(No Model.) 11 Sheets—Sheet 1.

W. E. BENNETT.

MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

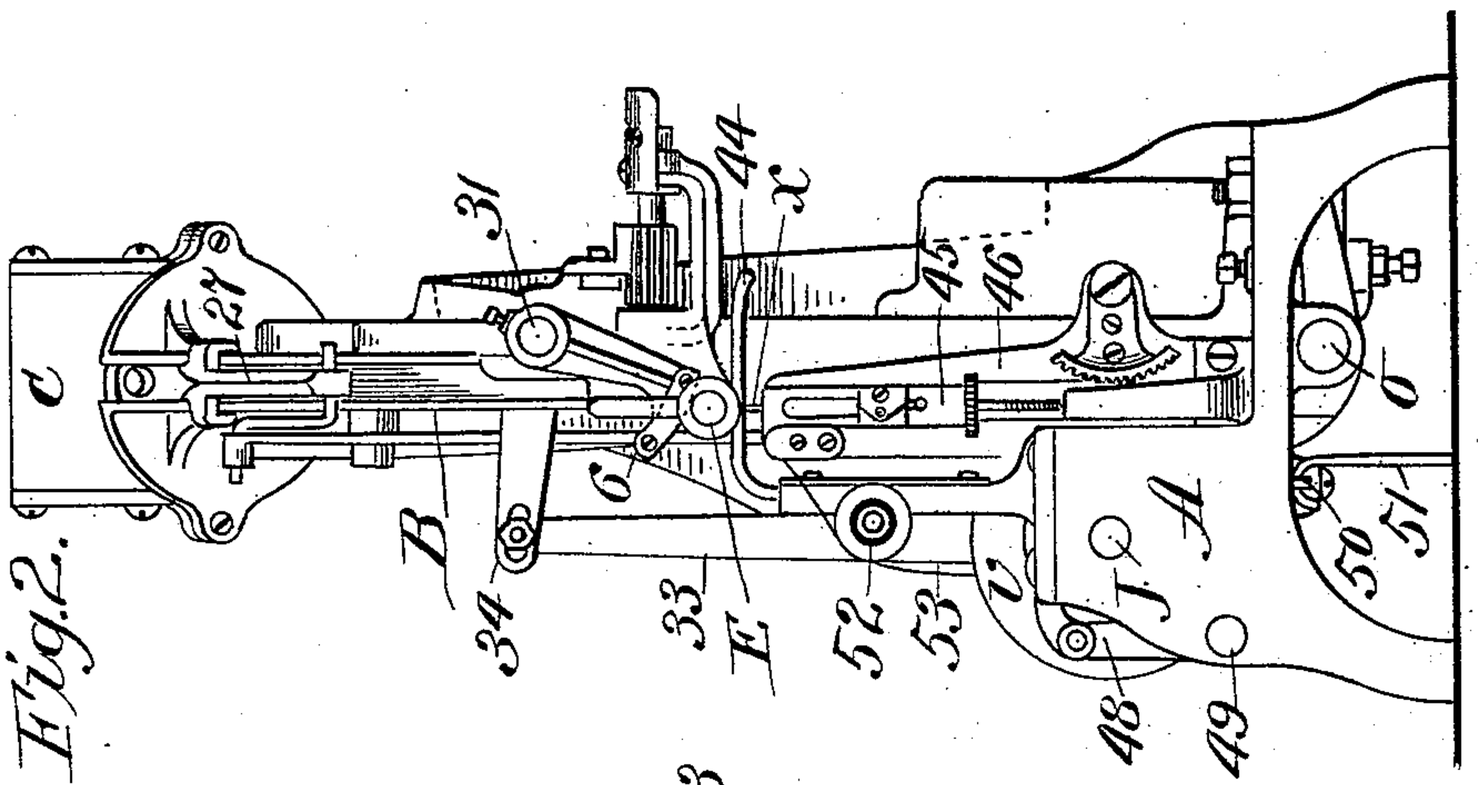

Fig. 2.

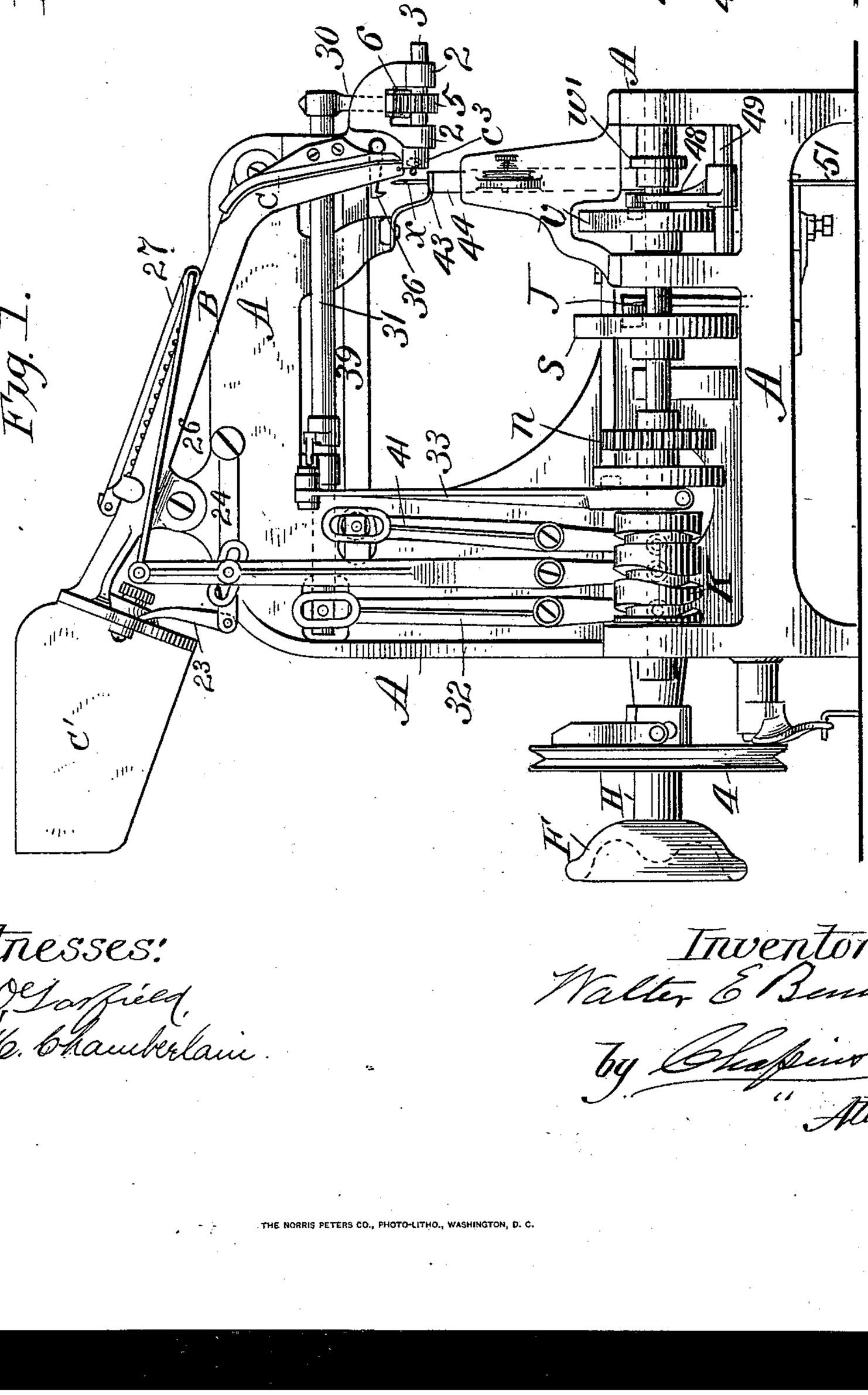

Fig. 1.

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(No Model.) 11 Sheets—Sheet 2.

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Fig. 4.

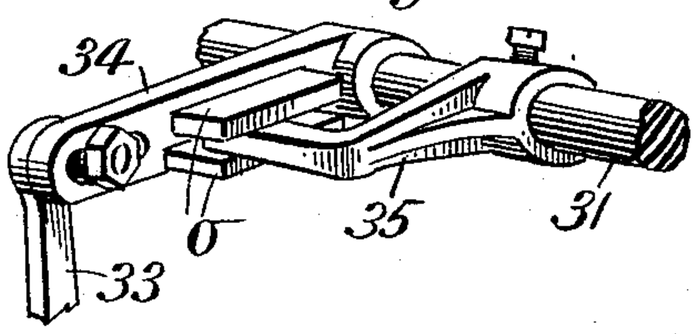

Fig. 3.

