

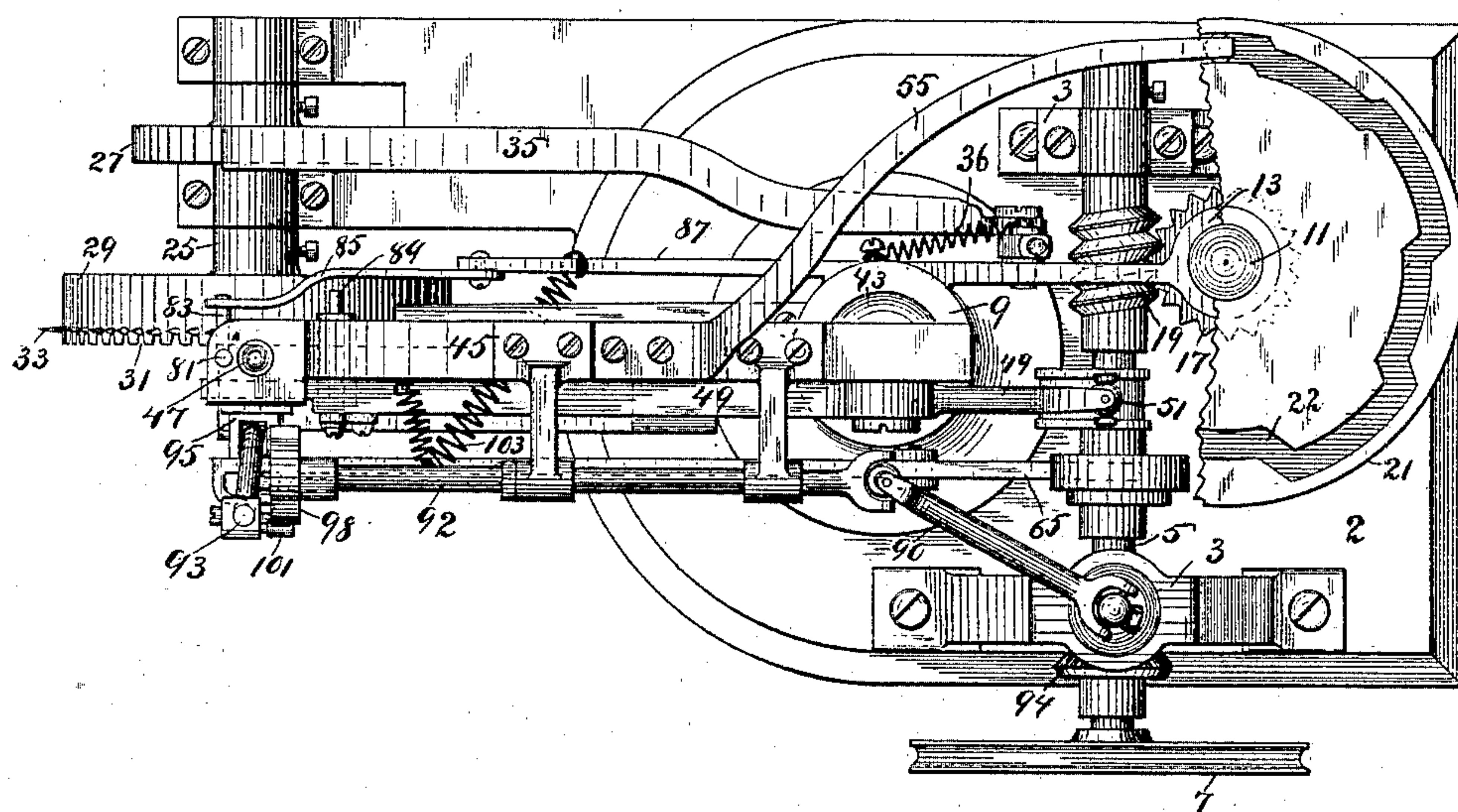
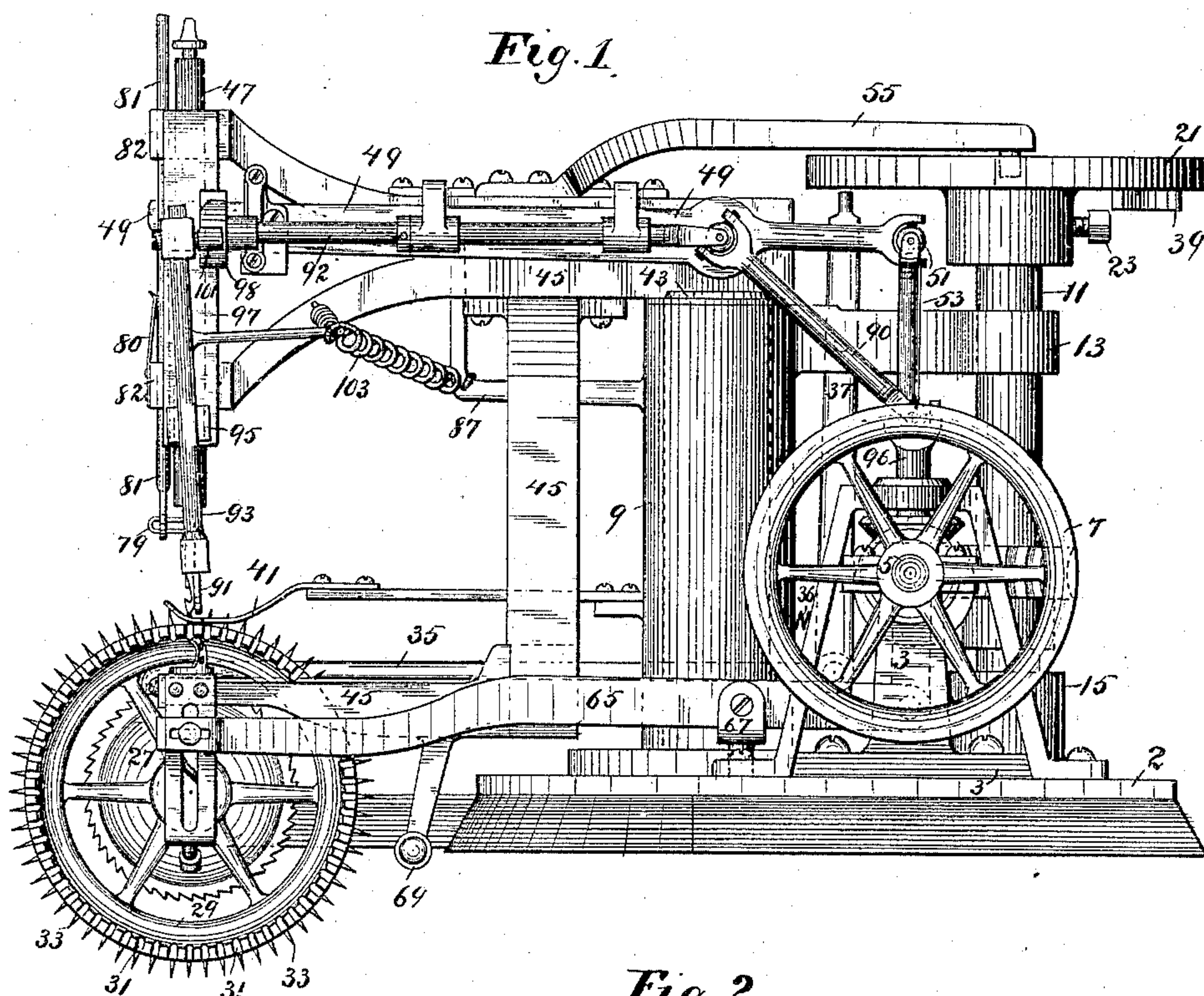
(No Model.)

