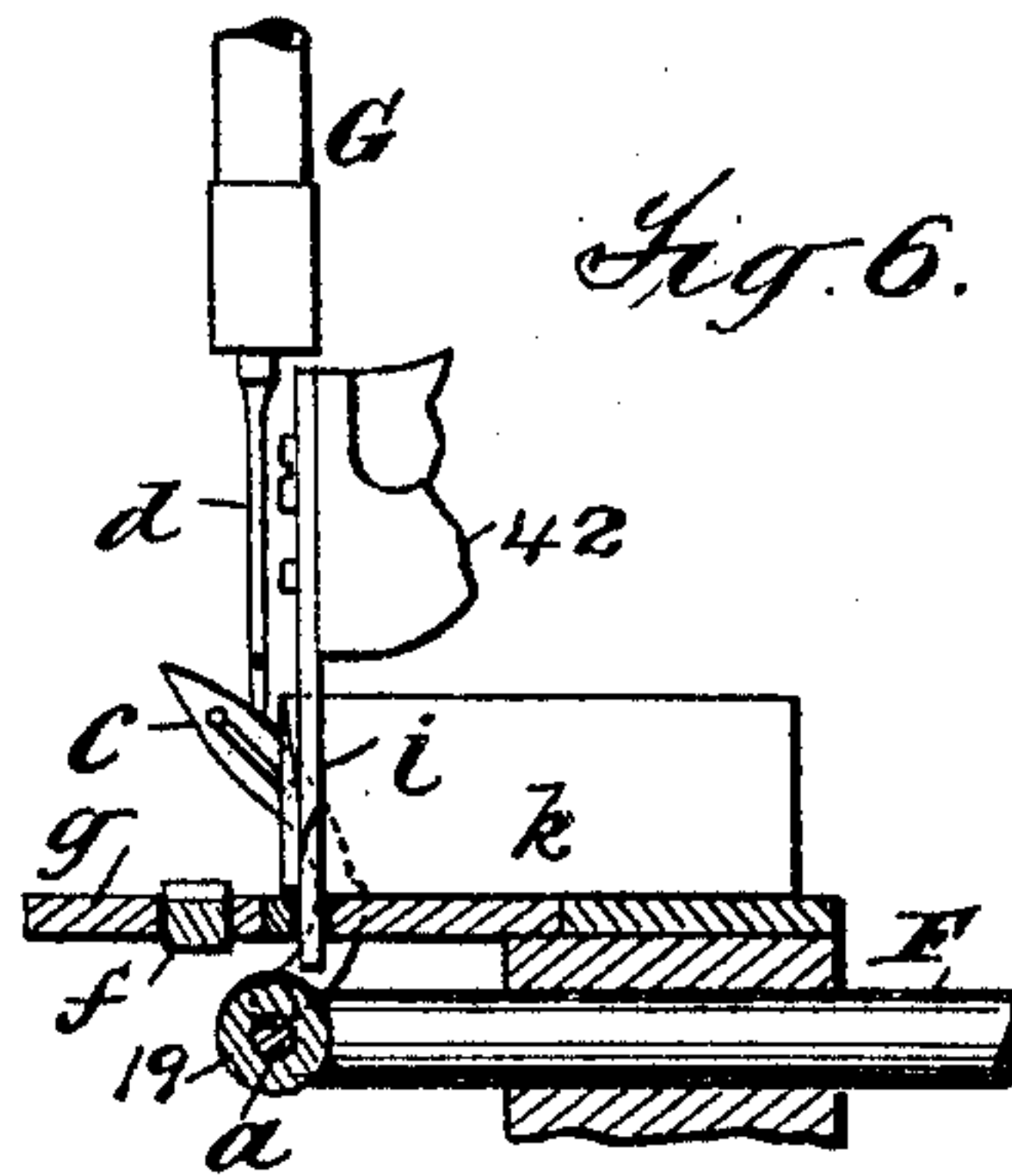
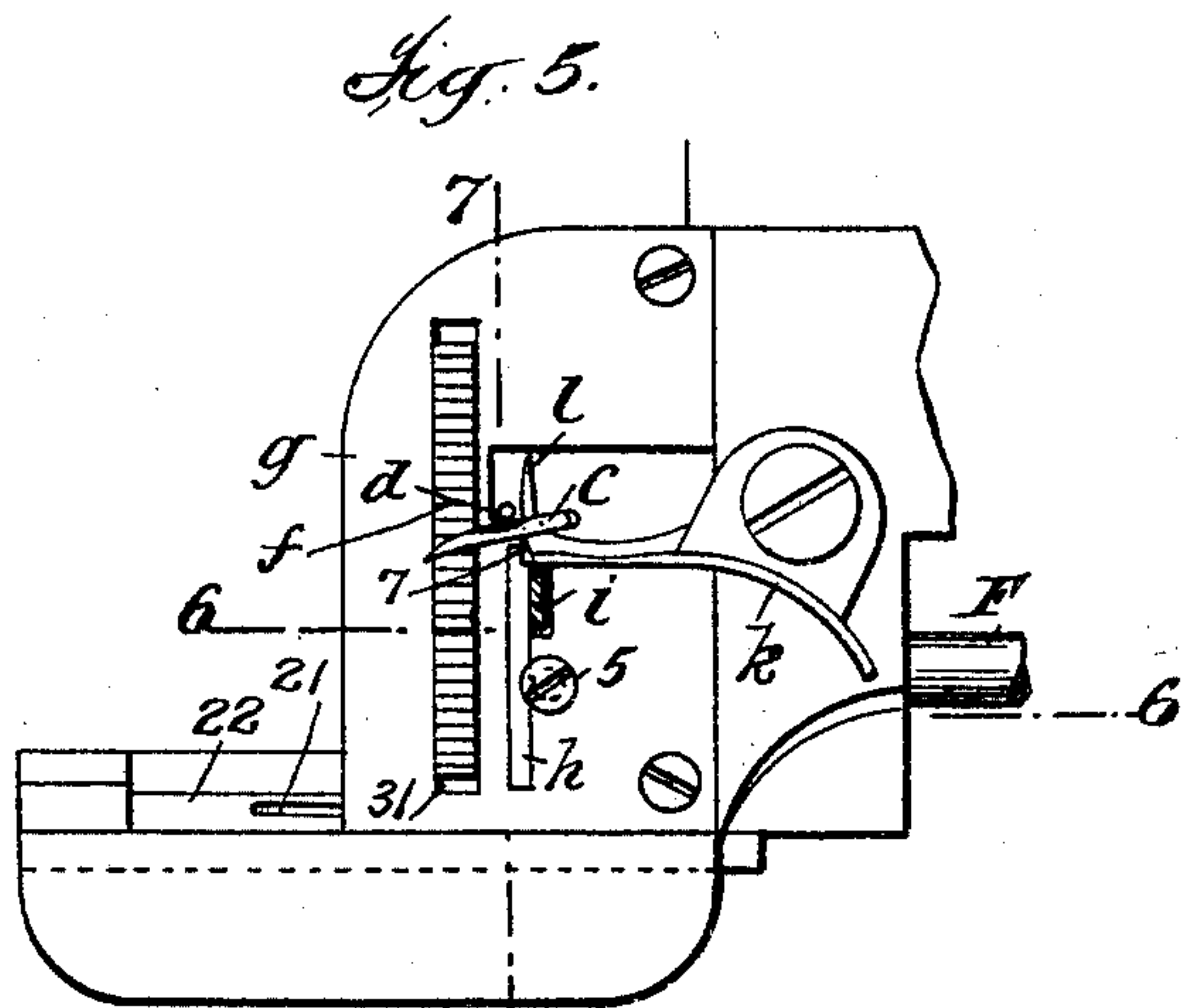
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NO MODEL.