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(No Model.) 11 Sheets—Sheet 3.

W. E. BENNETT.

MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

Fig. 5.

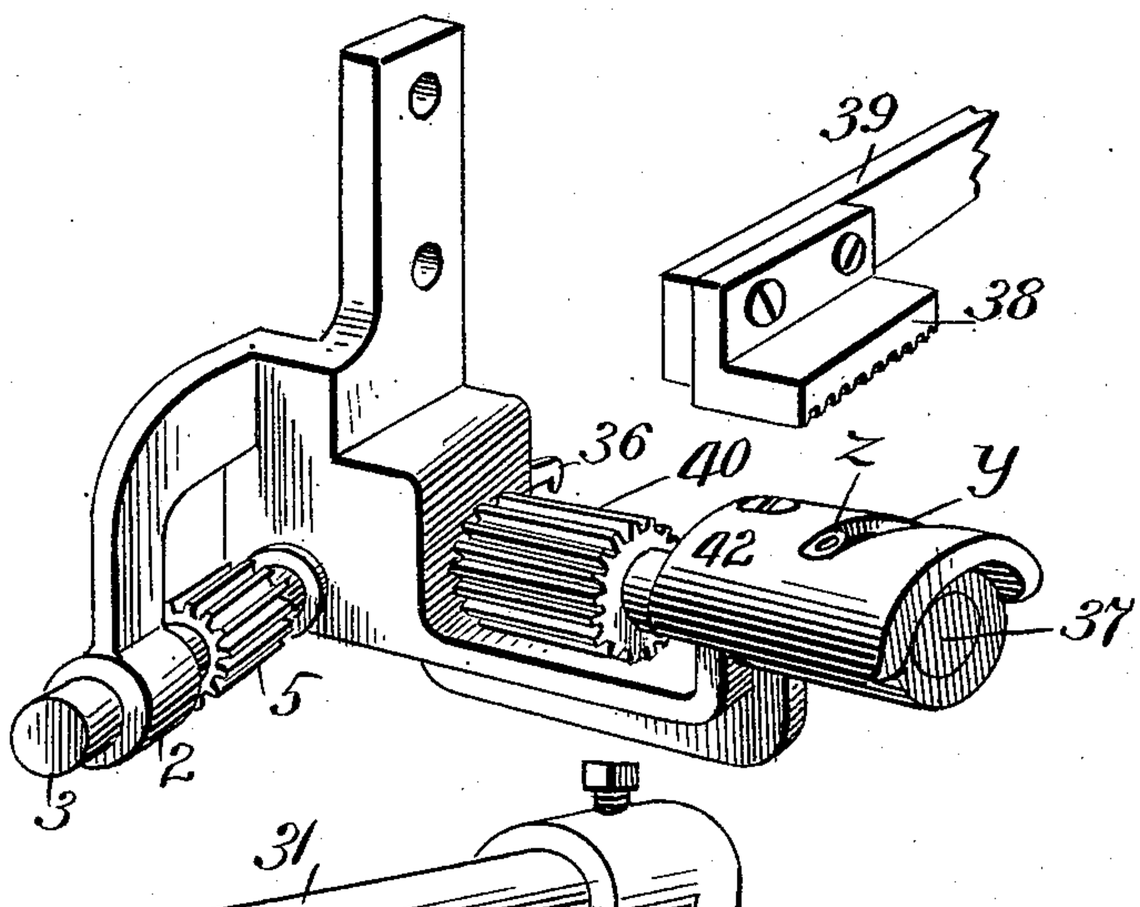
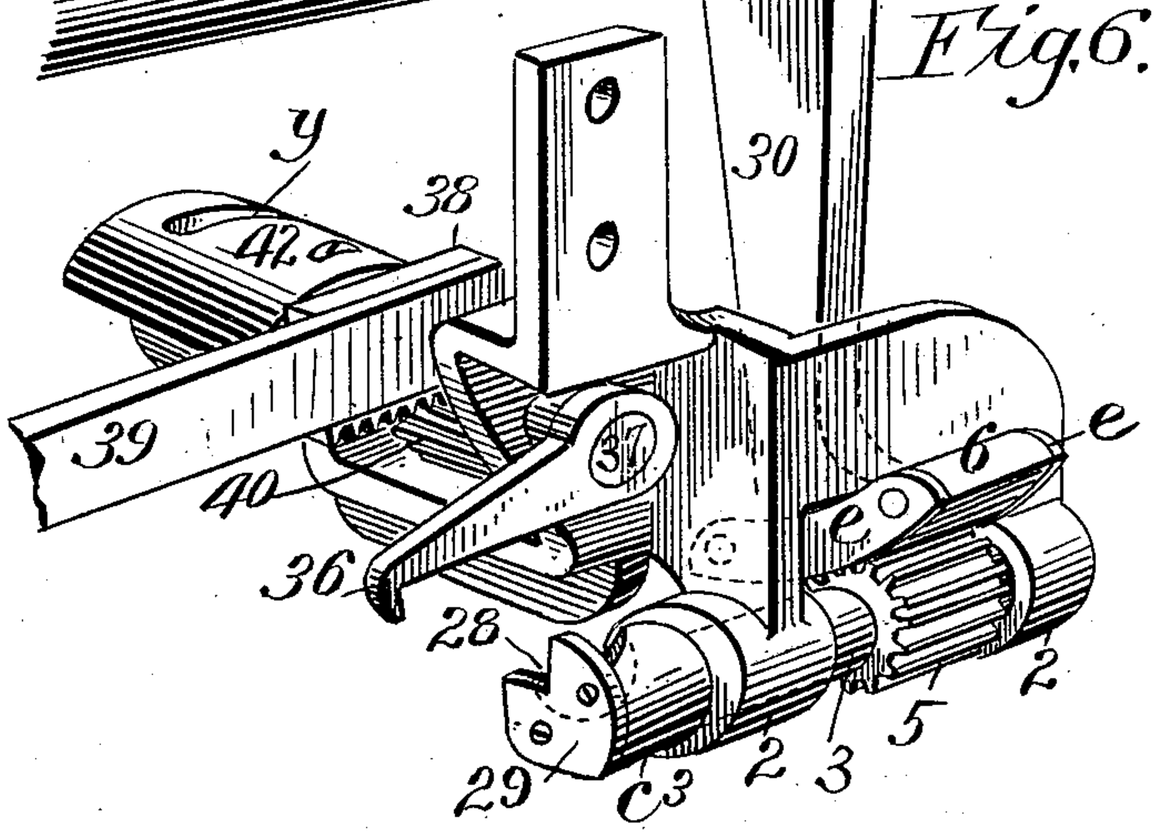


Fig. 6.



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MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

Fig. 7.