3 Sheets—Sheet 1.

G. D. MUNSING.
CROCHETING MACHINE.

No. 448,664.

Patented Mar. 24, 1891.



Witnesses.

J. Jessen.
A. M. Gaskill

Inventor.

George D. Munsing.

By Paul Newman attys.

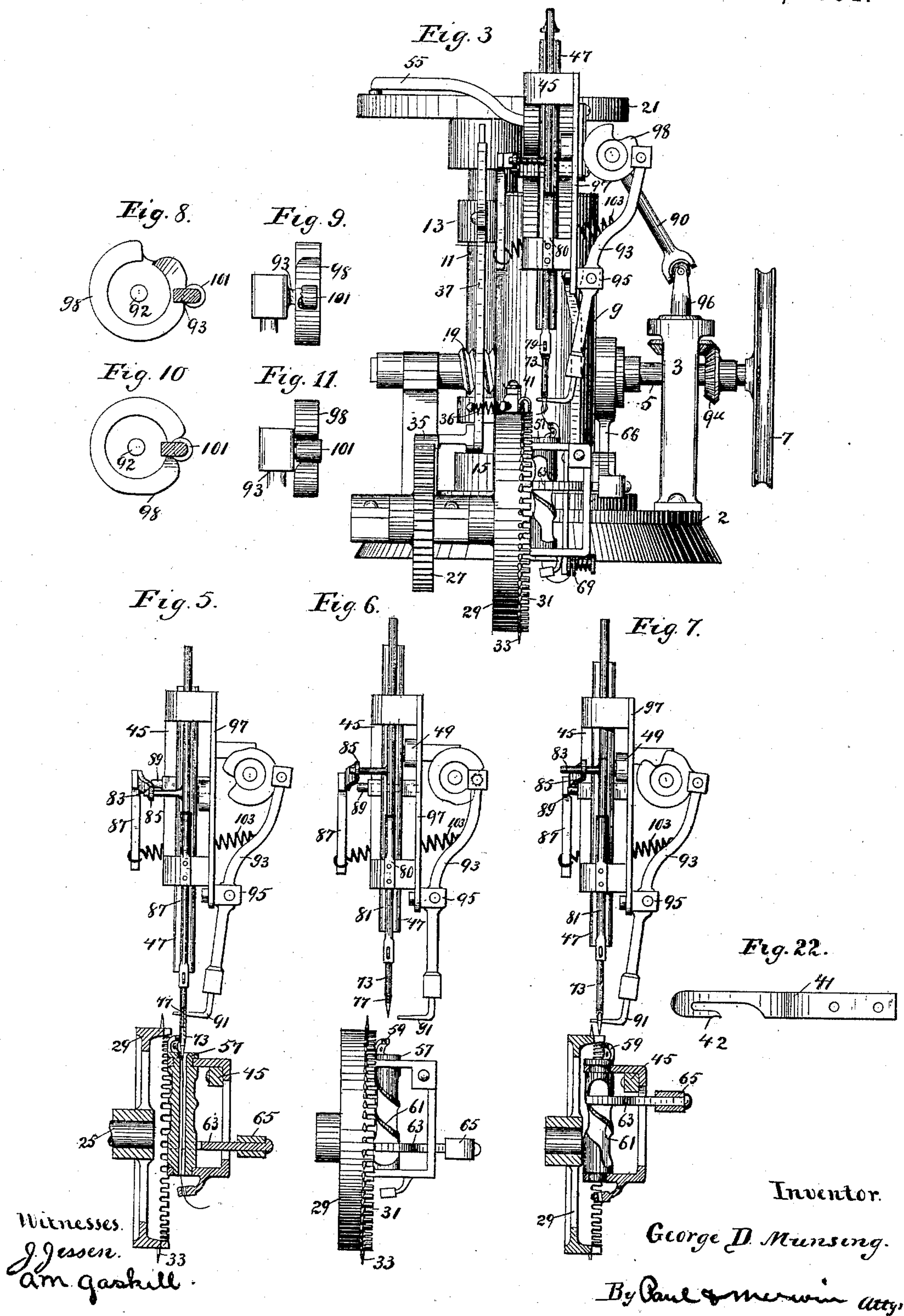
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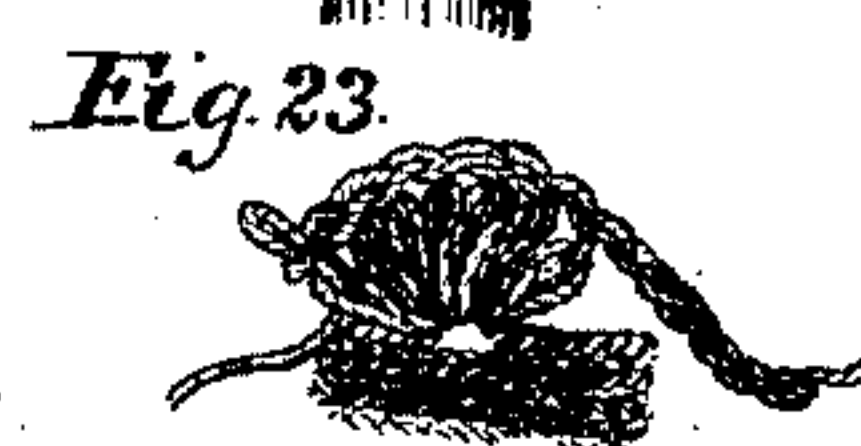
