

(Model.)

9 Sheets—Sheet 1.

W. E. BENNETT.
MACHINE FOR SEWING ON BUTTONS.

No. 465,333.

Patented Dec. 15, 1891.

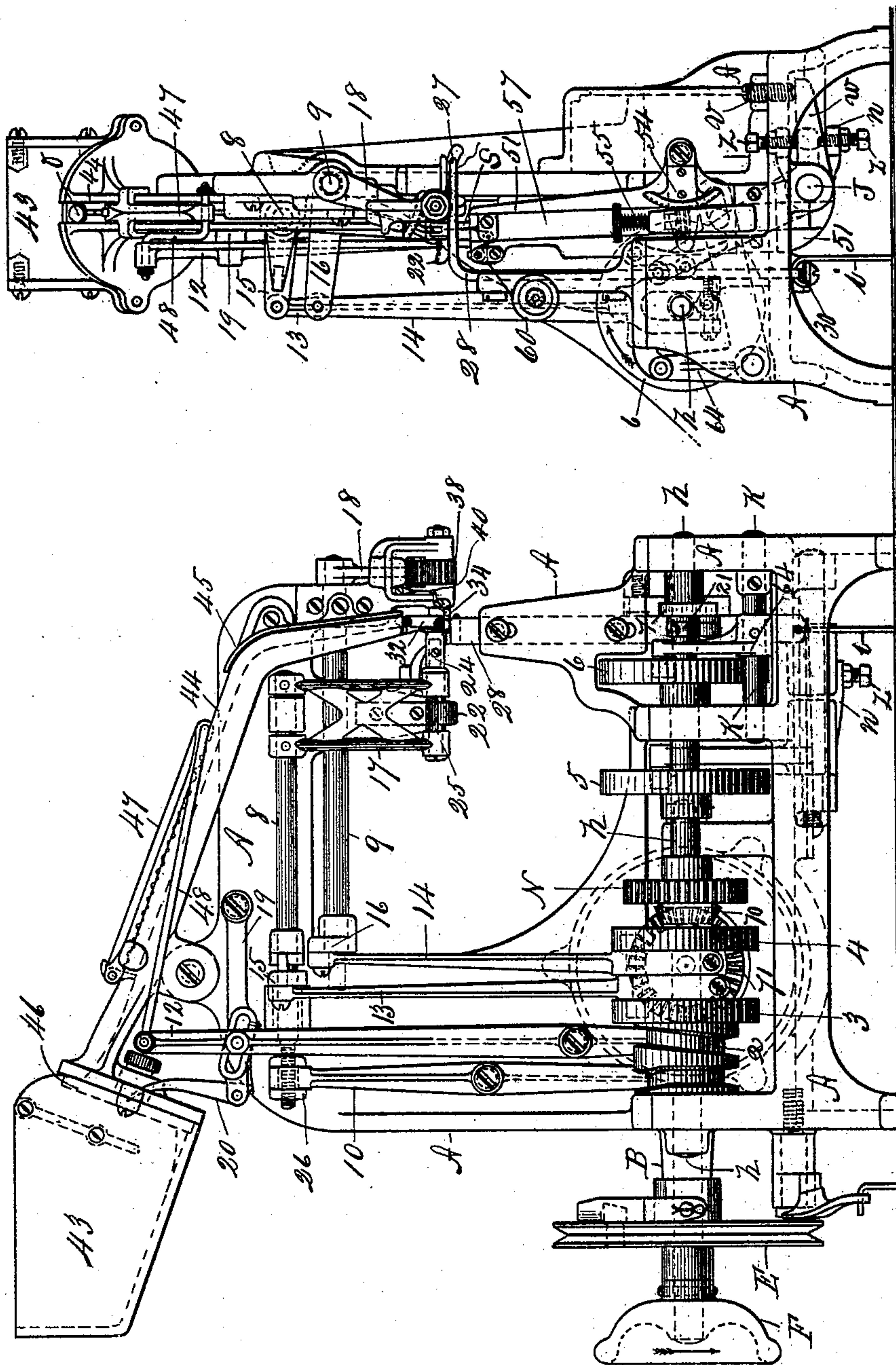


Fig. 2.

Fig. 1.

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By *Chapin* Atty

(Model.)

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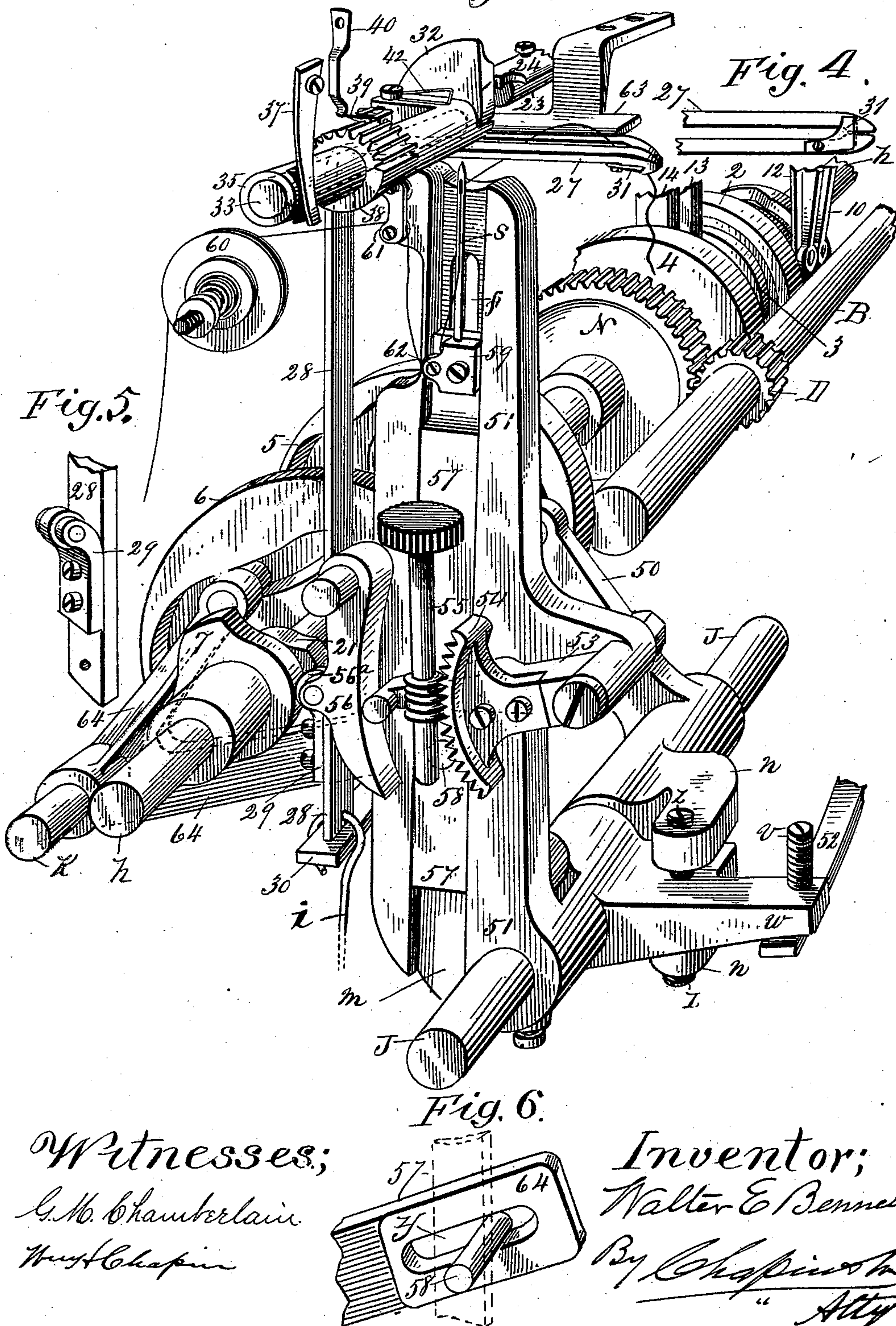
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Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.