4 SHEETS—SHEET 3.



Attest:
J. P. Schae
J. P. Schae

Inventor:
Sattulce Arnold
by Philip Sawyer Rice & Kennedy
Attys

No. 719,552.

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NO MODEL.

4 SHEETS—SHEET 4.

Fig. 16.

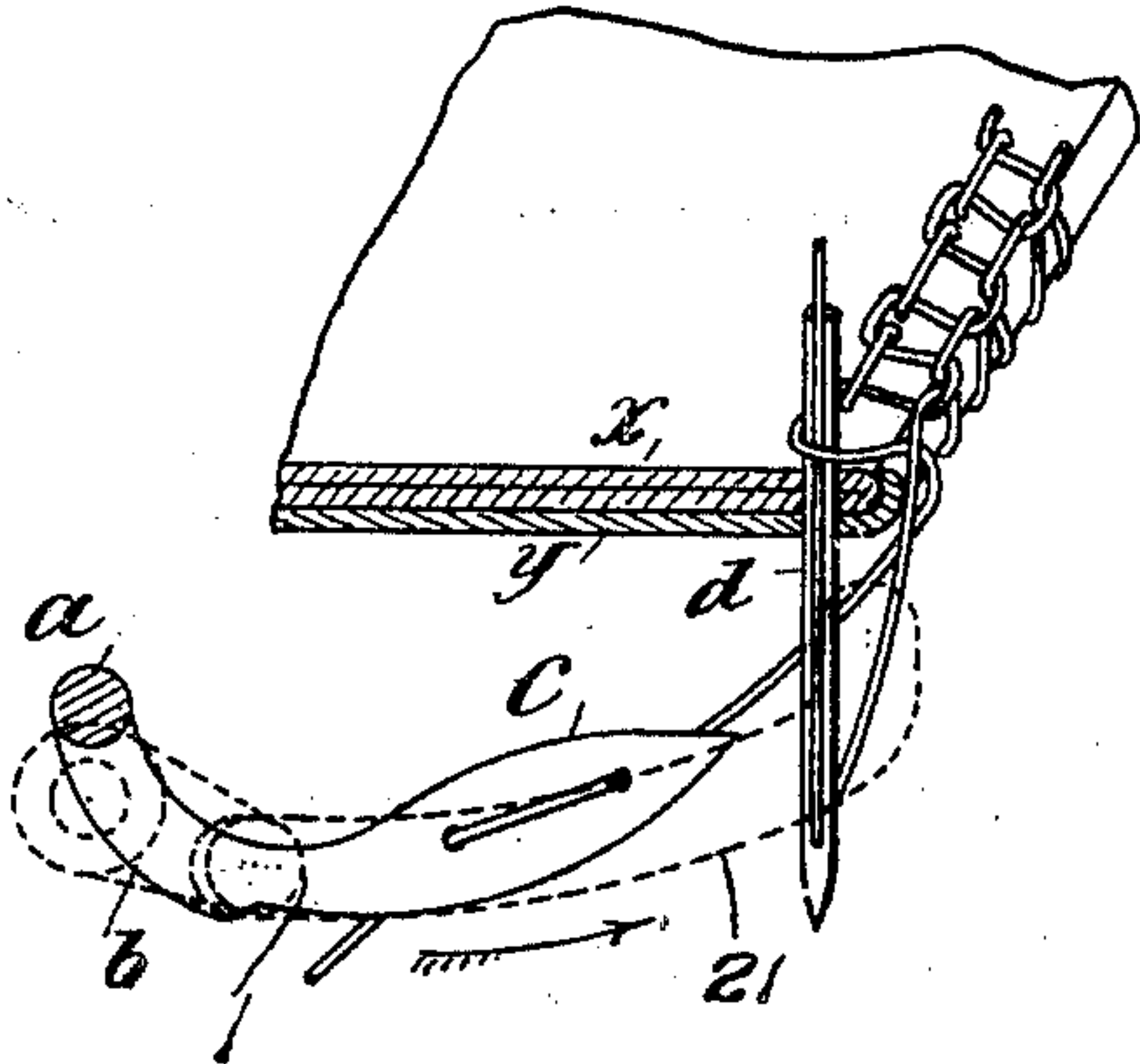


Fig. 17.