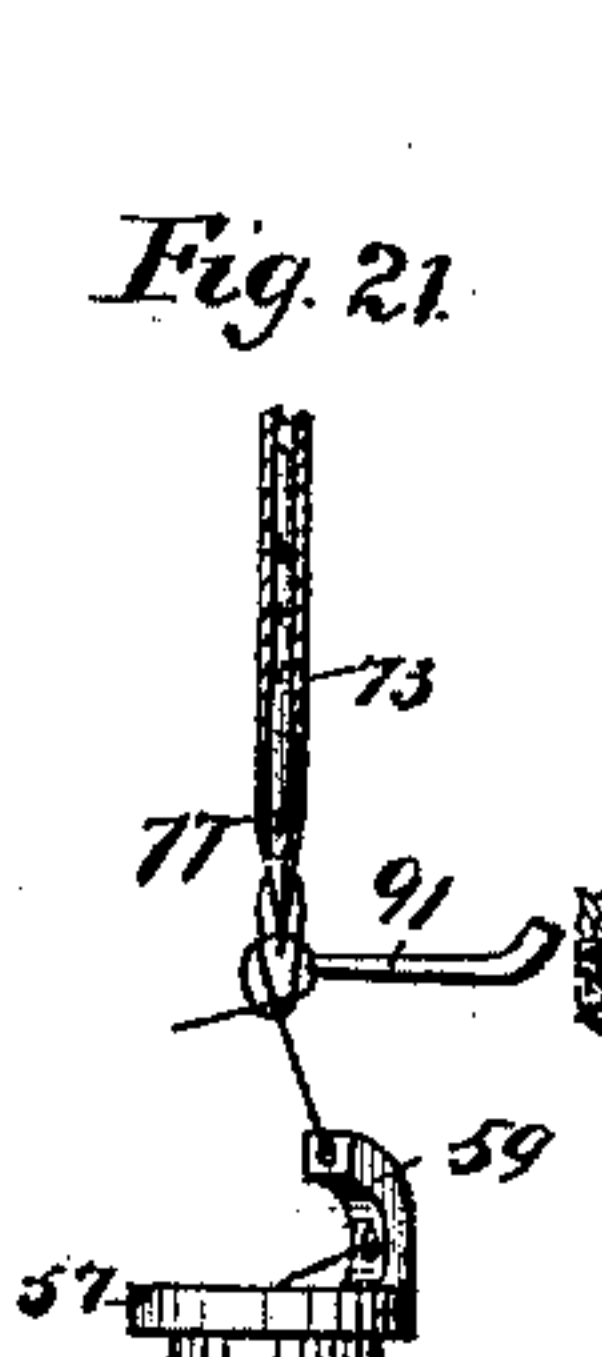
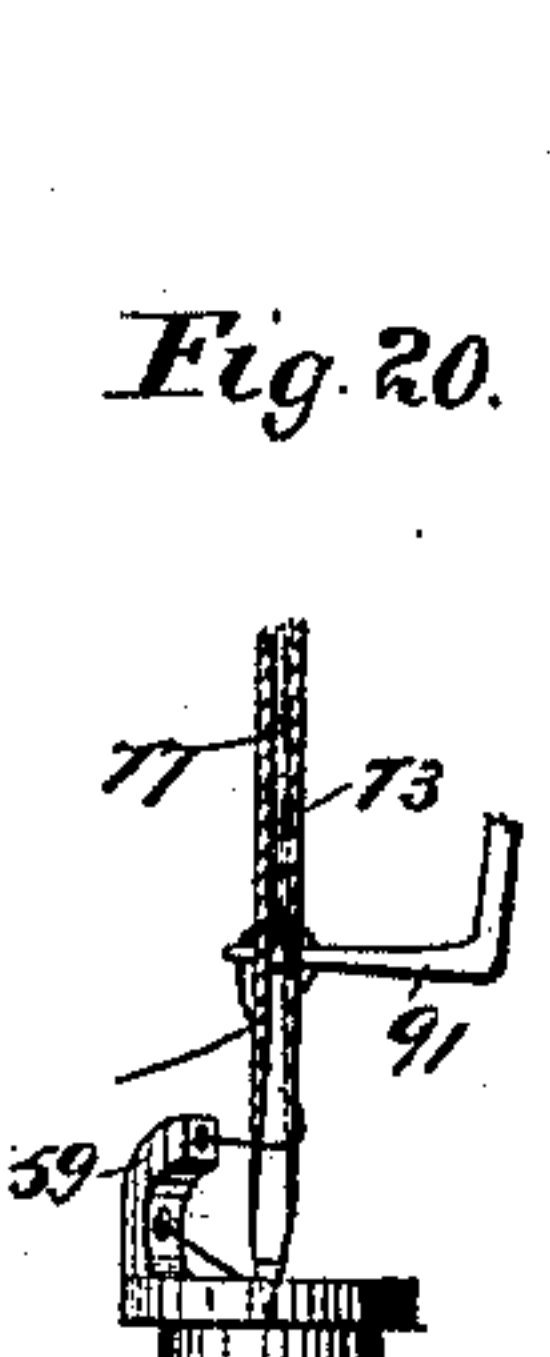
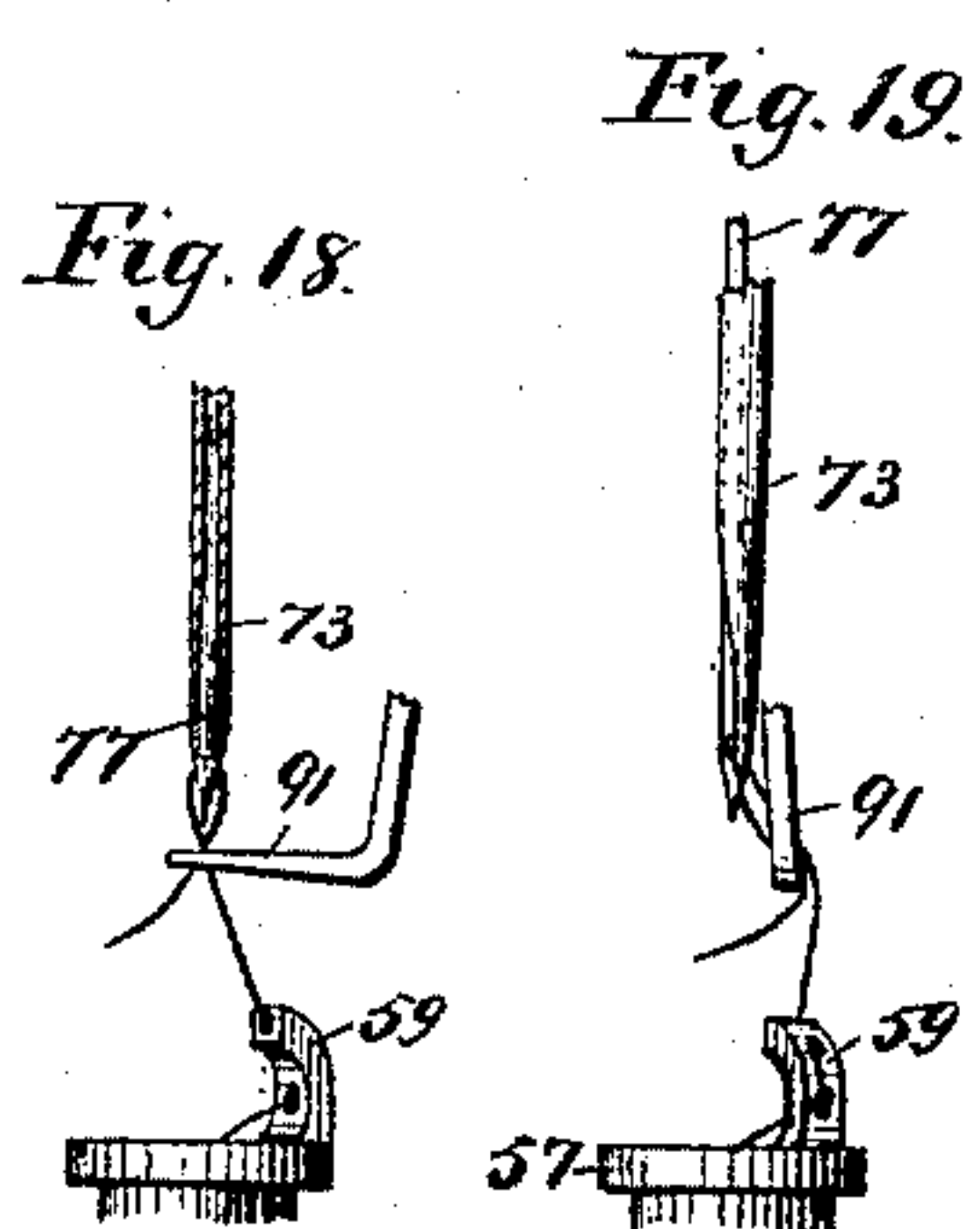
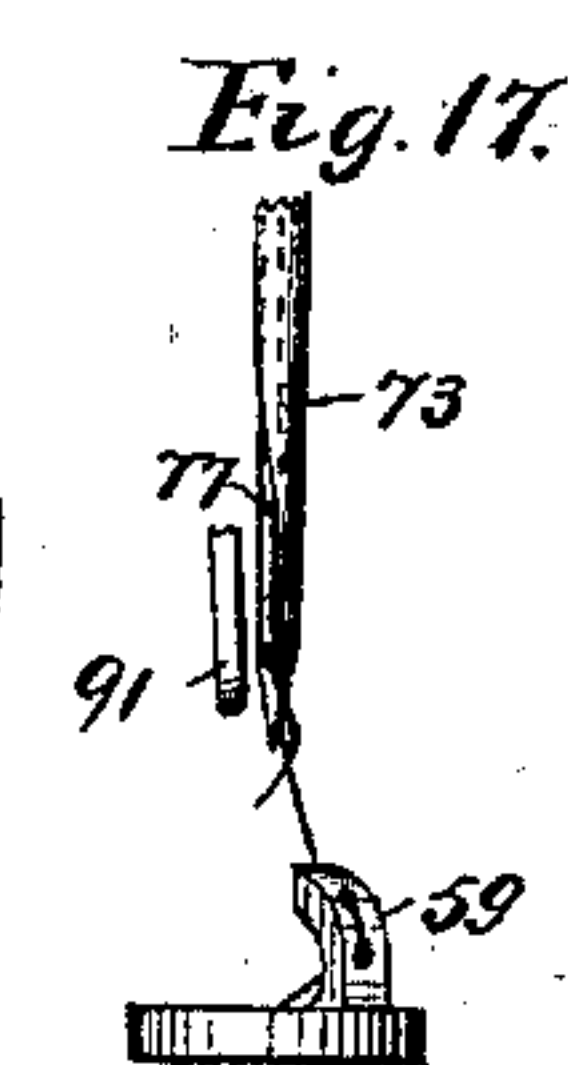