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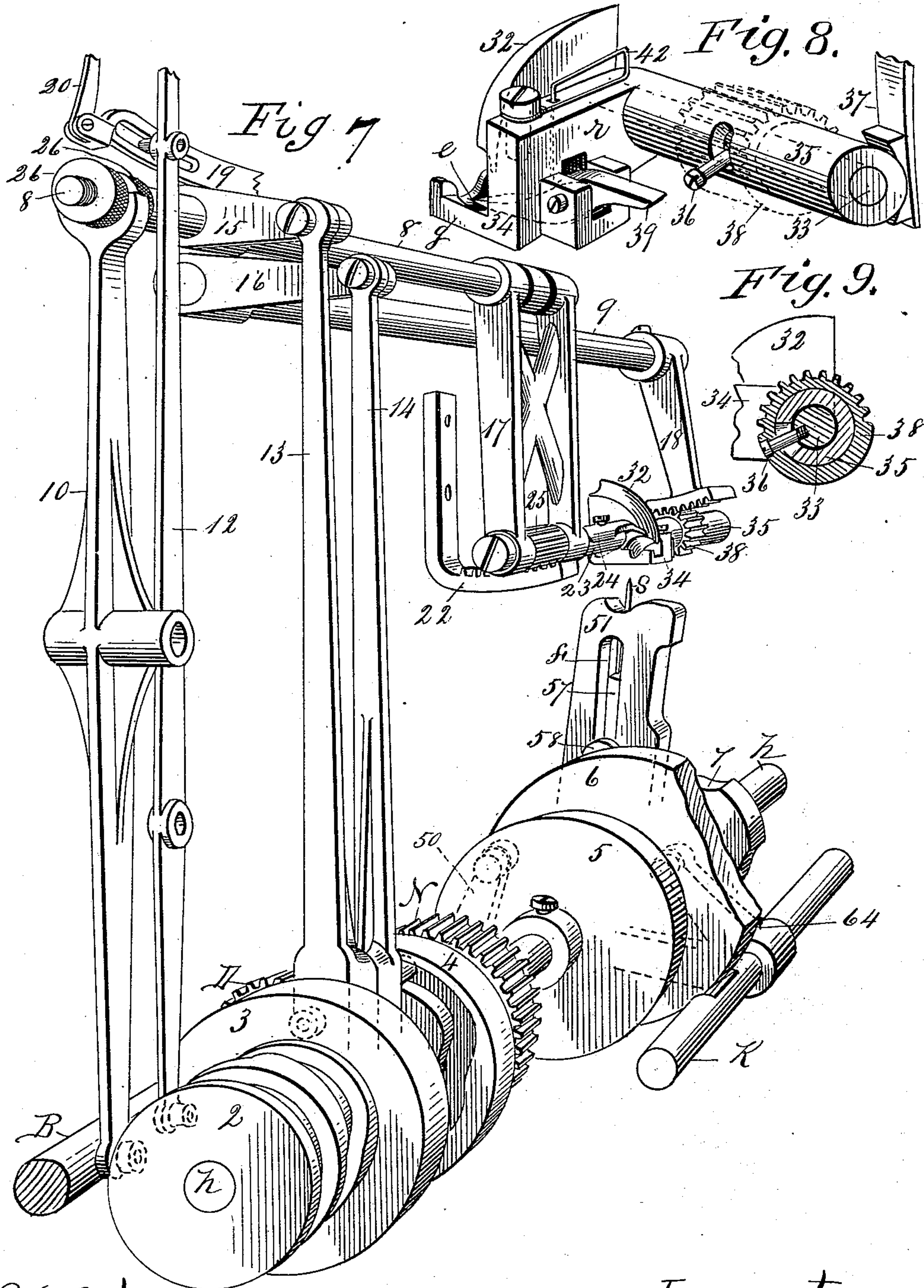
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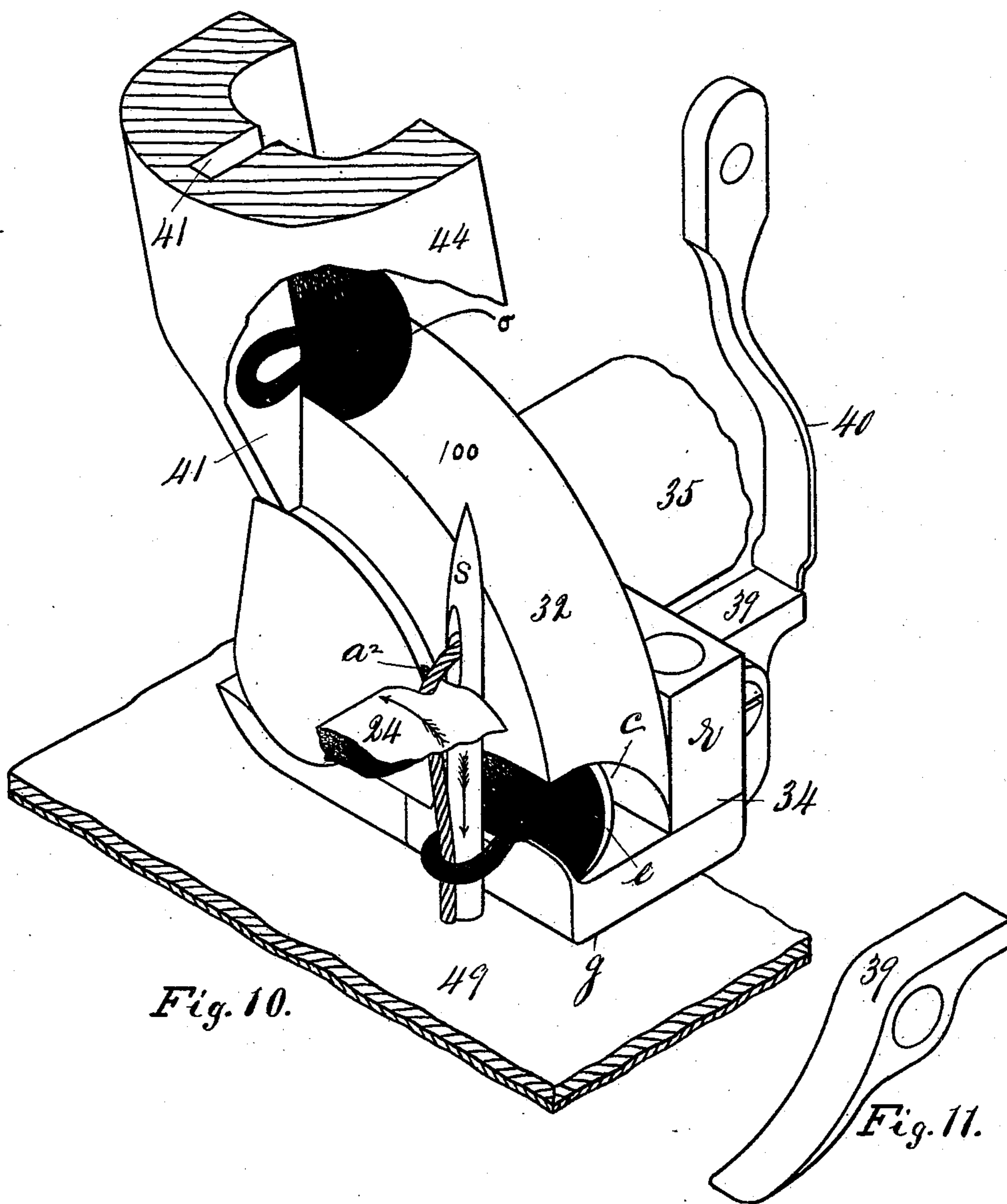
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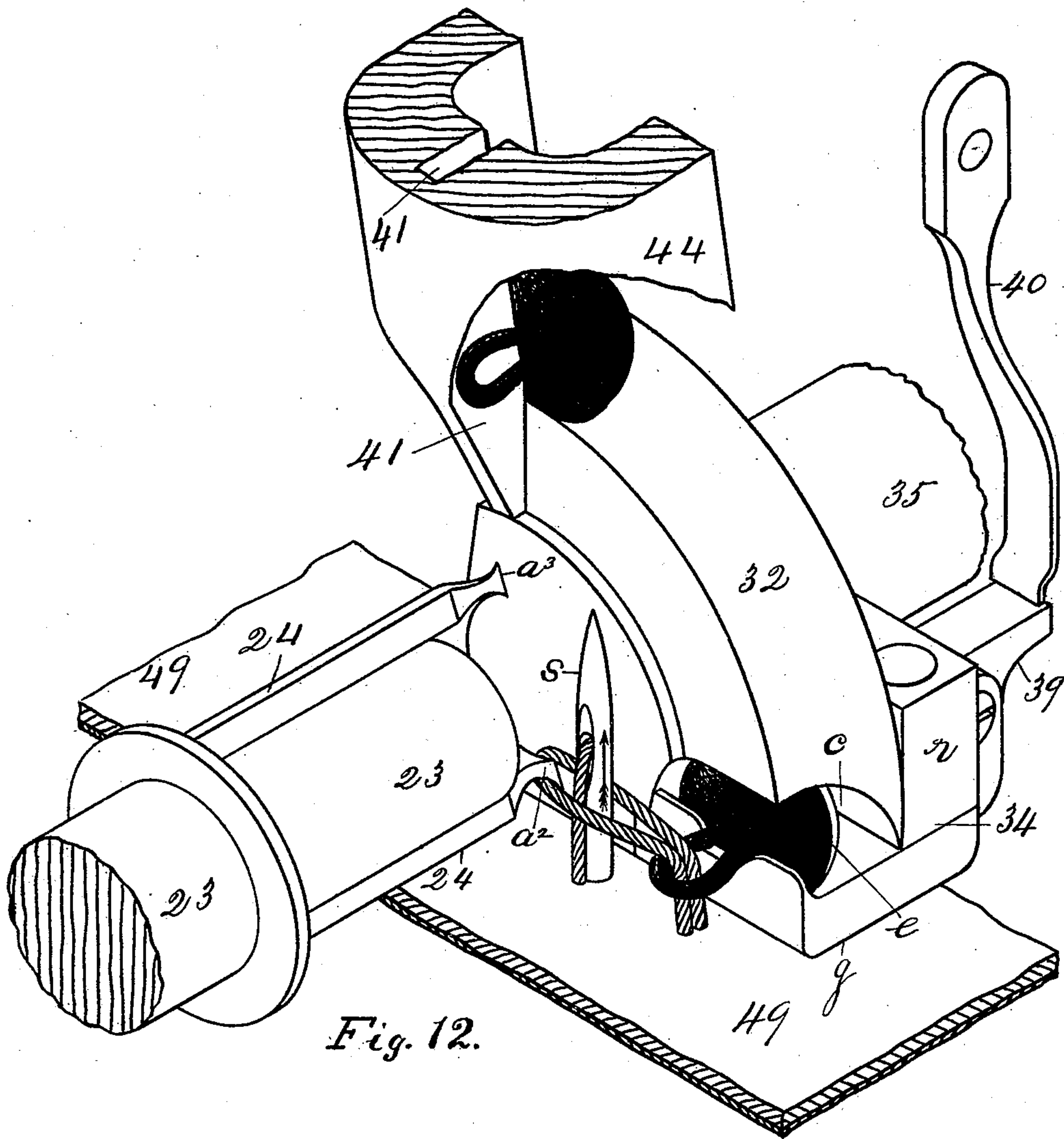