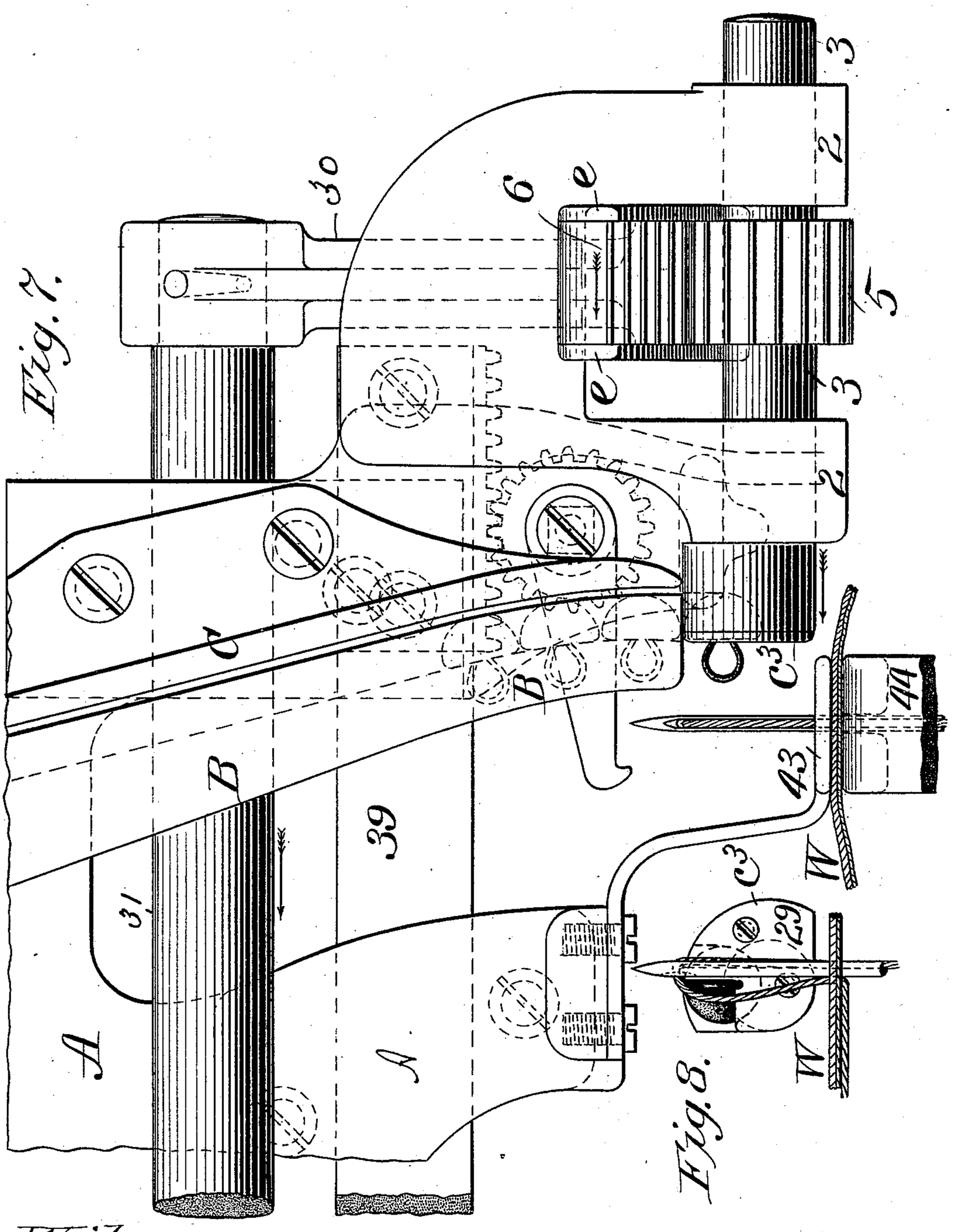

Fig. 8.

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(No Model.) 11 Sheets—Sheet 5.

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MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

Fig. 9.

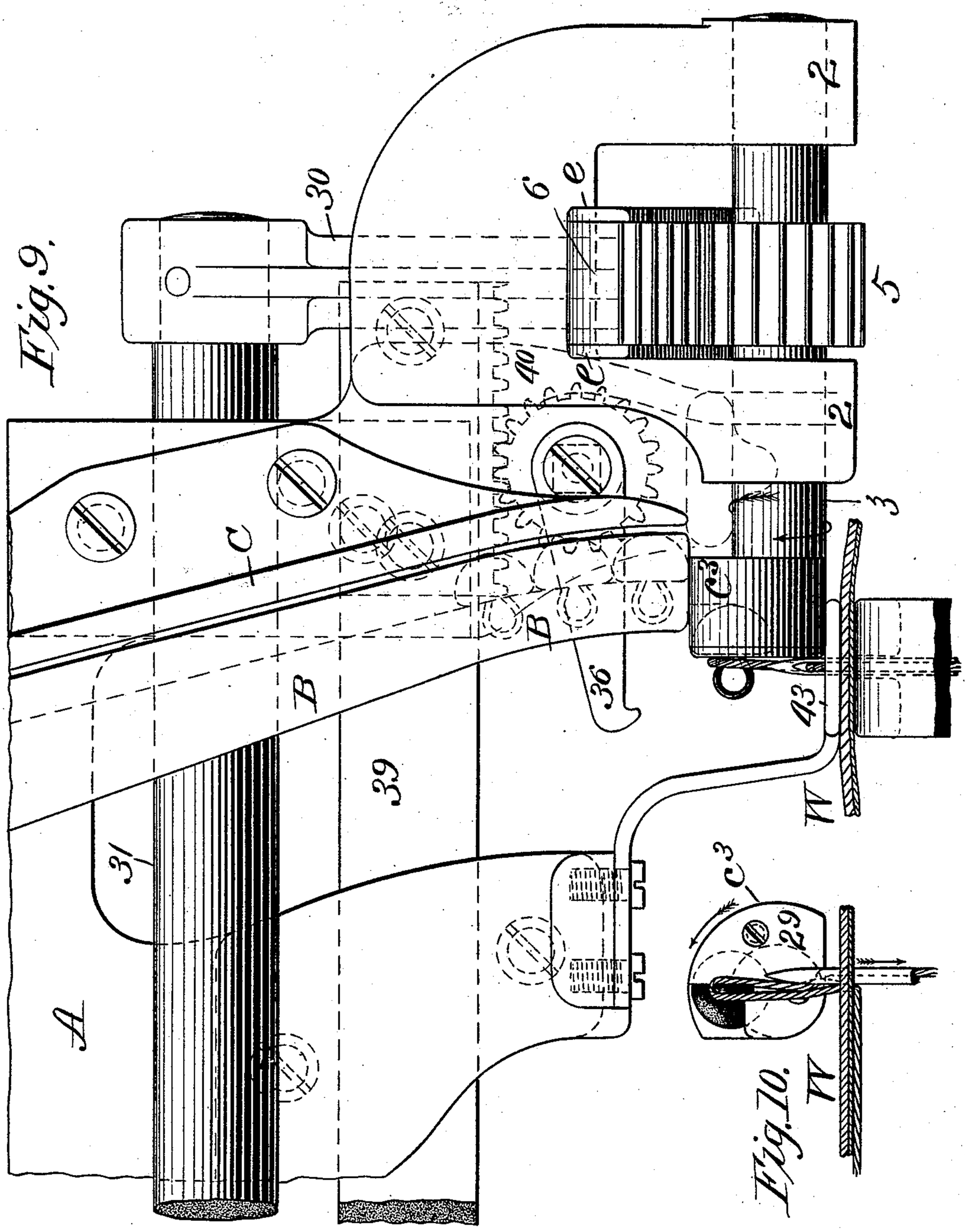

Fig. 10.

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MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

Fig. 11.