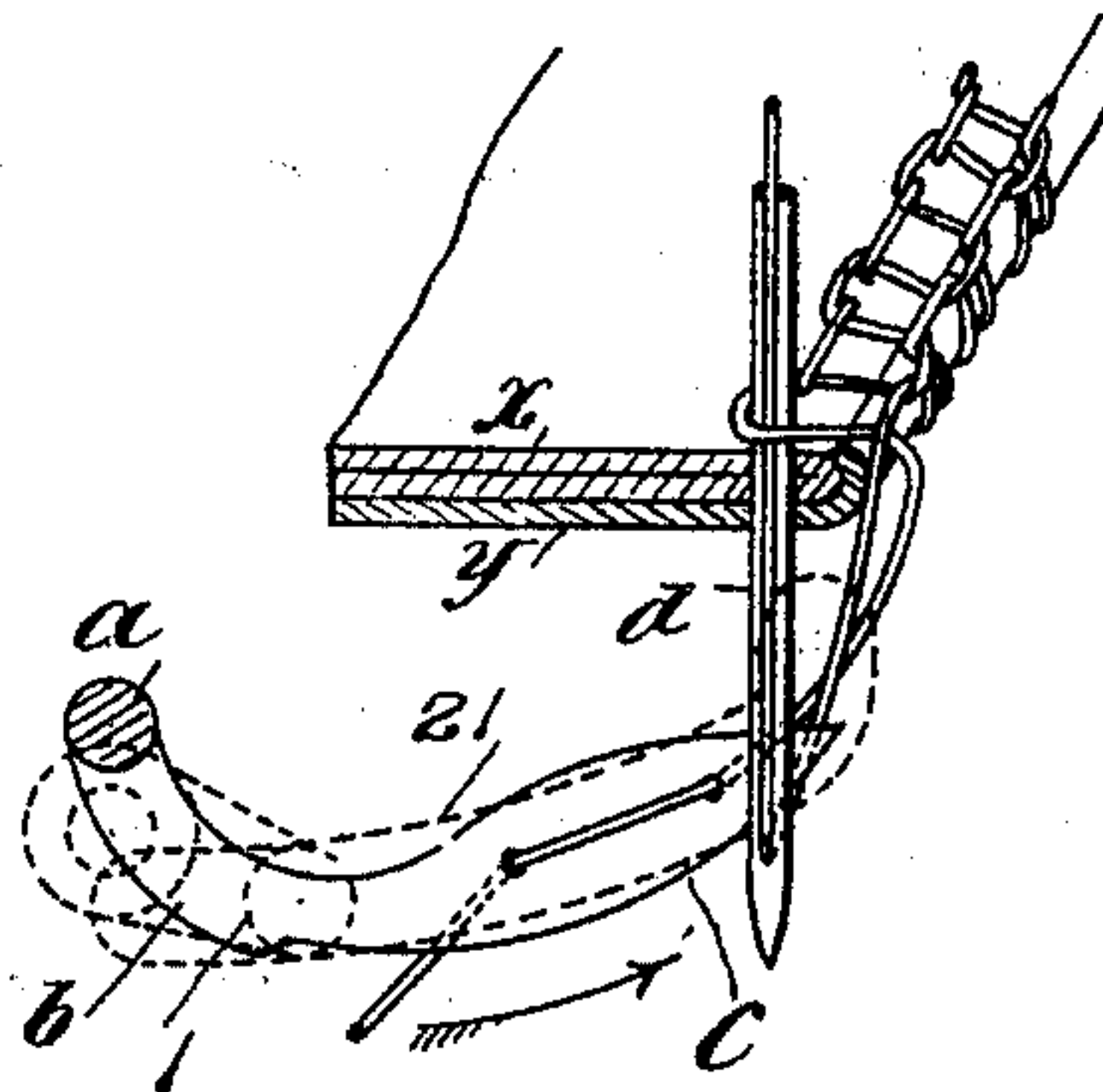


Fig. 19.

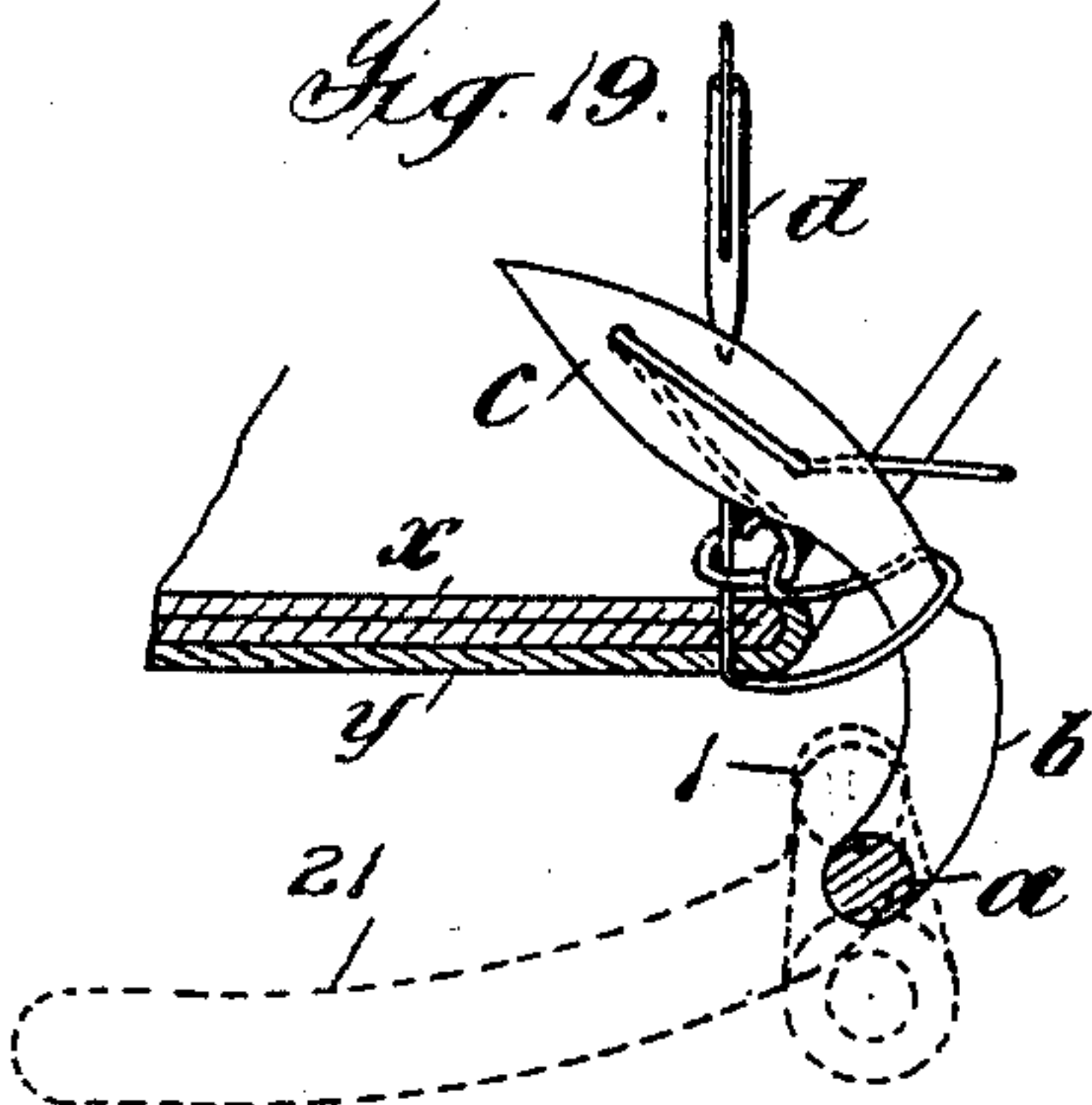


Fig. 18.