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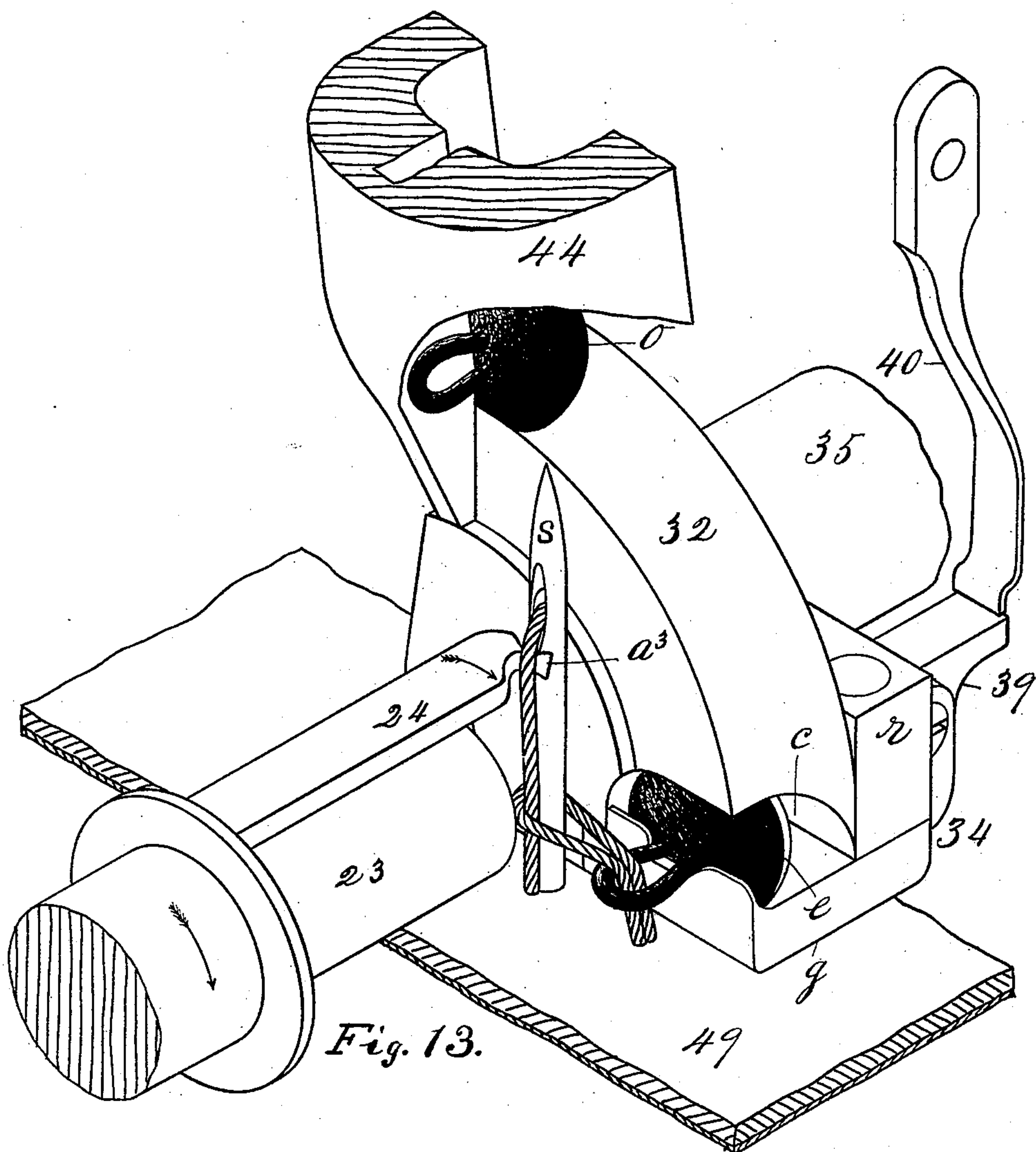
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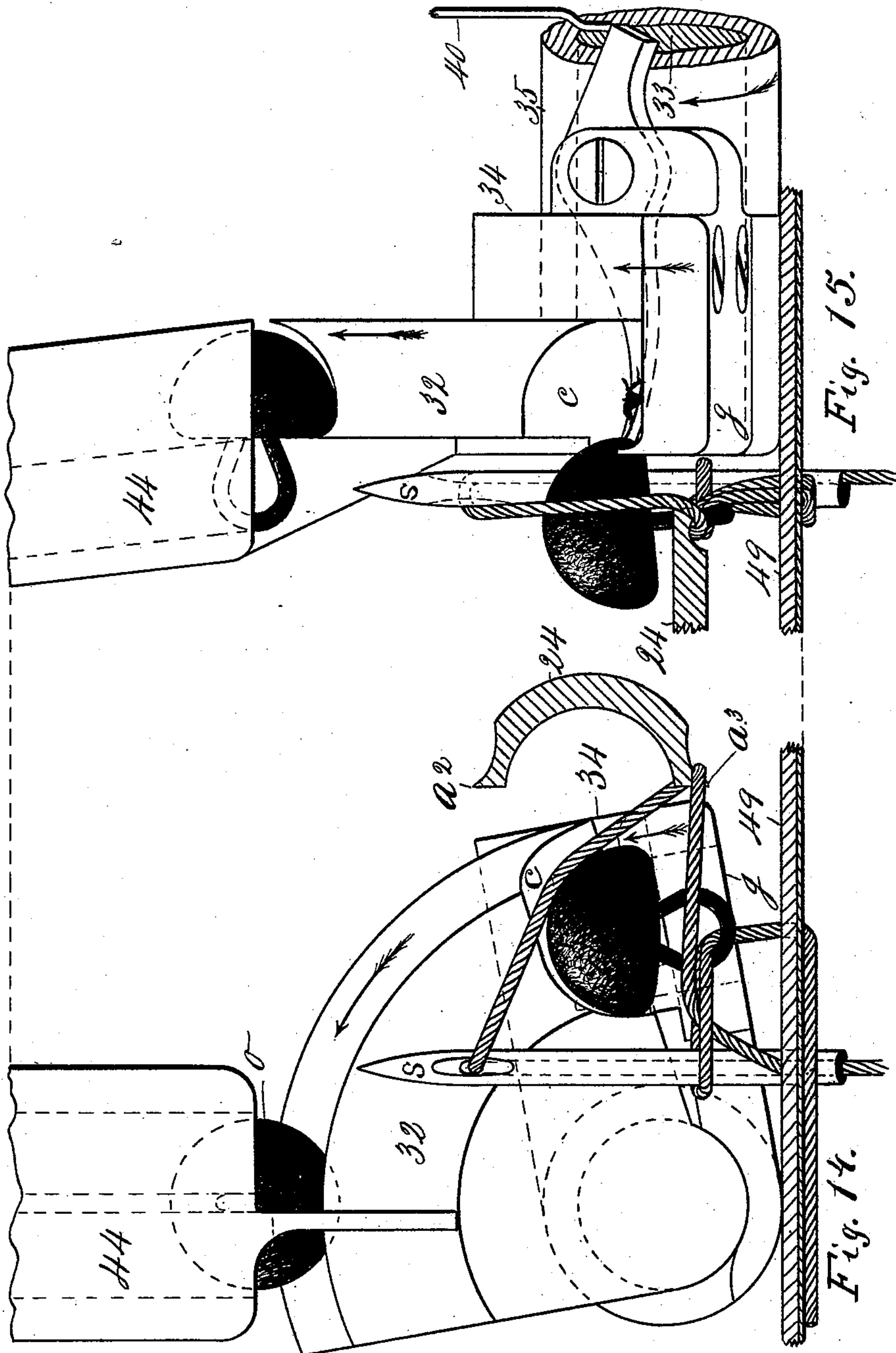