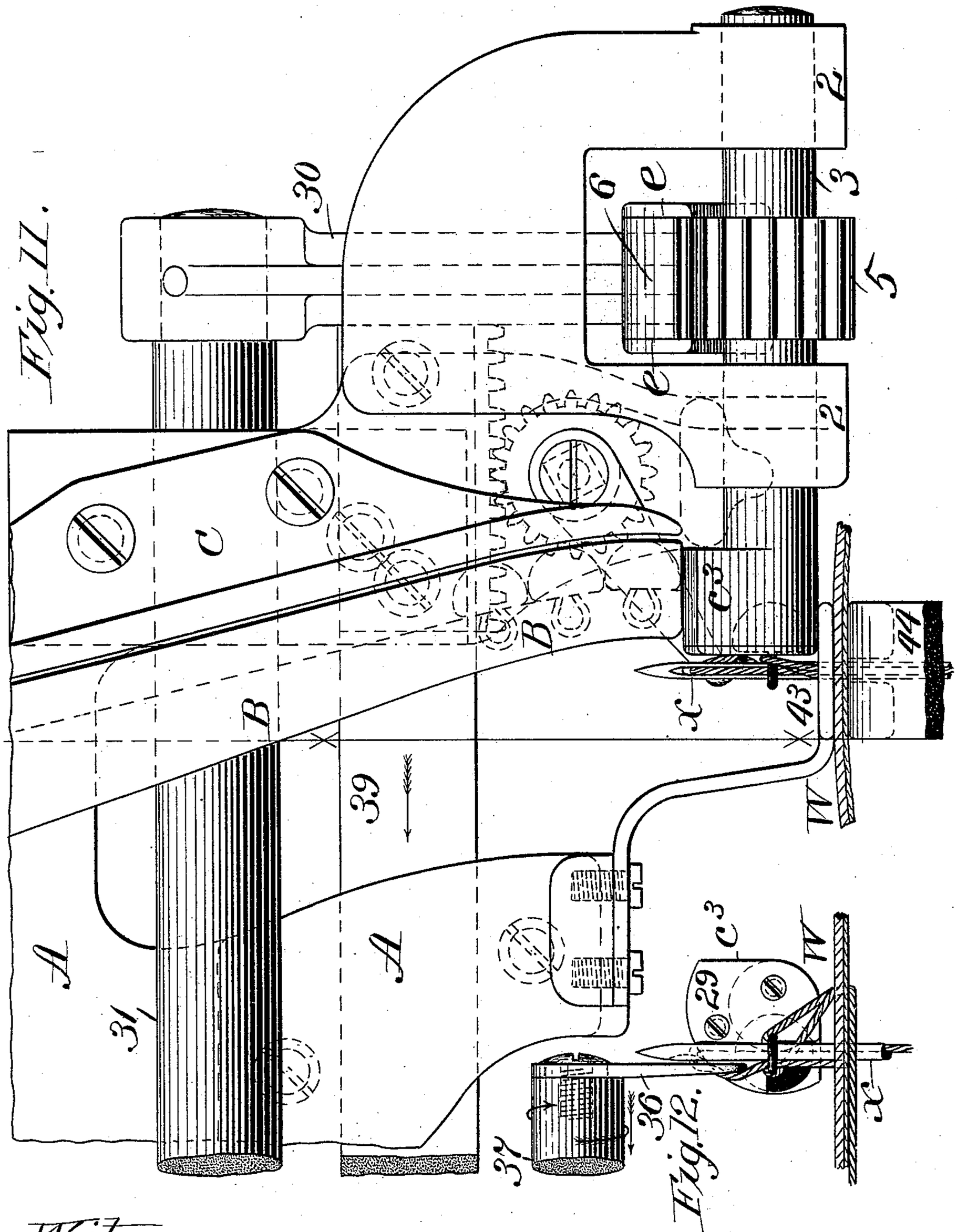

Fig. 12.

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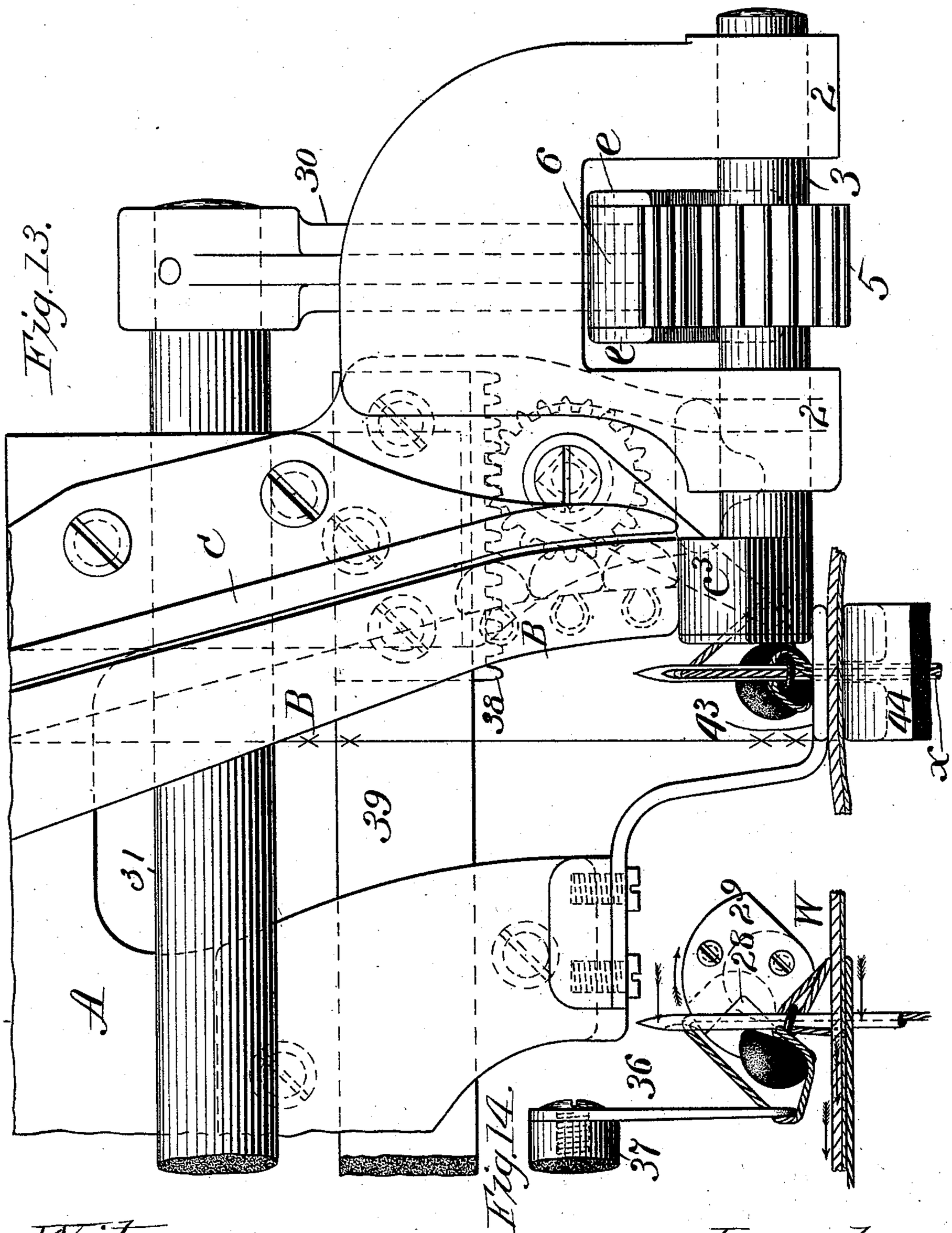

Fig. 13.

Fig. 14.

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(No Model.) 11 Sheets—Sheet 8.

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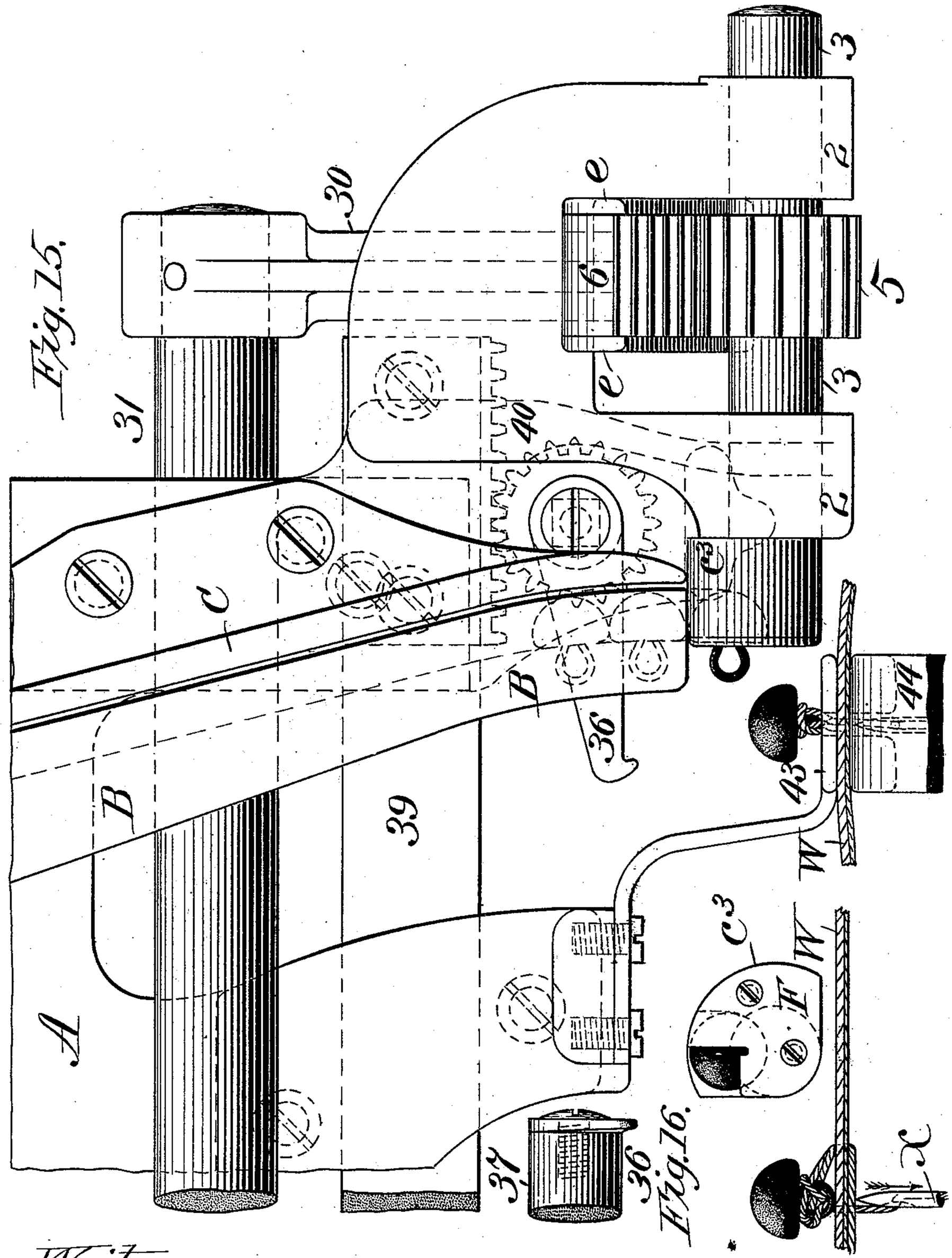