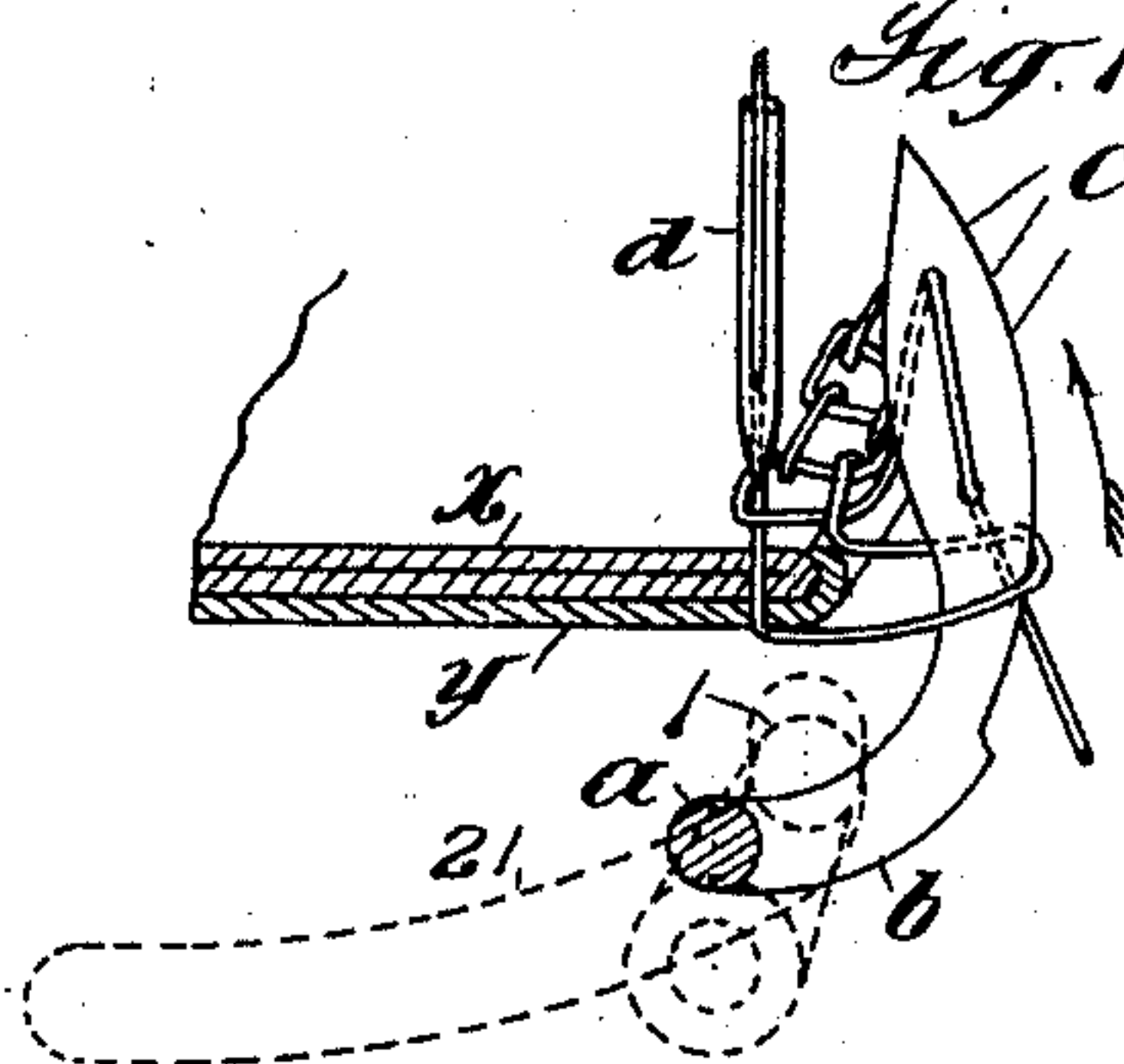
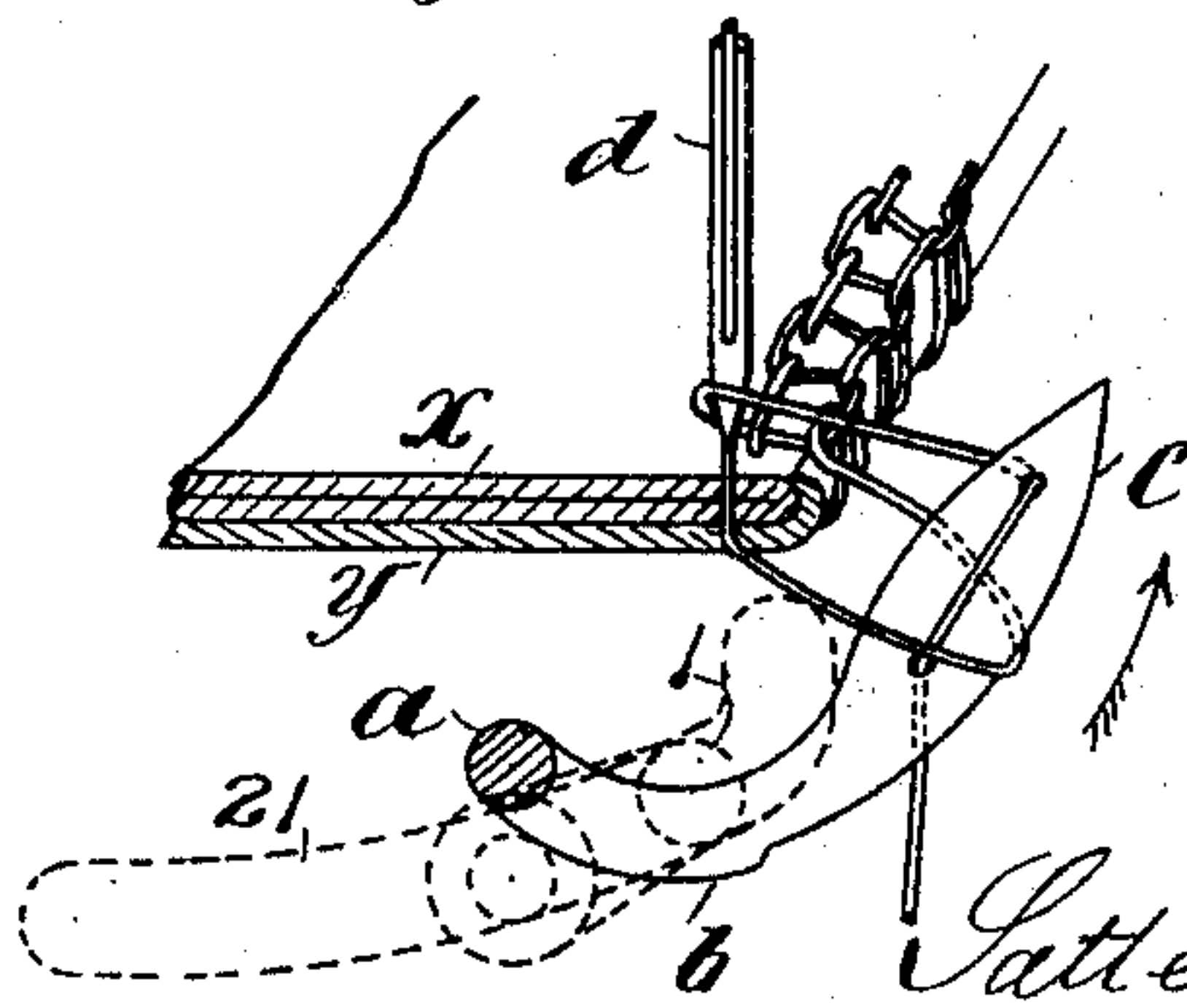