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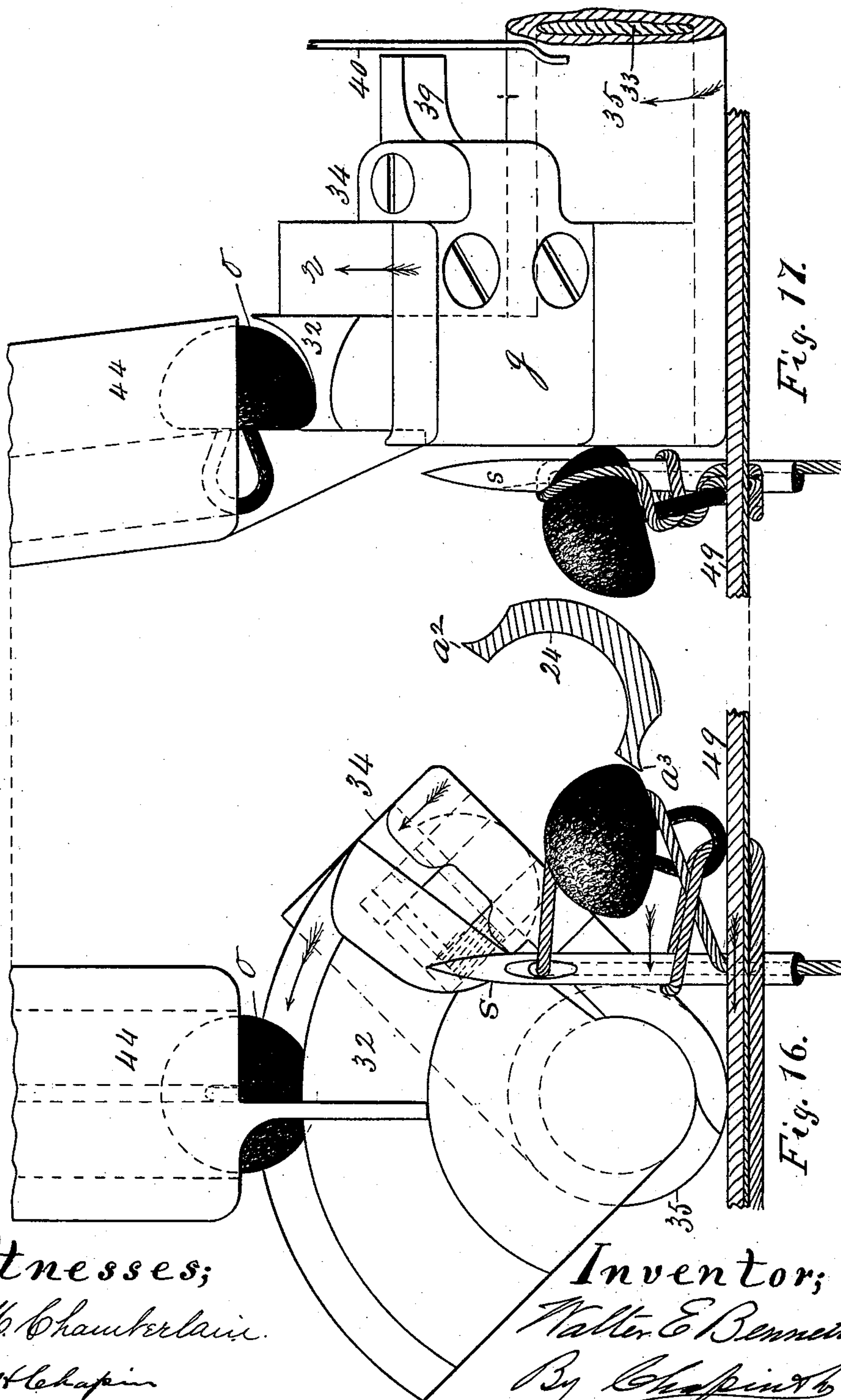
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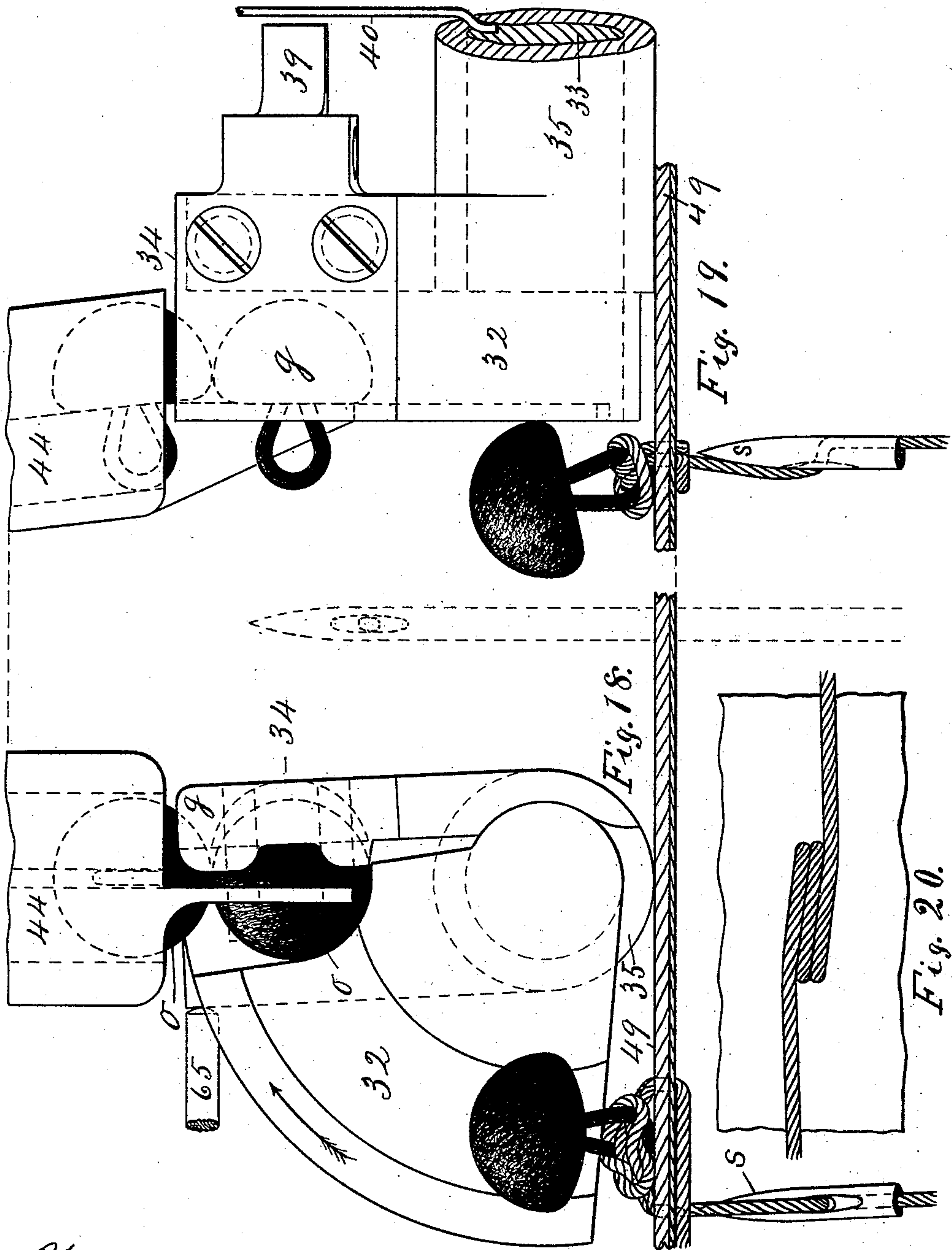
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UNITED STATES PATENT OFFICE.