Fig. 15.

Fig. 16.

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W. E. BENNETT.

MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

Fig. 17.

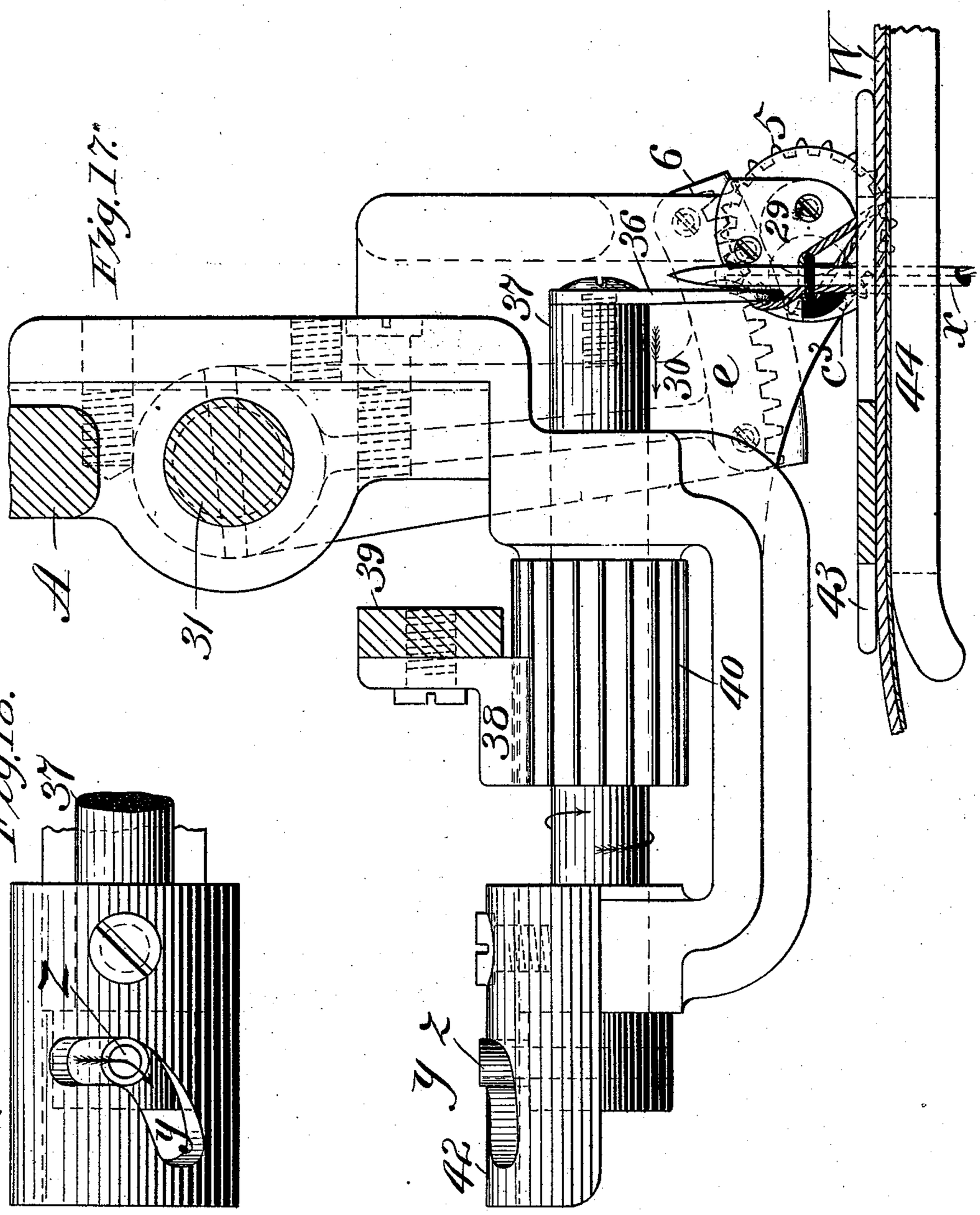

Fig. 18.

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(No Model.) 11 Sheets—Sheet 10.

W. E. BENNETT.

MACHINE FOR SEWING ON BUTTONS.

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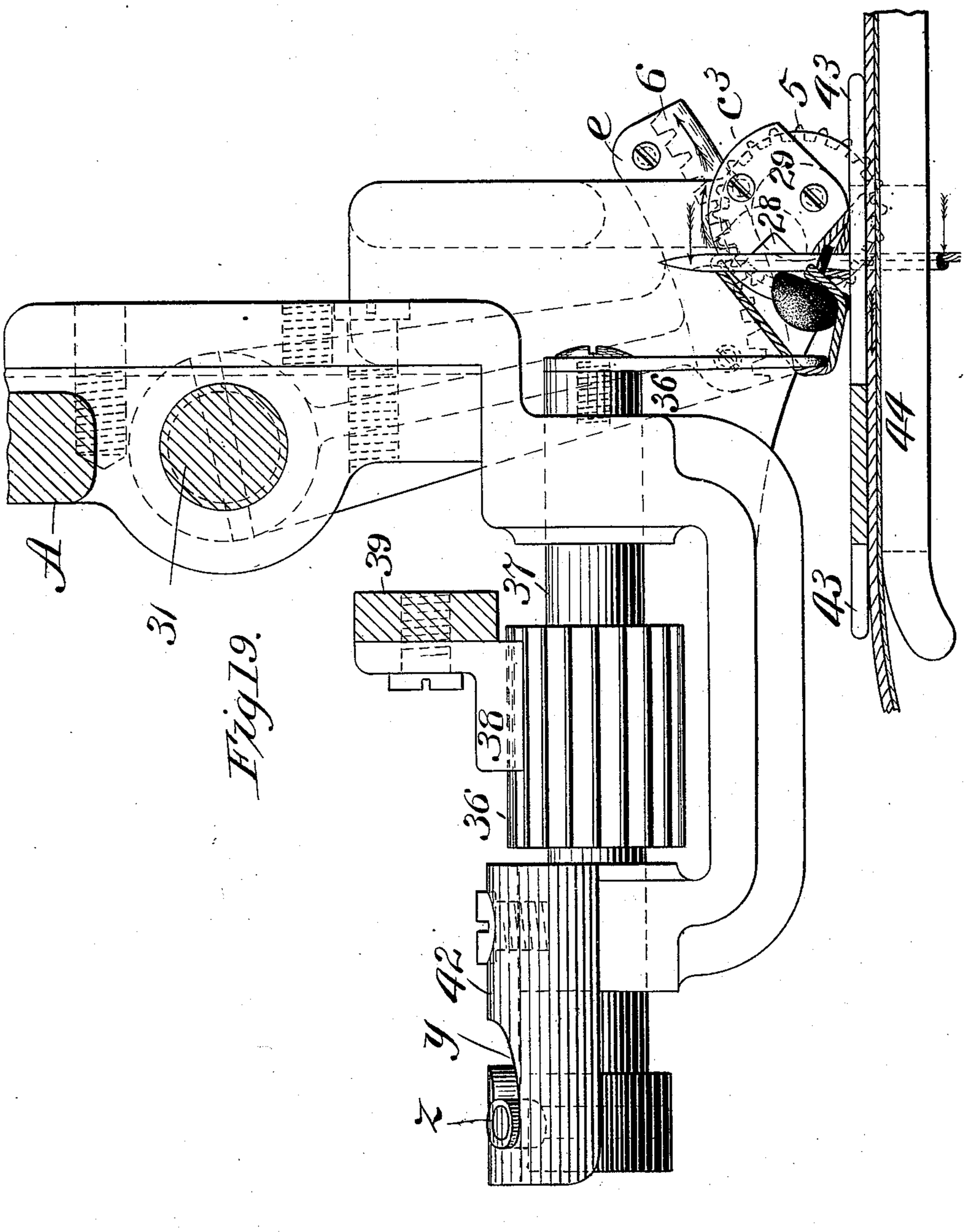

Fig 19.