Fig. 20.



Attest:
T. F. Schae
J. E. Evans

Inventor:

Satterlee Arnold

by Philip Langsdorf & Kennedy

Attys

UNITED STATES PATENT OFFICE.

SATTERLEE ARNOLD, OF VERONA, NEW JERSEY, ASSIGNOR TO THE ARNOLD SEWING MACHINE COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW YORK.

OVERSEAMING SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 719,552, dated February 3, 1903.

Application filed May 19, 1902. Serial No. 107,895. (No model.)

To all whom it may concern:

Be it known that I, SATTERLEE ARNOLD, a citizen of the United States, residing at Verona, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The invention relates particularly to that class of sewing-machines which make along the edge or edges of fabrics what is known as a "crochet-stitch" or "overedge-stitch," and which may be used either for ornamentation
15 or for uniting the edges of fabrics.

The invention includes a novel looper movement for producing the crochet or overedge stitch and certain features in the construction of the looper and means for mounting and actuating the same, all of which are
20 of general application in overedge-stitch machines.

The especial object of this portion of my invention is to provide an improved looper of
25 that class known as "somersault loopers," by which higher speed and greater certainty of action and durability shall be secured than in previous constructions of this class.

In embodying my looper invention in a machine adapted for uniting the edges of fabrics, and especially knit goods, I have made certain other improvements in this class of machines, and the invention includes certain novel devices for folding, guiding, and trimming the edges of the fabrics in such a machine, as well as various specific constructions and combinations of parts in the complete machine, many of which also are applicable in other classes of sewing-machines.

40 For a full understanding of the invention a detailed description of a machine embodying all the features of the invention in their preferred form will now be given in connection with the accompanying drawings, illustrating such a machine, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a front view of the machine. Fig. 2 is a plan view of the
50 machine with the overhanging arm and needle-arm.

Fig. 3 is a horizontal section on the line 3 of Fig. 1. Fig. 4 is a vertical cross-section on the line 4 of Fig. 1. Fig. 5 is a detail plan view of the needle-plate, showing the looper in the position of delivering its loop to
55 the needle. Fig. 6 is a section on the line 6 of Fig. 5. Fig. 7 is a section on the line 7 of Fig. 5. Fig. 8 is a view similar to Fig. 6, showing the looper at the beginning of its movement to take the needle-loop. Figs. 9, 10, 11, 12, and 13 are perspective details of different parts, Fig. 9 showing the needle-plate, Fig. 10 the rag-guard and stitch-finger carried thereby, Fig. 11 the movable knife, Fig. 12 the stationary knife, and Fig. 13 the presser-
60 foot. Fig. 14 is an enlarged detail section showing the action of the folding devices in welting goods. Fig. 15 is a detail of the novel oiling means for the needle-arm. Figs. 16 to 20 are diagrammatic views illustrating the
65 operation of forming a stitch.

Referring to the drawings, A is the base-frame of the machine, on top of which is the usual table B, and from which frame rises the vertical and overhanging arm C for the
75 needle-bar. At the end of the machine opposite the needle is a hollow horn for receiving tubular goods, the top and one side of this horn being formed by a cover D, which is mounted at 10 to swing horizontally, so that
80 by swinging this cover outward and away from the needle the parts within and below the cover are readily accessible for threading-up or other purposes.

The main shaft S is mounted in the base-frame A and actuates the various parts through suitable connections, preferably by eccentrics throughout, as shown, thus securing a positive and smooth movement, with great durability, even at high rates of speed. 90
This driving-shaft S actuates the needle-arm E through eccentric 11 and eccentric-rod 12, this eccentric being connected to a short arm 13, with which the needle-arm is provided on the opposite side of its pivot from the needle. This needle-arm E carries also on the
95 same side of the pivot as the short arm 13 another arm 14, extending beyond the arm 13; and through this arm 14, link 15, intermediate bell-crank lever 16, link 17, and con- 100

nection-piece 18 drives the horizontally-reciprocating looper-bar F, by which the looper is carried. By this driving means the needle-arm actuates the looper-bar, and the required movement of the looper-bar relatively to the eccentric-rod 12 is secured by the relative lengths of the arms 13 14 and of the two arms of the intermediate bell-crank lever 16. The piece 18 is preferably made of two or more plates, as shown, for flexibility.