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. 465,333, dated December 15, 1891.

Application filed November 8, 1890. Serial No. 370,821. (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 Machines for Sewing on Buttons, of which the following is a specification.

This invention relates to sewing-machines, and particularly to those which are adapted for sewing shank-buttons onto shoes and other objects; and it consists in certain improvements in means for manipulating the buttons, whereby they are brought to positions successively to be sewed on, and each button is subsequently passed through one of the loops of a stitch, and improvements in means for manipulating the loops of the stitches during the formation of the latter, and in the sewing mechanism, 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 front side elevation, and Fig. 2 a front end view, of a button-sewing machine embodying my invention. Fig. 3 is a perspective view of certain operative parts of the machine separated from the frame thereof, all of which are fully described below. Fig. 4 is a bottom plan view of the presser-foot, showing a thread-cutter thereon. Fig. 5 is a perspective view of the lower end of the leg of the presser-foot. Fig. 6 is a perspective view of the inner end of the needle-bar lever, illustrating its relation to a pin in the needle-bar. Fig. 7 is a perspective view of certain operative parts of the machine separated from the frame thereof, which are fully described below. Fig. 8 is a perspective view of the button-clamping finger, of the button-gate, and their supporting-shafts, and other details connected therewith, below described. Fig. 9 is a sectional view of the last-named shafts and a pinion on one thereof. Figs. 10 to 19, inclusive, are enlarged perspective views and side and end elevations of the stitch-forming and button-manipulating mechanisms, all of which are fully described below. Fig. 20 is a plan view of the under side of a piece of fabric, showing the positions

of the stitch-forming portions of the thread after a button shall have been sewed thereto.

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 B, having a driving-pinion D fixed thereon, is hung to rotate in suitable bearings in said frame, and has a clutch driving-pulley E 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 *h* 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 D engages, thereby giving shaft *h* the requisite rotary motion.

The shaft *h* has fixed thereon a series of cams, as follows: 2, 3, 4, 5, 6, 7, and 21, the purposes of which are described below. The mechanism above referred to for manipulating the buttons, whereby they are brought successively to positions to permit the needle to pass through the shank thereof in the process of sewing them onto articles, is constructed and arranged to operate as follows: A button-hopper 43 is fixed at the end of a button-trough 44, 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 plate-cover 45 thereon to properly retain the buttons in position in the trough while they descend one after another to the lower end thereof, where they are delivered to other devices, below described. Within the button-hopper, opposite the upper end of the button-trough, is placed a circular button feeding or lifting plate 46, having perforations therein for the reception of a button in each one thereof, which perforations register one after another with the upper end of the button-trough 44. Said plate 46 is indicated in dotted lines in Fig. 1, and is supported on the central stud to be rotated, and has on its inner face suitable ratchet-teeth in circular arrangement to be engaged by a pawl 20, whereby such rotation is effected.

Said pawl 20 is pivoted by one end on the end of the pawl-carrying arm 19, 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 12 engages. The extreme upper end of this last-named lever is connected by a rod 48 with the lower end of a sliding button-turner 47, which lies on the upper side of the button-trough 44, and is given a reciprocating motion thereon by the vibratory motion of said lever 12. The purpose of said slide 47 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 eye or shank-slot 41, (see Fig. 10,) so that when the buttons arrive at the delivery end of the slot they will occupy proper positions to permit them to be taken by other devices, below described, and brought one by one to a position which will permit the needle to pass through the eye of the shank. The said button hopper, trough, plate 46, and adjacent devices connected and operating therewith are old and well known and do not constitute any part of my invention. The said lever 12 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 2 on shaft *h*, whereby said lever is given its said vibratory motions.

A button-gate 32 of quadrant-like form (see Figs. 3, 8, and 10 to 19, inclusive) is fixed on the end of a shaft 33, and the latter is supported to have a reciprocating rotary or rocking motion within a hollow shaft 35, and the latter is supported in suitable bearings in the frame of the machine, whereby it may also have a reciprocating rotary or rocking motion. The edge of said button-gate 32 is suitably grooved, as shown at 100, to permit a portion of the border of the head of a button to enter more or less said groove when brought over the border of said gate at the end of the button-trough 44, as shown in Fig. 10, said button-gate having a rocking motion under the end of the button-trough from the positions shown in Fig. 10 to that shown in Fig. 18, and vice versa. In the position shown in said Fig. 10 the grooved border of the gate is so near the delivery end of the button-trough 44 as to prevent a button from escaping therefrom, and said button *o* can only leave the trough after the gate shall have been turned about one-quarter around to allow said button to drop between the front end of the gate and an opposite button-clamping device or finger 34, below described, said last-named position of the gate being shown in Fig. 18 and in Fig. 19, Fig. 18 showing a button in the position that it is received by said gate and finger 34, and the next lower button *o* in the trough resting upon the last-named one and being held in that position until the gate in its next movement in the direction of the arrow in Fig. 18 shall have the bottom of the groove in its periphery brought under the said button in the end of

the trough, while the one held by the gate and said finger is carried around to the position shown in Fig. 10. The end of the button-gate 32 opposite the inner side of the button clamp or finger 34 has a recess *c* therein to receive a portion of the head of the button when the latter is clamped thereagainst, as shown in Fig. 10. The said button-clamp 34 is fixed on or is integral with the said hollow shaft 35 and is constructed substantially in the form shown in Fig. 8—that is to say, having a body portion or part *r*, Fig. 8, extending in a plane parallel with the outer side of the button-gate and having a lip *g*, extending at right angles to said part *r*, opposite the said recessed end of the button-gate 32. The said lip has a recess *e* therein similar to and opposite the said recess *c* in the end of the button-gate, and said two recesses combined receive the head of the button and allow the shank thereof to project between said lip *g* of the button-clamp and the adjacent end of the gate, (the button-shank lying more or less in a recess in the side of the button-clamp,) as shown in Figs. 10 and 12, the button being thus held while the needle *s* operates to pass the thread through the eye of its shank and while the thread is otherwise manipulated, as below described.