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(No Model.) 11 Sheets—Sheet 11.

W. E. BENNETT.

MACHINE FOR SEWING ON BUTTONS.

No. 465,334. Patented Dec. 15, 1891.

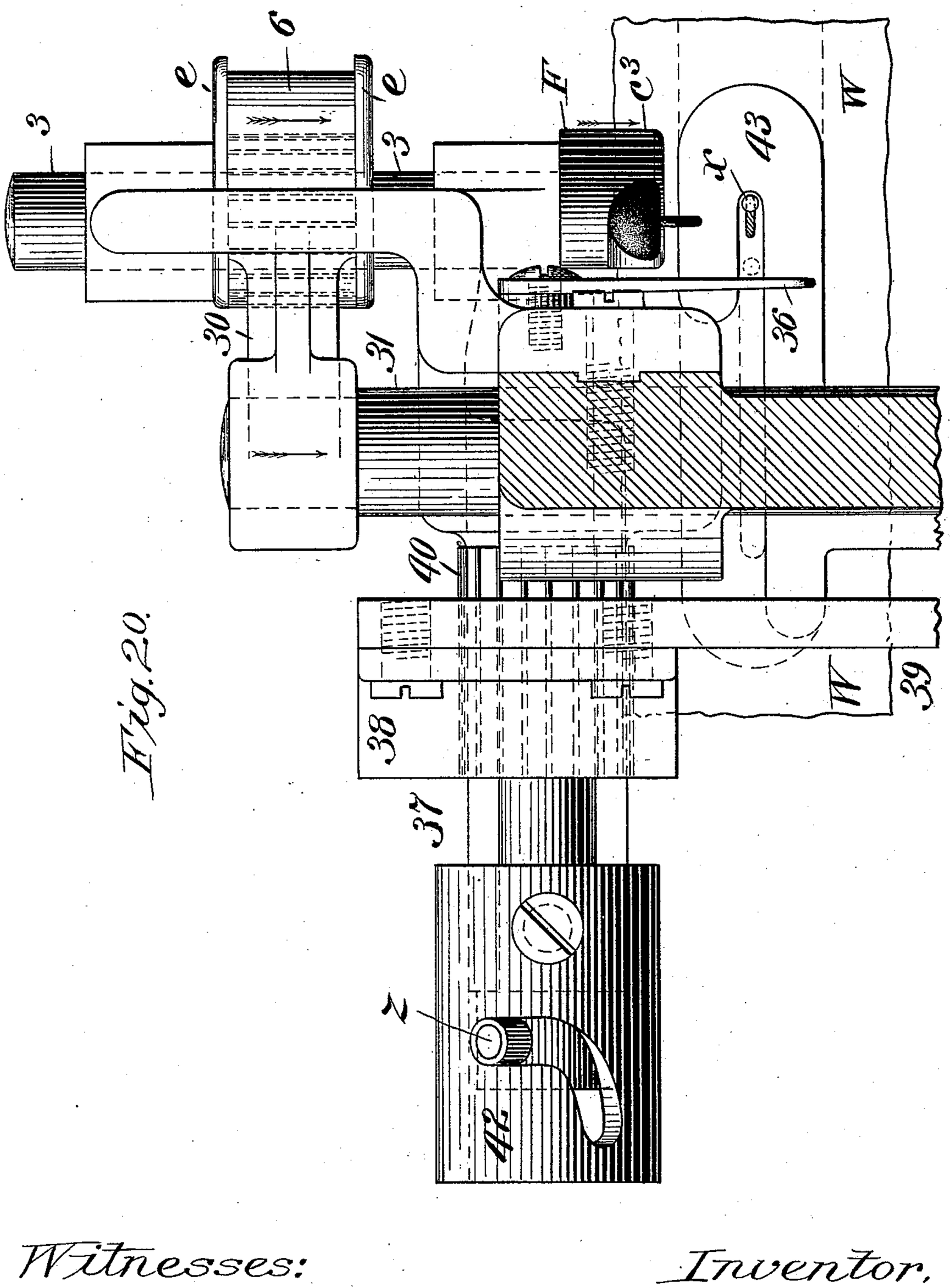

Fig. 20.

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G. M. Chamberlain.

Inventor.
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by Church & Church
Atty's.

UNITED STATES PATENT OFFICE.

WALTER E. BENNETT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE MORLEY BUTTON SEWING MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR SEWING ON BUTTONS.

SPECIFICATION forming part of Letters Patent No. 465,334, dated December 15, 1891.

Application filed January 28, 1891. Serial No. 379,398. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. BENNETT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Button-Sewing Machines, of which the following is a specification.

This invention relates to machines for sewing shank-buttons onto fabric, leather, &c., the object being to provide an improved machine of this class in respect to simplicity of construction and efficiency of operation in manipulating the button and the thread in attaching the former; and the invention consists in certain improvements in details of mechanism for accomplishing said object, all as hereinafter fully described, and more particularly pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation, and Fig. 2 is a front end view, of a machine for sewing shank-buttons to fabric constructed according to my invention. Fig. 3 is a perspective view of detail parts of the machine separated from the frame thereof; and Fig. 4 is a perspective view of portions of the mechanism shown in Fig. 3, all of which is fully described below. Figs. 5 and 6 are perspective views of portions of the operative mechanism of the machine separate from the frame thereof and are below fully described. Fig. 7 is a side elevation of the front end of the machine, showing the lower end of the button-trough, together with a portion of the mechanism for receiving and manipulating the button and forming the stitch. Fig. 8 is an end view of the button-holder, showing a button therein and a side elevation of the needle and of the thread-loop carried thereby, this figure and Fig. 7 showing the fabric in section. Fig. 9 is a similar view to Fig. 7, but showing the button-holder, the needle, and the thread-loop in different operative positions from those they occupy in the last-named figure. Fig. 10 is a similar view to Fig. 8, but showing the needle in a different position from that which it occupies, as shown in the last-named figure. Figs. 11, 13, and 15 are similar views to the aforesaid views, Figs. 7 and 9, but they severally illustrate different positions of the button, the needle, and the thread-loop in the operation of attaching the button to the fabric, all as hereinafter fully described. Figs. 12 and 14 illustrate the button-holder in end views, the needle in somewhat different positions, and different steps in the manipulation of the thread-loop and the loop-hook in relation to said loop, all as hereinafter described. Fig. 16 illustrates the loop-hook and a portion of its shaft, the end of the button-holder with a button therein, and a button attached to the fabric, together with the end of the needle. Fig. 17 is a sectional view on line *x x*, Fig. 11, with button-trough removed. Fig. 18 is a plan view of detail parts hereinafter described. Fig 19 is a sectional view on line *xx xx*, Fig. 13. Fig. 20 is a plan view, with the button-trough removed, of the mechanism illustrated in Fig. 17.

Heretofore it has been the practice in machines of this class to provide mechanism for holding the button so that its shank is held with one side against the material under or over the point of the needle, (sometimes also moving the button-shank under or over the needle-point,) and to operate the needle to cause it to first puncture said material either outside of or within the edge of said shank, and by well-known sewing mechanism to cause the button to be fully attached to the material, while the button is held as described, by sewing a stitch or stitches over the part of the button-shank surrounding the eye thereof, and securing the last loop in any suitable way.