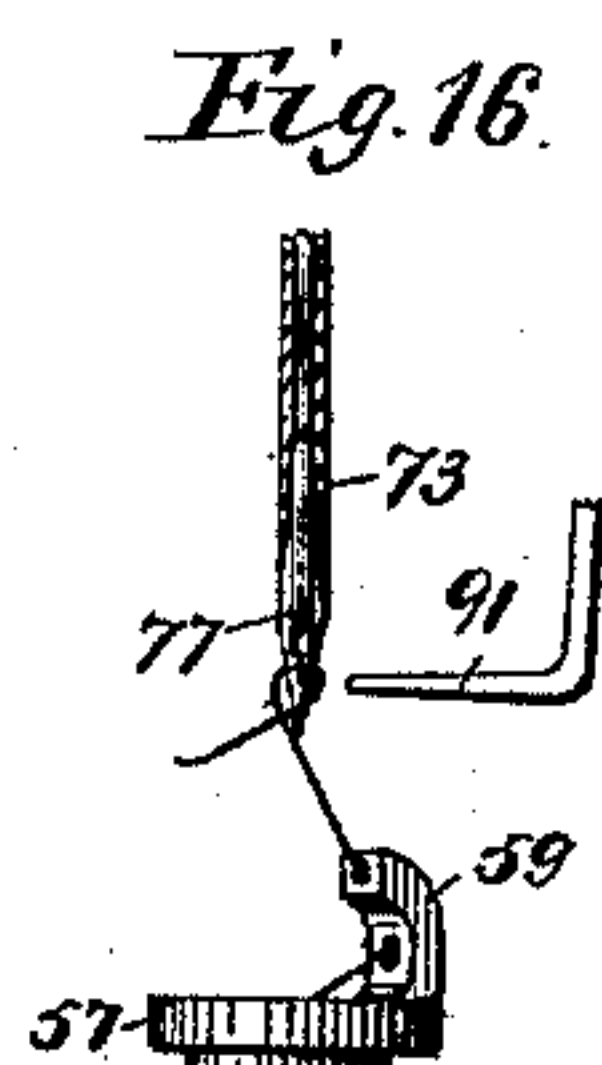
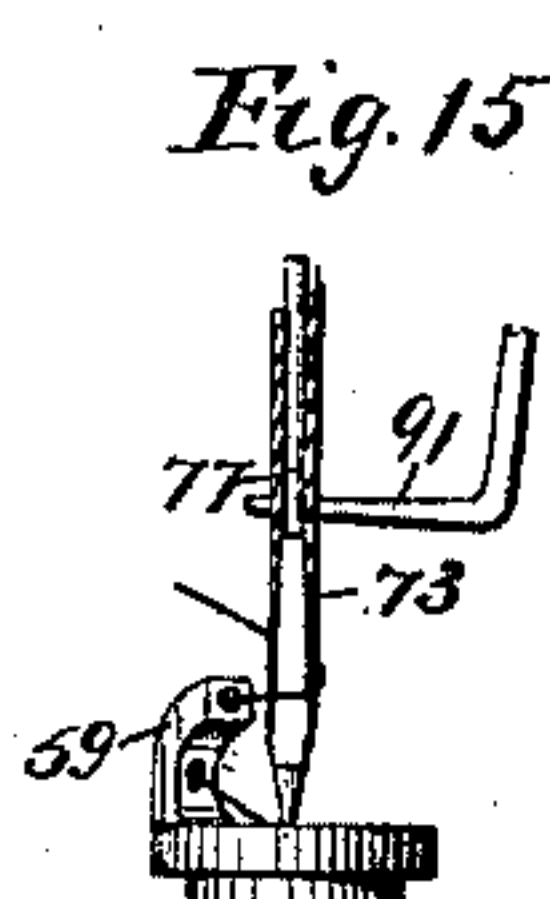
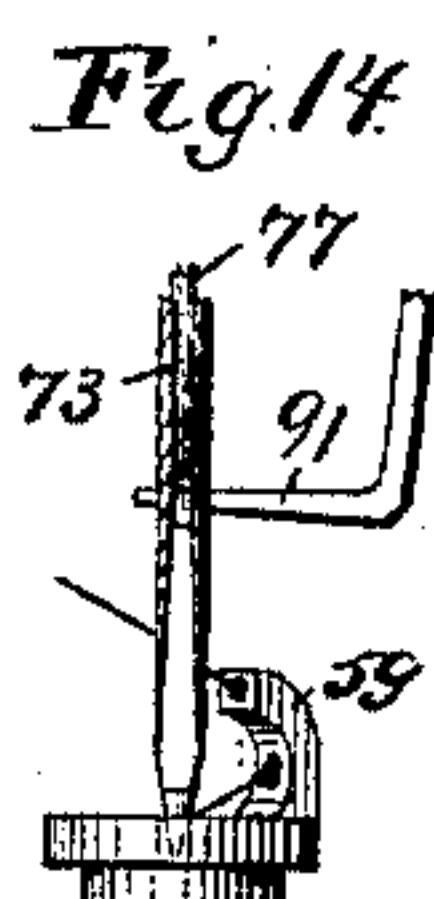
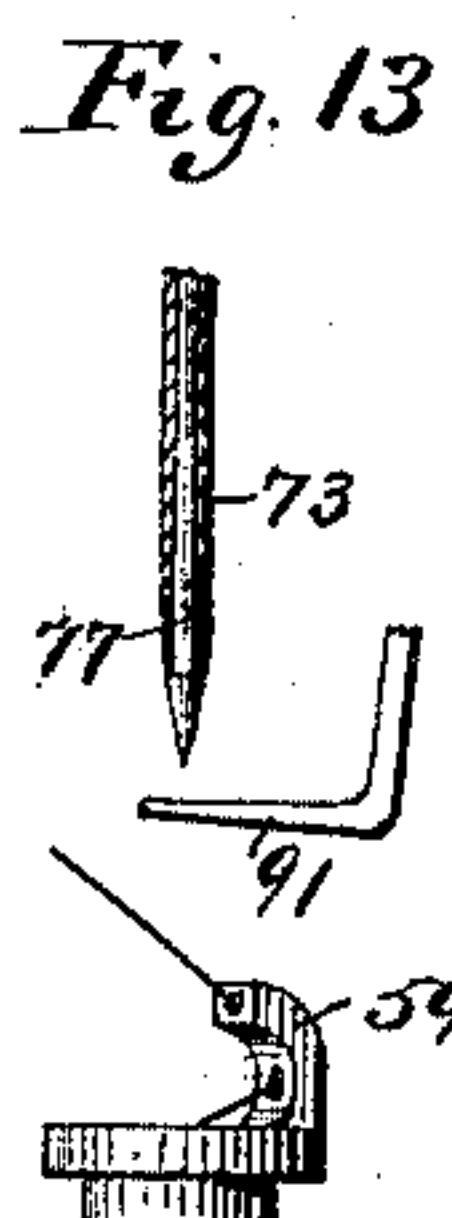