The end of the looper-bar F is formed T-shaped, the cross-piece consisting of a sleeve 19, which forms a long bearing for the looper-shank. The complete looper consists of the looper axis or shank *a* at right angles to the blade of the looper or looper proper, a crank portion *b*, which is radial to the axis or shank *a*, and the blade or looper proper, *c*, which is curved eccentrically to the axis and which is shown as formed and provided with the usual needle-holes for the double-thread machine illustrated. The looper-axis *a* and the bearing-sleeve 19 on the end of the looper-bar F are inclined to the vertical at such an angle that the point of the looper is on opposite sides of the needle in passing through the needle-loop and delivering its loop to the needle, this inclined mounting permitting the looper to properly coact with the needle without any sidewise or shogging movement.

The looper-shank *a* has secured thereto at its outer end a crank-sleeve 20, carrying the crank-pin 1, which runs in a cam slot or raceway 21, formed in a race-plate 22, secured at the front of the machine, this race-plate being inclined to the vertical, so as to be at right angles to the looper-axis. This cam slot or raceway 21 is curved through a portion of its length and provided with a straight vertical portion at its inner end, so as to secure the desired movement of the looper in connection with the reciprocating looper-bar F and the crank on the looper-axis, as fully described hereinafter in connection with the operation of the machine.

It will be seen that the looper-bar F, with the looper-axis, moves parallel with the cloth-plate or at right angles to the line of needle movement, while the rocking of the looper carries the looper-point from one side of the cloth-plate to the other and across the needle-path. This movement of the looper-axis substantially parallel with the cloth-plate or substantially at right angles to the needle-path while the looper is rocked on its axis results in a looper movement very different from that class of looper movements in which the looper is rocked on an axis which moves toward and away from the cloth-plate or substantially parallel with the needle movement.

The needle *d*, coöperating with the looper, may be quite short, as shown, on account of the peculiar form, arrangement, and movement of the looper, which is important in securing a rapid and efficient operation of the machine. This needle *d* is carried by the needle-bar G, which is mounted to slide ver-

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tically in bearings in the end of the arm C and connected to the needle-arm E in the usual or any suitable manner. For the purpose of mounting and adjusting the needle the needle-bar G is made hollow, preferably, throughout its length, as shown, and a split plug 23 is screwed into the lower end of the needle-bar, this plug being split at its lower end and provided with a set-screw 2, by which the two parts may be clamped together. A needle-hole is formed partly in each of the two portions of the plug and at one side of the center of the needle-bar and plug and the needle *a* held therein by clamping the two parts of the plug together by screw 2, the needle thus being set eccentrically to the needle-bar, so that the needle may be adjusted accurately relatively to the looper and other parts of the stitch-forming mechanism by rotating the needle-bar G in its bearings.

The oiling device for the needle-arm is shown by dotted lines in Figs. 1 and 2 and in detail in Fig. 15. In this construction oil-holes 24 are formed on opposite sides of the bearing for the needle-arm, extending parallel therewith, which holes are adapted to receive a sponge or similar oil-filled material. These oil-holes 24 are connected with the bearing by slots 3, running along the bearing, through which the oil passes from the oil-holes to the bearing, so that the bearing is kept properly oiled without the bearing coming in contact with the material by which the oil is held.

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The presser-foot *e* is carried by the presser-bar 25, mounted to slide in bearings in the end of the arm C, as usual in such constructions, and guide-bar 26 is mounted parallel with the presser-bar 25 to move therewith, and this bar 26 is provided with a hole 4, through which is passed a screw 27, which screws into the spring-holding collar 28 on the presser-bar 25, by which the presser-foot spring 29 is held under proper tension. The guide-bar 26 is provided also with a series of holes 8 for receiving a pin 9, which is engaged by a presser-lifter arranged at the front of the machine and in convenient reach of the operator while handling the goods, so that without removing the hands from the goods the presser-lifter may be operated to raise the presser-foot by the thumb or one of the fingers. This presser-lifter consists, in the form shown, of a lever 30, pivoted on the end of the arm C, the front end of which is over the needle-plate in convenient position for the operator and the rear end of which takes under pin 9 in the guide-bar 26, so that by pressing down the front end of the lever 30 the rear end is raised and the guide-bar 26, presser-bar 25, and presser-foot *e* thus raised.

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The feed is shown as consisting of the usual four-motion feed-bar *f*, working through a slot 31 in the needle-plate *g*. This feed-bar *f* may be mounted and actuated in any suitable manner, but is shown as carried by bar 32, which is cam-actuated at its forward end

by the shaft S and connected at its rear end to the vertical crank-arm 33 on horizontal shaft 34, which is actuated from shaft S through eccentric 35, eccentric-rod 36, and crank-arm 37 on the end of shaft 34. The usual stationary and movable thread-guides 38 39 below the needle-plate are shown, the movable thread-guide 39 being actuated by any suitable means. No needle-guide is shown below the needle-plate; but it will be understood that any common form of needle-guide may be used, if desired.

The means for trimming the edges of the fabrics and guiding away the trimmed-off portions are as follows: I use stationary and movable cutters, the stationary cutter being provided as follows: The needle-plate *g* is formed with a slot 40, the opposite ends of which are concave, and I set down into this slot from the upper side of the plate a cutter-blade *h*, (shown in Fig. 12,) the opposite ends of which are concaved on the under side, so as to fit the concave portions of the slot. The blade *h* is held down in the slot, accurately positioned by the convex and concave portions, by any suitable clamping means; but preferably I employ a set-screw 5, screwed into the needle-plate, and the head of which overlaps the top of the cutter-blade. The movable knife coacting with the stationary knife *h* is shown in detail in Fig. 11 and consists of a shank portion 41, carrying the knife *i*, the shank portion 41 being secured to the end of an arm 42, carried by rock-shaft 43, which shaft is actuated from shaft S, through eccentric 44 and eccentric-rod 45, connected to crank-arm 46 on shaft 43. For adjusting the movable knife *i* relatively to the stationary knife *h* the shaft 43, carrying arm 42, is mounted to slide in its bearings and is spring-pressed away from the stationary knife by spring 47. An adjusting-screw 48 is provided for adjusting the position of the shaft 43 and of the movable knife relatively to the stationary knife and a thumb-screw 49 for locking the parts in their adjusted position.