A button-ejecting lever 39 is pivotally hung in the button-clamp 34, one end of which extends outwardly therefrom, as shown, and its opposite end extends inwardly to the bottom of said lip *g* and the recess *e* therein, so that a button lying in said recess is in a position over and upon the said inner end of said lever. A spring-abutment 42 (see Fig. 8) has one end bearing on the upper side of said lever 39 to throw its said inner end into the bottom of the recess *e* in the lip *g* of the button-clamp, when said lever is free to be so acted upon. Said spring 42 may, if desired, be dispensed with, as shown in some of the other figures, leaving said lever to have its inner end carried into the bottom of the recess *e* when the gate and the clamp receive the button from the button-trough by the action of the button thereagainst; but the last-named action is less likely to obstruction from the lever when the spring 42 is employed. The inner end of said lever 39 is caused to be thrown upward from the bottom of said recess *e* by the engagement of the outer end of said lever during the earlier part of the movement of the button-clamp from the material 49 with the lower end of a depending spring-abutment 40, whereby the lever 39 is swung to the position shown in Fig. 15, the outer end of said lever then slipping from the end of said spring, while the clamp and button-gate turn upward to receive another button. The outer end of said lever on its return down movement slides by the lower end of said spring 40. The said hollow shaft 35, on which is the said button-clamp 34, has a slot through it, as shown in Figs. 8 and 9, extending circumferentially. A partially-cut pinion 38

loosely encircles the shaft 35 and is held by a screw 36, passing through the same and through said slot in said last-named shaft to rock the shaft of the button-gate 33. This construction permits of a certain degree of reciprocating rotary motion of said shaft 33 within and independent of the hollow button-clamp shaft 35, for the purpose below set forth.

A retaining-spring 37 (see Figs. 3 and 8) is secured by one end to a suitable part of the frame of the machine and has a friction-pad thereon which is pressed by said spring against the surface of said shaft 35 to restrain its reciprocating rotary movements within the limits of the motion imparted thereto by the below-described actuating devices, so that when operating rapidly said shaft 35 shall not exceed a certain degree of reciprocating rotary motion.

A stop-pin 65 (see Fig. 18) is set in any convenient fixed part of the machine near the lower end of the button-trough 44, against which the button-clamp 34 shall strike while being carried in the direction indicated by the arrow in Fig. 16, just before the cessation of the movement of the button-gate in that direction, in order to arrest the movement of said clamp and allow the adjoining end of the gate to move sufficiently far from it to permit a button to drop to the position shown in Fig. 18. This continued movement of the button-gate away from the button-clamp, to a certain degree, is provided for by the above-described connection of the pinion 38 with the button-gate shaft 33 by means of said screw, which passes through said slot in the button-clamp shaft 35, said pinion thus turning slightly on the last-named shaft, while the movement of the button-clamp is arrested by said stop 65. The reverse rotary motion of said pinion 38 causes the end of the button-gate to be carried against the button, which shall have been received between said clamp and gate, as shown in Fig. 18, and to so hold the button until it shall have been brought to the position over the material shown in Fig. 10.

The means for imparting the above-referred-to reciprocating rotary motion to the hollow shaft 35, which is encircled by the said half-formed pinion 38, consist of the rock-shaft 9, which is supported in suitable bearings on the upper part of the frame A, on which is secured a pendulum arm 18, on the lower end of which is a segmental rack-bar, as more clearly shown in Fig. 7, said segment engaging with said pinion 38. Said shaft 9 has fixed thereon an arm 16, to which is pivotally attached a connecting-rod 14. The lower end of said connecting-rod slides freely over shaft *h* and has a stud in its side which engages with a suitably-formed groove in the side of the cam 4, and by the rotation of said cam, which is fixed on the shaft *h*, the shaft 9 is given a rocking motion, thereby producing the requisite vibratory motion of the segment-bearing end of said arm 18 and a consequent reciprocating rotary motion of said shafts 33

and 35, whereby the above-described action of the button-gate 32 and the button-clamp 34 is produced.

The above-referred-to sewing mechanism and means for manipulating the loops of the stitches during the formation of the latter, whereby during the process of sewing on a button the same is made to pass through one of the loops of the stitches, are constructed and arranged to operate as follows: The needle *s*, 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, and in this respect this machine differs from machines heretofore employed for sewing shank-buttons to shoes and other articles, the needles heretofore employed for this purpose being what are termed "hook-needles," or those having an opening at one side of the eye to permit the thread to pass in and out of the eye thereof during the operation of sewing. The employment of the above-described needle in this machine renders it unnecessary to employ a cast-off, and hence the cost of the latter, and its requisite operating mechanism, and the maintenance of the same is obviated; also, the construction of the sewing mechanism is much simplified and greater speed of operation made possible. The said needle *s* (see Fig. 3) is carried on the needle-bar 57, and is secured thereto by the clamp-block 59. The said needle-bar has the requisite reciprocating movement in the slot *m* in the needle-bar holder 51, the latter being located in such position relative to the above-described button-gate that said needle is caused to move vertically near the side thereof, as clearly shown in Figs. 10 and 12. Said needle-bar holder has a hub at its lower end, as shown, and is fixed on the rock-shaft J by a suitable set screw or screws, said shaft being hung in suitable bearings under the lower part of the frame A, as shown in Fig. 2. Said shaft J has a rocking motion in one direction by means of the cam 5, which has a cam-slot in one face thereof with which a stud in the end of a lever 50 engages, which is fixed on said shaft J, whereby the latter is so rocked as to give the requisite backward throw to said needle-bar holder to bring the point of the needle *s* to a point under the material 49, where the stitch is to be made.

To provide means for adjusting and rigidly holding the said needle-bar holder in proper operative position relative to the lever 50, so that the said back-throw of the holder shall be unfailingly in consonance with the movement of the said lever, the hub of the latter on shaft J is provided with two parallel arms *n n*, between which a laterally-extending arm *w* on the hub of the needle-bar holder extends, and this latter-named arm is rigidly engaged on its opposite side by two set-screws *z*, one in each of said arms *n*. By operating said set-screws *z* it is clearly seen that the upper end

of the needle-bar holder, and consequently the point of the needle under the material to be sewed upon, may be very nicely adjusted to any desired point of operation. Although, as above described, said cam 5 imparts a positive motion in one direction to the needle-bar holder 51, it is desirable that no wear of said cam or other operative parts shall be permitted in any way to interfere with the proper degree of the backward throw of the needle-bar holder, whereby the point of the needle is brought to the proper position under the fabric and under the eye of the button-shank when a stitch is about to be formed, and to that end a spring 52 is secured to frame A near shaft J, the free end of which bears against the under side of the arm *w* on the needle-bar holder, thereby aiding to insure the desired back-throw thereof, as aforesaid.

20. An adjusting-screw *v* is placed in said frame over the end of said arm *w*, whereby the upward swing of the latter is regulated. The said spring 52, by bearing on the under side of said arm *w*, also serves to steady the forward throw of the needle-bar holder and to hold the stud in lever 50, which engages with cam 5, against the cam-surface which actuates said lever.