The improvements herein set forth provide means for manipulating the button and its attaching-loops in an essentially different manner from those above referred to by primarily holding the button considerably above the material away from the needle and with the flat sides of its shank in vertical planes. The holder containing the button then moves endwise in a plane with the material, carrying the button toward the needle, and passes its shank between the needle and a loop carried thereby. The holder, then rocking, turns the button over to bring the sides of the shank to horizontal planes, and so holds the button momentarily and then moves back, letting the button escape therefrom. During said movements of the button-holder and but-

ton a primary loop is, by the needle, engaged on the button-shank close to the button, and a secondary loop is carried through the button-eye and opened by a loop-hook, and the button-head is made to pass through said opened loop by movements of the button-holder, loop-hook, and needle, as below set forth. The said secondary loop is, by the usual thread-tension and the final downward movement of the needle, drawn closely around the shank of the button and the primary loop thereon, thus completing the attachment of the button by such an improved disposition of said loops as results in an exceedingly strong and firm fastening. The line of thread on the under side of the material between the stitches so formed is a single one.

In the drawings, A indicates the frame of the machine having a horizontal base, an upright part at one end of the base, and an arm-like formation extending from the top of said upright part over said base. The driving-shaft H, having a driving-pinion *m* fixed thereon, is hung to rotate in suitable bearings in said frame, and has a clutch-driving pulley 4 thereon of ordinary construction. A hand-wheel F is fixed to the rear extremity of the driving-shaft, by which it may be turned by hand for certain adjustments of mechanism connected therewith. A cam-shaft J is hung in the machine to rotate at the side of said driving-shaft, and has fixed thereon a gear-wheel *n*, with which said pinion *m* engages, thereby giving shaft J the requisite rotary motion. The shaft J has fixed thereon a triple-grooved cam K and the cams 22 and *s* and *v*, these last three cams having cam-grooves in one side thereof for actuating parts below referred to, and a cam *w'* for imparting a vibratory motion to the needle-bar.

The mechanism above referred to for manipulating the buttons, whereby they are brought successively to the button-holder, the button-holder having the functions heretofore described, and the mechanism for operating said button-holder and the loop-hook above referred to, are constructed and arranged to operate as follows:

A button-hopper C' is fixed at the end of a button-trough B, and the latter is fixed in proper position on the upper part of the frame A, as shown in Fig. 1, the lower end of said trough having a cover C thereon to properly retain the buttons in position in the trough, as shown in Fig. 7, while they descend one after another to the lower end thereof, where they are delivered to the button-holder C^3. Said button-hopper at the upper end of the button-trough is constructed in any well-known way to receive a mass of shank-buttons and to deliver them into the said trough B, whereby they are conveyed to the button-holder, as aforesaid. The mechanism within said hopper C, which elevates the buttons, but which is not shown in the drawings, is operated by a pawl 23, which is pivoted by one end on the extremity of the arm 24, the latter being pivoted by one end on the frame A, (see Fig. 1,) and has a slot therein, as shown, with which a stud on a vertical lever 25 engages. The extreme upper end of this last-named lever is connected by a rod 26 with the lower end of a sliding button-turner 27, which lies on the upper side of the button-trough B and is given a reciprocating motion thereon by the vibratory motion of said lever 25. The purpose of said slide 27 is to turn over any buttons which may be passing thereunder with their shanks uppermost and cause the latter to take a position in the shank-slot of the button-trough such as they should occupy when the buttons shall arrive at the delivery end of the button-trough, which position is one which permits them to be taken by or received into a button-socket in the end of the button-holder, as shown in Fig. 16. The said lever 25 is pivoted near its lower end to the frame A, and has a stud thereon which engages with one of the grooves of said cam K on the shaft J, whereby said lever is given said vibratory motion, and said motion causes the arm 24 to have a vibratory motion vertically, thereby imparting the requisite reciprocatory motion to the pawl 23. Said button hopper, trough, and devices operating therewith to cause buttons to be delivered from the lower end of said trough are old and well known, and do not constitute the subject-matter of this application. The said button-holder consists of a shaft 3, having a head c^3 thereon, which constitutes the holder proper, of the form shown, which in cross-section is substantially that of a segment of a cylinder, the circumferential portion of which is adapted to have an oscillating movement under and close to the lower end of the button-trough from the position shown in Fig. 10 to that shown in Fig. 12 and back again, alternately shutting the button-trough against button egress and presenting its button-socket to receive a button. Said head c^3 has a button-socket in one side thereof, beneath its surface, to receive the head of one button only when the latter drops from the lower end of the button-trough B, and hence when said button is received and the holder turns under the end of the trough it serves as a gate to arrest the movement of the column of buttons above the lower one. (See Fig. 7.) The outer end of the head c^3 has applied thereto a plate 29, which partly covers the said button-socket at the outer end of said head, in the edge of which plate is formed a notch or opening 28, in which the shank of the button lies, as shown in Fig. 16, when the button drops into said button-socket. The said button-holder is hung in bearings 2 2 on the extremity of the arm of the frame A in a position at right angles to the movement of the needle of the machine, and has fixed thereon between said bearings a pinion 5. A geared segment 6 on the lower end of an arm 30 engages with said pinion 5. Said geared segment is given a vibratory motion by the connection of its arm

30 with a rock-shaft 31, and consequently said button-holder has a rocking movement imparted to it. The said geared segment 6 is caused to have an engagement with the ends of said pinion 5 by means of the plates *e* on the opposite edges of said segment, to the end that said segment may be employed for giving an endwise movement to the button-holder, as well as said rocking movement, and therefore said rock-shaft 31 has a slight reciprocating endwise movement given to it by means of the lever 32, which is pivoted to the frame of the machine and has a stud thereon engaging one of the grooves of the cam K, the upper end of said lever being slotted, as shown, and engaging with a friction-block on a stud *f*, which is fixed in said rock-shaft 31. The above-described connection of the lever 32 with the shaft 31 serves to impart the requisite endwise motion thereto, through which, by means of the segment 6, the button-holder is given a like movement, but permitting said shaft 31 to have sufficient rocking motion, through which the said segment 6 is given its said vibratory motion. The rocking motion of shaft 31 is imparted thereto by means of the cam 22 on the shaft J, a connecting-rod 33 having a stud therein which engages with a slot in said cam and has its upper end connected to the extremity of an arm 34, which is hung loosely on shaft 31, in order that said shaft may have its said endwise movement without interfering with the mechanism with which arm 34 is connected, and to provide for this free endwise movement of shaft 31 a connection between said shaft and arm 34 is made, as illustrated in Fig. 4. It is seen in this last-named figure that the arm 34 is made with two short ribs *o o* thereon, between which the extremity of a dog 35 enters, as shown, said dog, by its hub and a set-screw passing therethrough, being rigidly fixed to the shaft 31. Hence it is seen that said shaft, by means of the lever 32, may have a slight endwise movement within the hub of the arm 34, the extremity of said dog 35 sliding between the ribs *o o* during said endwise movement, it being understood that the width of said ribs is such as to permit of the maximum endwise movement required of the shaft 31 without drawing the extremity of said dog from between said ribs *o o*. A loop-hook 36 is mounted on rock-shaft 27 and is rocked by said shaft into proximity with the button-holder shaft 3, and by means of other mechanism, below described, is caused to have movements toward and from the side of said button-holder. The mechanism for imparting a rocking motion to said loop-hook shaft 37 consists of a rack 38, attached to or integral with a horizontally-moving bar 39, having an engagement with a pinion 40, fixed on said shaft 37. The said rack-bar 39 is given a horizontally-reciprocating movement by means of a lever 41, which is pivoted to the frame A and has in its lower end a stud, which engages with one of the grooves of said cam K. The upper end of lever 41 is slotted and has an engagement with a friction-block on a stud *i* in said bar 39. The endwise movement of said loop-hook shaft 37, whereby said hook has a movement toward and from the side of said button-holder, is effected by means of a plate 42, fixed on the side of one of the bearings of said shaft 37, (see Figs. 5 and 6,) in which is a cam-slot *y*, and in said shaft 37 is fixed a stud *z*, which engages with said cam-slot, and therefore when said shaft 37 rocks in one direction it is caused to move endwise and draw the loop-hook from the side of said button-holder, and when rocked in the opposite direction the loop-hook is moved toward said holder. Said Figs. 5 and 6 illustrate in perspective views a supporting casting, which is rigidly secured to the extremity of the arm of the frame A, in which are provided the bearings and supports for the aforesaid button-holder and loop-hook shafts. Fig. 5 is a rear perspective view of said support and the parts attached thereto and of one end of said rack-bar and its rack 38; and Fig. 6 is a front perspective view of the parts shown in Fig. 5, and in addition thereto of the rock-shaft 31, the geared segment 6, and the arm connecting the same with said rock-shaft.