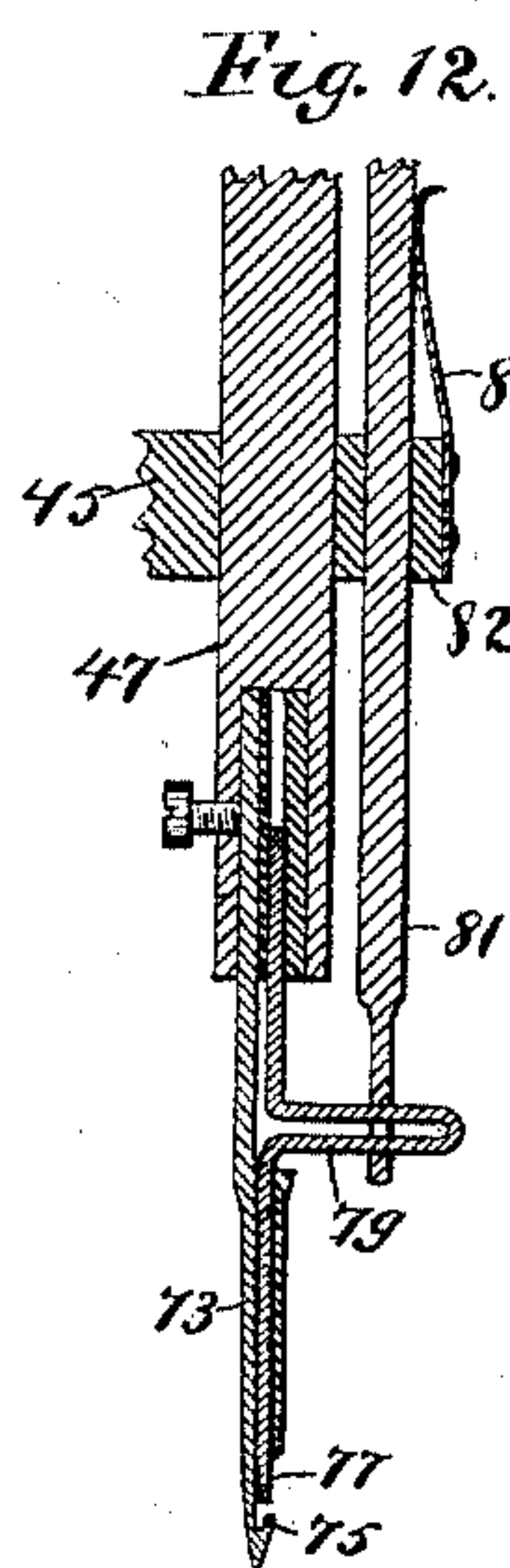
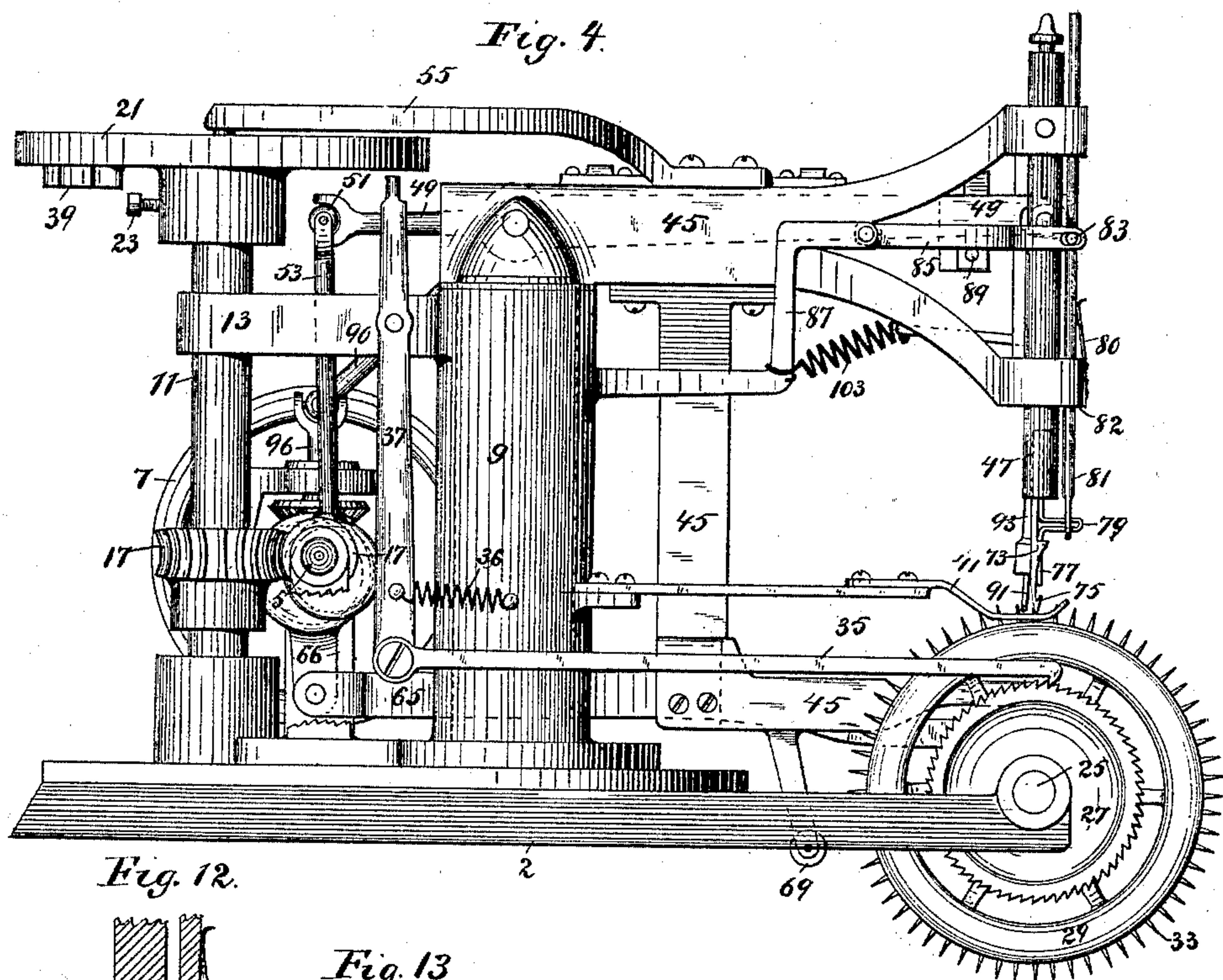
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3 Sheets—Sheet 3.