The forward throw of the needle-bar holder is effected by the action of the cam 7, fixed on said shaft *h* against a pivoted pendulous lever 56, which is hung on the frame of the machine and which bears a friction-roll 56^a, as shown in Fig. 3, against which the periphery of said cam 7 moves, whereby said lever is given a vibratory motion on its suspending stud or pin. Said lever 56, when vibrated as aforesaid, is made to swing against an arm 53, which is pivoted by one end to the needle-bar holder 51, and the free end of said arm is adjustable toward and from the pivot-point of the lever 56 for the purpose of varying and adjusting the extent of the forward throw of the needle-bar holder and needle to vary the length of the stitches and the feed motion of the needle, whereby the material is fed along for the formation of stitches in different places and to space the buttons as they are sewed on. For the purpose of adjusting the free end of arm 53 as aforesaid a segment 54 is secured on the latter, and said segment is operated by means of a worm-shaft 55, which is supported in the frame of the machine and is provided with a head, as shown, which is seized by the fingers for the purpose of turning it to adjust the arm 53, as above described.

The needle-bar 57, above referred to, has a stud 58 fixed therein, (see Figs. 3 and 7,) which extends through a slot *f* in the needle-bar holder at the base of the needle-bar slot *m* in the latter, and the requisite vertically-reciprocating motion is imparted to said needle-bar by means of a bell-crank lever 64, (see Fig. 3,) one arm of which has a stud therein which engages in a groove in the face of the cam 6, and the second arm of said lever, or

lower one, has a slot therein, as shown in Fig. 6, through which the said stud 58 in the needle-bar extends. The grooved cam 6 imparts the requisite vibratory motion to the lever 64, and the latter in turn imparts said reciprocating motions to the needle-bar. Said bell-crank lever 64 is hung on a shaft K, hung in suitable bearings in the frame of the machine. (See Figs. 1 and 6.)

The presser-foot 27, having a longitudinal slot therein, as shown, through which the needle operates and in which it has its above-referred-to swinging motions, is suitably located above the needle-bar holder and under the cloth-plate 63, against which said presser-foot is moved by a spring 30, which moves against the lower end of the presser-foot bar 28, said spring-pressure serving to hold the material upon which sewing is being performed, and when said material is to be fed along by the needle a cam 21 on said shaft *h* acts against a roller supported on a roller-arm 29, which is secured against the side of said presser-foot bar opposite the cam 21, to move said bar and presser-foot downward away from the cloth-plate sufficiently to release the material for the purpose aforesaid, and subsequently the spring 30 returns the presser-foot against the material, as before, to hold it while the sewing is being done. The said presser-foot has secured on its under side a thread-cutting blade 31, which extends across the slot in the presser-foot and presents a curved cutting-edge, as shown in Fig. 4, to the thread when the work is carried along rearwardly off from the presser-foot and draws the thread with it against the edge of said cutter. The thread so cut has an end of sufficient length left in the needle to provide for recommencing the sewing on another piece. Said cloth-plate has an arm thereon, as shown in Fig. 3, whereby it is suitably secured to the frame of the machine. The thread is drawn from a suitably-located spool or bobbin and is carried around an ordinary tension 60, which is fixed on the frame of the machine, and from thence over two guide-rollers 61 and 62, one on the needle-bar holder and the other on the needle-bar, and thence through the eye of the needle, as shown. A hook *i* is attached to the lower end of the presser-foot bar and in practice extends downwardly and is attached by its opposite end to some convenient foot-treadle, whereby the operator may at will draw the presser-foot downward away from the cloth-plate for the purpose of inserting work therebetween or other manipulation thereof. The details of the construction of said roller and roller-arm 29 on the presser-foot bar 28 are shown in Fig. 5.

The mechanism for manipulating the thread-loops as and for the purpose aforesaid and to co-operate with the needle for completing the stitches is constructed and arranged to operate as follows: A loop-hook 24, consisting of a single element having thereon two loop-engaging prongs α^2 and α^3 and hav-

ing preferably the form of a longitudinal tubular section, as shown, on one end of which are said prongs, is secured on the end of a shaft 23 near to the inner side of the button-gate, but sufficiently far from the latter to leave room for the needle and thread to rise from the material 49 between them, as shown. Said shaft 23 is hung in suitable bearings in a pending support 17, which may be of the form shown in Figs. 1 and 7 or any other that may be preferred, the upper end of said shaft-support being fixed on the rock-shaft 8, and the latter is hung in suitable bearings on the upper part of the frame A and has the requisite rocking motion imparted thereto by means of the grooved cam 3, with which said rock-shaft is connected by means of an arm 15 thereon and a connecting-rod 13, pivotally attached to said arm and having an engagement with a suitably-formed groove in one side of said cam. The said shaft 23 has a pinion 25 splined thereon, which engages with a fixed rack 22, which is secured to the frame of the machine back of said shaft-support 17. The said rock-shaft 8 has also a reciprocating endwise motion, whereby the prong-bearing end of the loop-hook 24 is caused to be moved toward and from the adjoining side of the needle s, as and for the purpose below set forth. The said endwise motion of the shaft 8, which is comparatively slight, is imparted thereto by means of the pivoted lever 10, (see Figs. 1 and 7,) whose lower end has an engagement with one of the grooves of cam 2 on shaft h, and whose upper end is bifurcated and is engaged between two nuts 26 on the rear end of the shaft 8, which nuts provide means for adjusting the rock-shaft and its actuating-lever so that the proper endwise movement of said shaft is assured.

The operation of this machine in sewing buttons to material after they shall have been brought one by one so that their shanks occupy a proper position thereover, as above described, is as follows: Fig. 10 illustrates the position of a button and its shank over the material before and after the first movement of the needle in sewing on said button, and it also illustrates the position of the hook-bearing end of the loop-hook 24 (a section of which hook is shown in said last-named figure) immediately after said needle shall have come up through the shank of the button, and, as there shown, it is seen that the end of said hook by the endwise movement of said shaft 8 has been carried near to the side of the needle, whereby the prong a^2 of the loop-hook is brought to such position that the rotary motion of the hook in the direction of the arrow in Fig. 10 causes said prong to become engaged, as shown, with the thread at the side of the needle, and the continued rolling motion of the loop-hook, actuated by the devices heretofore described connected with shaft 23, on which said hook is secured, causes a loop to be drawn from the needle (which is termed the "primary" loop) and to be carried

by the motion of said prong a^2 to the position shown in Fig. 12, the needle meanwhile having gone back in the direction of the arrow in Fig. 10 below the fabric, the tension devices also permitting the requisite amount of thread to be given off under a proper tension. Before the needle first rises through the fabric to the position shown in Fig. 10 the loop-hook is brought to a position in front of the needle, and by the rearward endwise movement of shaft 8 the end of the loop-hook has been brought about to a line with the side of the needle adjoining said end of the hook, and when the needle in rising is nearly at its uppermost position, the loop-hook commences to roll toward the thread carried by the needle, and just as the needle commences to descend the prong a^2 of said hook engages the thread, as shown in said last-named figure, and said hook continues its rolling motion until it has reached about the position shown in said figure, where said motion is arrested for an instant, while the needle descends below the presser-foot and material. Then shaft 8 moves endwise slightly, carrying forward the loop-hook to bring the primary loop carried thereon over the point of the upwardly-rising needle, (the latter meanwhile having received its forward movement from the needle-bar holder,) and so holds said primary loop while the needle comes up through the material and the loop, as shown in Fig. 12, the loop-hook having meanwhile rolled to the position there shown. After the needle has fairly entered said primary loop the loop-hook rolls slightly farther backward, letting the end of said loop slip off from said prong a^2 , and shaft 23 moves rearwardly, drawing with it the loop-hook back to such a position away from the side of the needle as permits the hook to move forward again without interfering with the latter. The needle, after entering the primary loop, as shown in Fig. 12, rises to the position shown in Fig. 13. The loop-hook then, being brought forward and rolling by the side of the needle, engages its prong a^2 with the thread carried by the latter, which constitutes the secondary loop, and draws the latter to the position shown in Fig. 14. Then the button-gate and button-clamp commence to move in the direction of the arrow shown in said last-named figure, and bringing the outer end of the button-ejecting lever 39 in engagement with the end of the spring 40, whereby the inner end of said lever under the button is thrown upward to the position shown in Fig. 15, (the end of the button-gate adjoining the button-clamp having meanwhile rolled slightly away from the latter,) thus lifting and turning the button to the position shown in said last-named figure and ejecting it from between the button-gate and clamp and throwing it through said loop and bringing it to such position as causes the thread or secondary loop thereof carried by the needle to be drawn down between the button and the button-gate when the needle next goes down through the