The usual cloth-plate of the machine 43 is rigidly secured by a pending arm, as shown in several of the figures, to a downhanging part of the arm of the machine, said cloth-plate being located, as usual, in such position as to provide for the passage of the needle *x* through a suitable perforation therein. Said cloth-plate is located directly over the presser-foot 44, and between the latter and the under side of the cloth-plate the material W is held, upon which the buttons are to be sewed, it being understood, of course, that the said opening, through which the needle passes in the cloth-plate, communicates with the usual slot in said plate, which permits of the feed of the material by the vibratory motions of the needle and the movement of the material with the buttons thereon under said plate to and away from one end thereof, as is usual in machines of this class. Said presser-foot, as is well known by persons skilled in the art of operating this class of machines, is also similarly perforated and slotted.

The needle *x*, employed for sewing in the machine herein described, is an ordinary sewing-machine needle having an eye through it near its point, in which the thread is continuously carried while the buttons are being sewed on. The employment of the above-described needle in this machine obviates the employment of a cast-off. The said needle is carried on the needle-bar 45, which needle-bar has the requisite reciprocating endwise movement in the needle-bar holder 46. Said needle-bar holder has a hub at its lower end and is fixed on the rock-shaft *o*, which shaft is hung in suitable bearings under the lower part of the frame A, as shown in Fig. 2. The shaft *o* has a rocking motion in one direction

by means of the cam *s*, which has a cam-slot in one face thereof with which a stud in the end of a lever 47 engages, which is fixed on said shaft *o*, whereby the lever is so rocked as to give the requisite backward throw to said needle-bar holder to bring the point of the needle to a suitable position under the material W, where the stitch is to be made. The forward throw of the needle-bar is effected by the action of the cam *w'*, (see Fig. 3,) fixed on said shaft J. The cam *v* imparts a vibratory motion to the lever 48, which lever is hung on a rock-shaft 49 and has one arm, as shown by dotted lines in Fig. 3, engaging with a groove in said cam and a second arm (partly shown in dotted lines) extending by the face of said cam and having an engagement with the needle-bar 45, whereby the latter is given said reciprocating endwise movement in the needle-bar holder.

The needle and presser-foot operating mechanism of this machine are substantially identical with those shown and described in my application for a patent filed November 8, 1890, Serial No. 370,821, and hence the corresponding devices of the machine herein shown and described do not constitute the subject-matter of this application nor of the claims thereof, and therefore such specific description of the construction of said mechanisms has not been given herein as is set forth in my said application, to which reference may be had for a more particular description thereof.

The presser-foot 44 has a leg 50, extending to the lower part of the machine, (see Fig. 2,) to which a rod 51 is hooked, which may be attached to any suitable foot-pedal, whereby the presser-foot (which is held up against the cloth-plate by any suitable spring) is drawn downward to permit of introducing work therebetween. This presser-foot, like that described in my said application, is automatically operated for releasing the work when the latter is fed along by the needle for the usual purposes.

An ordinary thread-tension device 52 is attached to the frame of the machine, around which the thread 53 passes on its way to the needle *x*.

The operation of my improvements in the within-described button-sewing machine is as follows: A quantity of shank-buttons is placed, as usual, in the button-hopper C, from which they descend through the trough B, taking their positions one after another therein, as shown by dotted lines in Fig. 7, the button-holder c^3 being at this stage of the operation in the position shown in Figs. 7 and 9 and the point of the needle being below the fabric W, the latter being placed between the presser-foot 44 and the cloth-plate 43, as shown in said last-named figures. The machine now being started, the needle pierces the fabric and takes a position relative to the adjoining end of the button-holder c^3, as shown in Fig. 7, carrying with it a loop of thread to its highest point of movement. The needle then dips or drops sufficiently to throw out said thread-loop away from the side of the needle, as shown in Fig. 8. The button-holder then moves up to the side of the needle and causes the button-shank, which is now held with its sides in vertical planes, as just received from the button-trough, (its button-socket being under the end of said trough when the needle came up,) to be inserted between the needle and said loop, as shown in said Fig. 8. The needle then moves downward, thus drawing said loop of thread over the upper edge of the button-shank, as shown in Figs. 9 and 10. While the needle is passing still farther downward and out of the fabric, the button-holder is turned back in the direction of the arrow in Fig. 10 a quarter of a revolution, and moves backward very slightly from the needle to keep the last-named or primary loop out of the way of the needle when it shall next rise through the fabric, thus bringing the button to a position over the fabric a little to one side of that which it occupied when the primary loop became engaged with the shank thereof, as shown in Fig. 10, said movement of the button bringing it to the position over the fabric shown in Fig. 12 and with the sides of its shank parallel with the face of the fabric, the primary loop still being engaged around the shank of the button. The needle then reascends, piercing the fabric directly under the eye of the button-shank, and passes up through the latter, as shown in Fig. 12, bringing with it the secondary thread-loop. The needle now dips or drops slightly, thus throwing out said loop slightly from its side above the button-shank. The loop-hook 36 then swings from the position shown in Fig. 9 to that shown in Figs 11 and 12 and engages said secondary loop, as there shown, then moving bodily away from the side of said holder in the direction of the straight arrow in Fig. 12 and swinging backward at the rear side of the button-holder and carrying the loop with which it is engaged and causing it to be opened, as shown in Figs. 13, 14, and 19. After said engagement of the loop-hook with the secondary loop the button-holder begins to turn back (see arrow pointing to the right in Fig. 19) to its first position, thereby causing the button-head to be ejected from the button-socket in the holder and through said opened loop, while the shank of the button is pivoted on the needle, as shown in said last-named figure. At this stage in the operation the fabric is fed backward some distance by the needle to space the next button to be sewed on. The needle then moves down, and by the aid of the thread-tension 52 draws the secondary loop tightly around the button-shank and the primary loop thereon, thus completing the stitch, as shown in Figs. 15 and 16. The button-holder has meanwhile moved back to its first position (see Fig. 15) to receive another button from the trough, after which the operations are repeated, as described. The appearance

of the loops or stitches as finally engaged with the shank of the button above the fabric is illustrated in Figs. 15 and 16, and under each button beneath the fabric will be found three parallel threads and a single line of thread between each button.

What I claim as my invention is—

1. In a machine for sewing shank-buttons to fabrics, a button-holder of cylindrical form having a side recess to receive the head of a button and an end opening through which the button-shank projects, a needle having its path of reciprocation in proximity to said projecting shank, and a loop-hook mounted on a rock-shaft in proximity to said needle, said loop-hook and shaft having an oscillating and endwise-reciprocating movement, and means for actuating the moving parts, in combination substantially as described.

2. In combination, in a machine for sewing shank-buttons to fabric, a button-trough, a button-holder of cylindrical form having a socket therein below its surface to receive the head only of a button and an opening in its end adjoining said socket through which the shank of the button held therein protrudes in the direction of the axis of the holder, a pinion 5, fixed on the shaft of said holder, sewing mechanism, a rocking and an endwise-moving shaft 31, an arm 30, secured on said rock-shaft, having a geared segment thereon engaging with the face and ends of said pinion, and mechanism, substantially as described, for actuating said shaft 31, substantially as set forth.

3. In a machine for sewing shank-buttons to fabric, the button-trough, the button-carrier having a cylindrical side and having a socket of capacity to receive the button-head and an end opening from which the shank protrudes, said carrier forming the gate to the trough, means for rocking and for longitudinally reciprocating said carrier, and means for attaching the button to a fabric, in combination substantially as described.

4. The button-trough, the button-carrier having a cylindrical side and having a button-socket and a rigid end piece with an opening from which the button-shank protrudes, said carrier forming a gate to the trough, the pinion attached to said button-carrier, a geared segment engaging said pinion to rock the button-carrier and having end plates at the end of said pinion, and means for rocking and longitudinally reciprocating said geared segment, and thereby the button-carrier, in combination substantially as described.

WALTER E. BENNETT.

Witnesses:
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H. A. CHAPIN.