G. D. MUNSING.
CROCHETING MACHINE.

No. 448,664.

Patented Mar. 24, 1891.



Witnesses.
J. Jensen.
a. m. Garbuhl



Inventor.
George D. Munsing
By Paul & Munn Attys

UNITED STATES PATENT OFFICE.

GEORGE D. MUNSING, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF
TO EDGAR J. COUPER AND A. C. PAUL, BOTH OF SAME PLACE.

CROCHETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 448,664, dated March 24, 1891.

Application filed October 17, 1888. Serial No. 288,301. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. MUNSING, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a certain new and useful Crocheting-Machine, of which the following is a specification.

The object of my invention is to provide a machine for the manufacture of crocheted fabric, either in the form of an edging or trimming for another fabric or as a complete web.

I design the machine particularly for making what is known as "shell-work trimming," used particularly for the finish of knitted undergarments, blankets, or fancy articles.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is a plan of the same. Fig. 3 is a front end elevation. Fig. 4 is a side elevation showing the opposite side of the machine from Fig. 1. Figs. 5, 6, and 7 are details showing several positions of the needle, latch, stitch-holder, and thread-carrier. Figs. 8, 9, 10, and 11 are details of the mechanism for operating the stitch-holder. Fig. 12 is a vertical detail section of the needle-bar and needle. Figs. 13, 14, 15, 16, 17, 18, 19, 20, and 21 are details illustrating the movements of the needle and the thread-carrier. Fig. 22 is a detail of the presser-foot. Fig. 23 is a detail, on an enlarged scale, of a shell made by the machine. Fig. 24 is a detail illustrating a fabric made on the machine. Fig. 25 is a view on a larger scale of the back of the shell.

In the drawings, 2 represents the base of the machine, which may be of any suitable size and shape.

Mounted in suitable bearings 3, which are preferably secured upon the base 2, is the main driving-shaft 5, provided with a suitable pulley 7, by means of which power may be applied to the shaft.

Secured to or formed upon the base-plate 2 is a standard or column 9, which supports the main portion of the operating parts of the machine.

A vertical shaft 11 is mounted in suitable bearings 13 and 15 upon the base-plate 2 and standard 9. This shaft is preferably provided with a worm-gear 17, by which it is driven

through a worm 19 from the shaft 5. The shaft 11 is provided at its upper end with a pattern-wheel 21, having a groove 22, which determines the pattern of the fabric. This wheel is preferably secured to its shaft by a set-screw 23, which permits it to be removed and another wheel substituted at pleasure.