fabric, leaving the secondary loop around the
 primary loop at the end of the button-shank, as
 shown in Fig. 19, thus tightly locking the but-
 ton to the fabric 49. Fig. 17 shows the posi-
 5 tion of the secondary loop as sliding between
 the button and the button gate and clamp
 while the needle goes down for the last time.
 The button gate and clamp continue their
 movements just referred to in the direction
 10 of the arrow in Fig. 16 until brought to the
 position shown in Fig. 18, the needle mean-
 while moving slightly downward and at the
 same time feeding the material along to space
 the buttons. The needle then retires beneath
 15 the fabric and swings forward thereunder pre-
 paratory to coming again upward through the
 shank of the next button, the button gate and
 clamp having meanwhile rolled back to the
 position shown in Fig. 10, and the operations
 20 are repeated.

The bevel-gears 70 and 71 (shown in Fig. 1)
 are the propelling-gears of a button-counting
 mechanism arranged on the rear side of the
 machine, and, since said counting mechanism
 25 constitutes no part of the invention herein
 described, no reference has been made to it,
 nor is it illustrated.

Having fully described my invention, what
 I claim, and desire to secure by Letters Pat-
 30 ent, is—

1. In a machine for sewing shank-buttons
 to fabric, the button-trough, the button-gate
 having a rocking motion under the end of
 said trough, and the button-clamp having a
 35 corresponding center of movement and an in-
 dependent rocking motion similar to that of
 the button-gate and serving at the proper
 time to clamp the button between the end of
 the gate and said clamp, means for rocking
 40 said gate and clamp intermittently, and stitch-
 forming mechanism whereby the stitch may
 be begun while the button is held between
 the gate and clamp in combination substan-
 tially as described.

2. In a machine for sewing shank-buttons
 to fabric, the button-trough, the rocking gate
 under the end of said trough, the button-
 clamp next the end of the gate and rocking
 50 in the general direction of the gate, but inde-
 pendently thereof, so as to clamp the button
 between said clamp and gate, and a button-
 ejecting lever hung in said clamp, in combi-
 nation with driving means, substantially as
 55 described, whereby the specified movements
 are imparted to the gate and the clamp, and
 stitch-forming mechanism, substantially as
 described.

3. In a machine for sewing on shank-but-
 tons, the button-trough, the button-gate rock-
 60 ing under the end of said trough and having
 a grooved face and a recess, the recessed but-
 ton-clamp supported and moving independ-
 ently of the gate and acting, as described, to
 grasp the body of the button in the recesses
 65 between the clamp and gate, the ejector-lever
 hung in the gate, and an abutment on the
 machine against which said lever is carried

to be operatively engaged thereby, means for
 imparting the described movements to said
 elements, and stitch-forming mechanism, all 70
 combined substantially as described.

4. In a machine for sewing shank-buttons
 to fabric, a thread-carrying needle, a button-
 clamp for holding a button near said needle,
 and a rocking loop-hook in position to en- 75
 gage the thread carried by said needle to
 form a loop at the side of said clamp, a but-
 ton-ejecting lever carried by the clamp, and
 operative means, substantially as described,
 whereby the described movements are im- 80
 parted to said operative elements, the parts
 in combination substantially as set forth.

5. The button-clamp fixed on the side of a
 hollow shaft having a slot therethrough, the
 button-gate fixed on the end of a shaft, which 85
 latter shaft operates within said hollow shaft,
 a pinion located and having a limited oscil-
 lating movement on said hollow shaft and se-
 cured to said button-gate shaft by a screw pass-
 ing through said slot, and mechanism, substan- 90
 tially as described, engaging with said pinion,
 whereby it is given intermittently-reciprocating
 rotary motions, and stitch-forming mech-
 anism, substantially as described, combined
 and operating substantially as set forth. 95

6. The button-gate, the button-clamp con-
 sisting of a block having a recessed lip extend-
 ing at right angles therefrom, and a button-
 ejecting lever pivoted thereon having one end
 extending inwardly into the recess in said lip, 100
 combined with a fixed spring whose free ends
 engage the outer end of said lever when said
 clamp moves away from the material on which
 a button has been sewed, mechanism, sub- 105
 stantially as described, for reciprocally rotat-
 ing said gate and moving said clamp, and
 stitch-forming mechanism, substantially as
 described.

7. The needle-bar, the loop-hook and means
 for operating the same, the vibrating needle- 110
 bar holder, a pending cam-lever 56, suitably
 supported, a cam rotating in engagement
 with said lever, a throw-adjusting arm 53,
 pivoted on said holder and having its free
 end engaged by and adjustable toward and 115
 from the pivot-stud of said cam-lever, and
 means, substantially as described, for adjust-
 ing said lever and for imparting said vibrat-
 ing movement to the needle-bar holder, com-
 bined and operating substantially as set forth. 120

8. The button-gate, the recessed button-
 clamp in proximity thereto, the ejecting-le-
 ver pivotally supported on said clamp, and
 means for rocking said gate, clamp, and lever
 in the prescribed succession, combined sub- 125
 stantially as described.

9. In a machine of the character described,
 the needle-bar having a reciprocating move-
 ment in the needle-bar holder, the needle-bar
 holder having a rigid arm, a shaft on which 130
 the bar-holder is mounted and a lever also
 mounted on the shaft and having adjustable
 bearing-pieces which engage opposite faces
 of the rigid arm of the bar-holder, means for

rocking said lever and thereby rocking the bar-holder, and adjunctive connections whereby the described movements are imparted and the elements made operative, in combination substantially as described.

10. In combination, the vertically-reciprocating needle-bar, the vibrating needle-bar holder, the arm 53, pivoted thereon, having a worm-segment thereon, a worm-shaft engaging with said segment, the pivoted cam-lever 56, and a cam operating to swing said lever, substantially as set forth.

11. The eye-pointed needle and its bar, means for reciprocating said bar, the slotted needle-bar holder having a perforated hub, the rock-shaft on which said hub is mounted, a rocking lever supported on said shaft and having adjustable contact-surfaces engaging said arm, and means for rocking said lever on the rock-shaft, all combined substantially as described.

12. The eye-pointed needle and its bar and holder and adjacent means for operating the same, the rock-shaft on which said holder is mounted, and a lever mounted on said shaft and having adjustable contact-pieces engaging said holder, the loop-hook rocking in proximity to said needle, and means for rock-

ing and longitudinally reciprocating said loop-hook, the parts in combination substantially as described.

13. The needle-bar holder having a groove therein and a slot at the base of the groove, the needle-bar moving in said groove and having a pin extending through said slot, a cam-lever engaging said pin, and means for actuating said cam-lever, in combination with operating means for imparting the described movements to the specified elements, and the necessary adjunctive elements to produce the stitch, substantially as described.

14. The hollow shaft 35, having a slot there-through, the button-clamp fixed on said shaft, the shaft 33 within shaft 35, and the button-gate thereon, a pinion 38, having a limited rocking movement on shaft 35 and operatively connected to shaft 33 by a screw passing through the slot in shaft 35, means for rocking said pinion, and the necessary operative connections whereby the button-clamp and gate are manipulated, in combination substantially as described.

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Witnesses:

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G. M. CHAMBERLAIN.