Just in front of the needle and between it and the cutters *h i* is mounted the rag-guard *k*, which is curved toward the front of the machine, so that as the edges are trimmed by the knives *h i* the trimmed-off portions are guided away from the seam and directed toward the front of the machine, out of the way, by this rag-guard. This rag-guard *k*, which is shown in detail in Fig. 10, also carries the stitch-finger *l*, over which the stitches are formed.

The machine is shown as adapted for welting goods, such as the top of stockings, and for hemming other knit goods where a single cut edge is to be trimmed and folded over the previously-folded edge and united thereto by overseaming, and for this purpose special folding and guiding means are used, which in the preferred construction shown are formed on the stitch-finger and the presser-foot. It will be understood, however, that the ma-

chine shown is adapted also for other kinds of overseaming, it being necessary only to substitute a presser-foot and stitch-finger of suitable form for such other work in place of those illustrated.

The presser-foot and stitch-finger shown, with the folding-guides for welting and similar work, are novel, however, and in themselves form parts of the invention. In such welting and similar work the single cut edge is trimmed off about three thirty-seconds of an inch in width from the folded edge and just in advance of the folding and sewing. This single cut edge is then folded up so as to overlap slightly upon the previously-folded edge to which it is to be united, being held in this position by the stitch-finger and presser-foot while the stitches are formed over the stitch-finger, the fabrics passing from the stitch-finger with the folded-over cut edge stitched down and the seam completed. The guiding of the folded edge and the folding over of the cut edge upon it are secured in the construction shown by the flange 6 on the presser-foot, which holds and guides the folded edge in proper position, and by the folding-surfaces 7 of the presser-foot and of the stitch-finger, which on the stitch-finger consist of the little flange 7, extending downward below the stitch-finger, as shown clearly in Fig. 10. The operation is shown clearly in Fig. 14, which is a section taken just before the stitch is formed, *x* being the folded-over fabric, and *y* the cut-edge fabric, which is to be folded over upon the fabric *x* and stitched down.

No description of the operation of the machine is necessary, except possibly in connection with the looper, and this will be clear from a brief description in connection with the drawings, and especially Figs. 16 to 20. As shown in Fig. 16, the looper is at the end of its movement in one direction and is just about to move toward the needle for taking the needle-loop, the crank-stud 1 of the looper-crank being at the end of the raceway 21. It will be seen that in this position the point of the looper-blade *c* is directly opposite the needle-loop, so that movement in a substantially straight line will carry the looper-blade through the needle-loop and that only a short needle movement below the needle-plate is required on account of the axis of the looper being located but a short distance below the needle-plate. From the position shown in Fig. 16 the looper-bar F moves to the right, as illustrated in the drawings, thus carrying the looper, with its inclined axis and the inclined sleeve 19, toward the needle, and the form of the raceway 21 is such during the first part of this movement that the crank-pin 1 thereon is not actuated to rock the looper upward, but the looper-blade moves in a substantially horizontal line to enter the needle-loop, the position of the parts with the looper-blade *c* just entering the needle-loop being shown in Fig. 17, the needle *d* being substan-

tially stationary during this portion of the movement of the looper. From the position shown in Fig. 17 the needle rises, and the curved raceway 21 acts upon the crank-pin 1 as the looper-bar F continues its movement to the right, so as to rock the looper upward, and as the needle rises above the needle-plate the looper has passed through the needle-loop, so that the latter is at the heel of the looper, the parts being then in the position shown in Fig. 18, with the crank-pin 1 just entering the straight vertical portion of the raceway 21. The further movement of the looper-bar F to the right, with the crank-pin 1 held in the straight vertical portion of the raceway 21, now throws the looper quickly across the needle-path into position for the needle to pass through its loop in the downward movement of the needle. The position of the parts with the needle just about to enter the looper-loop is shown in Fig. 19, and this is the position of the looper illustrated in the general views and in Figs. 5 to 7. The looper-bar F has now completed its movement to the right and the return movement to the left begins, the first part of this movement returning the looper from across the path of the needle by a quick movement similar to that by which it crossed the needle-path, this quick movement of the looper occurring while the crank-pin 1 is held in the straight vertical portion of the raceway 21 and being completed just as the crank-pin passes out of this straight portion into the curved portion of the raceway. The parts are shown in Fig. 20 just after the completion of this quick movement with the needle *d* moving downward through the looper-loop. The movement of the parts from the position shown in Fig. 20 continues, with the looper-bar F moving to the left and the crank-pin 1 traveling in the curved and substantially straight portions of the raceway 21 until all the parts are returned to the position shown in Fig. 16, ready for another operation.

My improved looper and looper movement has been shown and described in connection with a two-thread machine; but it will be understood that the invention is applicable also in single-thread machines, the form of the looper being changed, as well understood in the art, so as to carry the needle-thread over to form the loop above the needle-plate and deliver it to the needle.

It will be seen that my invention provides a looper construction and movement by which a very short path for the needle and looper is possible and that the arrangement of the looper-axis and the means for operating the looper enable me to secure a very high rate of speed with great certainty of action and durability. It will be seen also that the other novel features of my machine are important in securing efficiency and enabling the attainment of higher rates of speed than in machines now in use.

It will be understood that my invention,

considered broadly, is not to be limited to a looper-carrier moving in a straight line, as shown, nor to the exact construction of other parts of the machine shown as the preferred embodiment of the various features of my invention, as modifications may be made in the form and arrangement of the devices illustrated without departing from the invention.

What I claim is—

1. The combination with a needle and a looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted in said carrier and positively-acting means for rocking the looper in both directions during the movement of the looper-carrier to take a loop from the needle and deliver a loop to the needle, substantially as described.
2. The combination with a needle and a looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted in said carrier and means for rocking said looper during the movement of the carrier to take a loop from the needle and deliver a loop to the needle and positively controlling the looper throughout its rocking movement in both directions, substantially as described.
3. The combination with a needle and a looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted on said carrier, a crank on the looper, and a cam-surface for actuating said crank to rock the looper during the movement of the carrier to take a loop from the needle and deliver a loop to the needle, substantially as described.
4. The combination with a needle and a looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted on said carrier, a crank for actuating said looper, and a cam-slot or raceway for actuating said crank to rock the looper in both directions to take a loop from the needle and deliver a loop to the needle, substantially as described.
5. The combination with a looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted on said carrier, and means for actuating said looper to move the looper-point in a substantially straight line at the beginning of its movement to enter the needle-loop and for rocking the looper with a quick motion in its plane of movement across the needle-path at the other end of its movement, substantially as described.
6. The combination with a reciprocating looper-carrier and means for moving said carrier substantially parallel with the cloth-plate, of a looper pivotally mounted on said carrier and means for actuating said looper with a substantially straight movement of the looper-point at the beginning of its movement to enter the needle-loop, in a curved path during the middle of its movement, and

with a quick movement across the needle-path at the end of its movement, substantially as described.

7. A pivoted looper having its axis moving
5 substantially parallel with the cloth-plate in combination with a cam-surface adapted to rock said looper with a substantially straight movement of the looper-point at the beginning of its movement to enter the needle-
10 loop and with a quick movement across the needle-path at the other end of its movement, substantially as described.

8. In a sewing-machine, the combination with a needle, of a pivoted looper having its
15 axis moving substantially parallel with the cloth-plate and inclined to the path of movement of the needle, and means for rocking said looper to take a loop from the needle and deliver a loop to the needle, substan-
20 tially as described.

9. In a sewing-machine, the combination with a needle, of a pivoted looper having its axis moving substantially parallel with the cloth-plate and inclined to the path of move-
25 ment of the needle, and positively-acting means for rocking the looper in both directions to take a loop from the needle and deliver a loop to the needle, substantially as described.

30 10. In a sewing-machine, the combination with a needle, of a pivoted looper having its axis moving substantially parallel with the cloth-plate and inclined to the path of movement of the needle and means for rocking
35 said looper during the movement of the carrier to take a loop from the needle and deliver a loop to the needle and positively controlling the looper throughout its rocking movement in both directions, substantially
40 as described.

11. In a sewing-machine, a pivoted looper having its axis moving substantially parallel with the cloth-plate and inclined to the path of movement of the needle and mounted with
45 its point approximately on the line of the movement of its axis at the beginning of its movement to take the needle-loop, substantially as described.

12. In a sewing-machine, a pivoted looper
50 having its axis moving substantially parallel with the cloth-plate and inclined to the path of movement of the needle and mounted to swing on said axis from a position in which the point of the looper is approximately on
55 the line of movement of the axis to a point on the opposite side of the needle-plate from the axis, substantially as described.

13. A pivoted looper having its axis moving substantially parallel with the cloth-plate
60 and mounted with its point approximately on the line of the movement of its axis at the beginning of its movement to take the needle-loop, in combination with positively-acting means for rocking the looper in both direc-
65 tions, substantially as described.

14. In a sewing-machine, the combination

with a needle, of a pivoted looper having its axis inclined to the path of movement of the needle and moving in a straight line substan-
tially parallel with the cloth-plate and means 70 for rocking said looper to take a loop from the needle and deliver a loop to the needle, substantially as described.

15. In a sewing-machine, the combination with a needle, of a pivoted looper having its
75 axis inclined to the plane of movement of the needle and moving in a straight line substantially parallel with the cloth-plate, and positively-acting means for rocking the looper in both directions to take a loop from the needle 80 and deliver a loop to the needle, substantially as described.

16. The combination with a needle and a looper-carrier mounted to move in a straight line substantially parallel with the cloth-plate 85 and means for moving said looper-carrier, of a looper pivotally mounted in said carrier, and means for rocking said looper during the movement of the carrier to take a loop from the needle and deliver a loop to the needle 90 and positively controlling the looper throughout its rocking movement in both directions, substantially as described.

17. The combination with a needle and a looper-carrier mounted to move in a straight 95 line substantially parallel with the cloth-plate and means for moving said looper-carrier, of a looper pivotally mounted in said carrier, and positively-acting means for rocking the looper in both directions during the move- 100 ment of the looper-carrier to take a loop from the needle and deliver a loop to the needle, substantially as described.

18. The combination with a needle and a looper-carrier mounted to move in a straight 105 line substantially parallel with the cloth-plate, of a looper pivotally mounted on said carrier, a crank for actuating said looper, and a cam-slot or raceway for actuating said crank to rock the looper in both directions to take a 110 loop from the needle and deliver a loop to the needle, substantially as described.

19. A pivoted looper having its axis moving substantially parallel with the cloth-plate and mounted to swing on said axis from a 115 position in which the point of the looper is approximately on the line of movement of the axis to a point at the opposite side of the cloth-plate from the axis, in combination with positively-acting means for rocking the looper 120 in both directions, substantially as described.

20. A pivoted looper having a movable axis inclined to the path of movement of the needle in combination with a crank on the looper-shank for actuating said looper to take a loop 125 from the needle and deliver a loop to the needle, and a cam-slot or raceway for actuating said crank, substantially as described.

21. A pivoted looper having a movable axis inclined to the path of movement of the needle 130 in combination with a crank on the looper-shank for actuating said looper, and a cam-

slot or raceway for actuating said crank, said cam-slot being formed in a race-plate positioned at right angles to the looper-axis, substantially as described.

5 22. The combination of a stitch-finger and a presser-foot, the adjacent surfaces of which form a folding device for folding the edge of the goods, substantially as described.

23. The combination with the sliding looper-
10 bar F, of the lever 16 for actuating said bar, and flexible connection-piece 18 between the looper-bar and lever formed of a plurality of plates, substantially as described.

24. The combination with reciprocating
15 looper-bar F carrying bearing-sleeve 19, of a looper having axis-shank *a* in said bearing, crank-sleeve 20 on said shank having crank-

pin 1 and raceway 21 for said pin, substantially as described.

25. The combination with reciprocating 20 looper-bar F carrying inclined bearing-sleeve 19, of a looper having inclined axis-shank *a* in said bearing, crank-sleeve 20 on said shank having crank-pin 1, an inclined race-plate 22 having raceway 21 for said pin, substantially 25 as described.

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

SATTERLEE ARNOLD.

Witnesses:

J. A. GRAVES,
T. F. KEHOE.