Mounted in stationary bearings at the front end of the bed-frame is the shaft 25, which is provided with the ratchet-wheel 27 and with the fabric-holding feed-wheel 29. The wheel 29 is provided with a flanged rim having a series of notches 31 and a series of points 33. A pawl-bar 35 engages the ratchet-wheel 27, and its opposite end is connected to the lower end of a pivoted lever 37, which is preferably mounted upon the column 9. A cam-projection 39 is secured to the under side of the pattern-wheel 21. At each revolution of the pattern-wheel the lever 37 is vibrated, and thereby the ratchet-wheel is turned by the bar 35. The wheel 29 is thereby turned with a step-by-step motion. The lever 37 is retracted by a suitable spring 36. A spring presser-foot 41 is arranged over the feed-wheel, and is preferably cut away in the center, so that the points move freely through the slot in the presser-foot. A slot is cut into the side of the presser-foot connecting with the slot in the center thereof, and thereby forming a horn or finger 42, over which the thread is drawn as the needle-bar swings away from the feed-wheel and off from which the loops slip as the fabric is advanced. The standard 9 is hollow and receives a vertical shaft 43, which is arranged therein. Secured upon the top of the shaft 43 is an arm 45, which extends to the front of the machine and supports the needle-bar. The needle-bar 47 is arranged to move vertically in suitable bearings arranged at the forward end of the bar 45. The shaft 43 is given an oscillatory movement, as hereinafter described, and thereby the needle-bar and all of the parts supported by the bar 45 are moved away from and toward the feed-wheel. An arm 49 is pivoted upon the bar 45 and its forward end is connected with the needle-bar and its rear end is connected by a gimbal-joint 51 with a vertical rod 53, whose lower end carries a strap eccentric that is arranged upon the shaft 5. As the shaft

is rotated the arm 49 is vibrated, and thereby the needle-bar is raised and lowered. An arm 55 is secured upon the bar 45 and extends over and engages the pattern-wheel 21. This wheel is provided with a pattern-groove 22, into which projects a roller on the arm 55. By this means the oscillatory movement is given to the shaft 43. The groove 22 in the wheel 21 may be of any preferred shape in order to secure the pattern desired.

Supported by the arm 45 so as to move laterally with the needle-bar is a thread-carrier 57, which is arranged beneath the needle-bar, as shown in Figs. 3, 5, 6, and 7. This thread-carrier preferably consists of a small cylinder having a hook-shaped point or bill 59 arranged at one side thereof. The lower part of the thread-carrier is preferably provided with a spiral 61. A traveler 63, secured upon the end of a pivoted lever 65, engages this spiral. The lever 65 is pivoted upon the stud 67, that is in turn pivoted upon the base-plate 2, the pivots of the lever and stud being at right angles to each other. The opposite end of the lever is pivoted to a connecting-rod 66, that engages an eccentric upon the shaft 5. By this means the lever 65 is vibrated upon its pivot and the thread-carrier is given an oscillatory movement. The yarn or thread is passed over a suitable tension device 69 under a guide and through a central opening in the cylinder 57. It is then passed through eyes in the hook or thread carrier 59.

The needle or looper that I prefer to use in this machine is a hooked needle with a sliding latch. It is shown in detail in Fig. 12. The needle 73 is provided with a hook 75, and a latch 77 is arranged to slide in the shank of the needle and close the hook. The needle is secured to the needle-bar in the usual manner and is reciprocated thereby. The latch 77 is connected by a lug or other suitable means, with a rod 81, mounted in bearings 82 upon the front of the bar 45. A spring 80 is arranged to bear upon the rod 81. The friction between the rod 81 and the spring 80 is sufficient to cause the rod and the latch to remain stationary except when power is applied to move them. When the needle-bar begins to descend, the latch remains stationary. The lower end of the needle-bar then strikes the lug 79 on the latch, after which the needle and latch descend together with the latch open. When the needle begins to ascend, the latch remains stationary until the end of the hook strikes the lower end of the latch, after which the needle and latch ascend together, with the latch closed. A pin 83 projects from the side of the rod 81 and passes through the slot in an arm 85. The arm 85 is pivoted upon a stationary arm 87, that is secured to the standard 9. The arm 85 is capable of moving vertically about its pivot, but has no lateral movement. As the needle-bar is swung away from and toward the feed-wheel the pin 83 slides in the slot in

the arm 85. A lug 89 projects laterally from the side of the needle-bar.

As shown in Fig. 2, there is preferably a bend in the arm 85 which brings the outer end of it nearer to the needle-bar than the rear end. When the needle-bar is swung away from the feed-wheel, as shown in Figs. 3, 5, and 6, the lug 89 passes the arm 85 without touching it, as the needle-bar reciprocates. When the needle-bar is over the feed-wheel, as shown in Fig. 7, the lug 89 strikes the arm 85 as the needle-bar rises and moves the arm 85 and with it the rod 81 and latch 77. As the radius upon which the arm 85 turns is shorter than that of the arm 49 by which the needle-bar is moved, it follows that the movement of the arm 85 will be more rapid than that of the arm 49, and consequently that the latch will move faster than the needle, thereby opening the hook in the needle and permitting any loop or loops on the needle to fall into the hook.

A stitch or loop holder 91 is arranged to operate in connection with the needle for the purpose of holding the loop or loops upon the needle while the needle passes down. This loop-holder consists, preferably, of a finger that is secured upon a lever 93, that is pivoted upon the stud 95, that is in turn pivotally secured upon a plate 97, supported upon the bar 45. A shaft 92 is supported in bearings upon the bar 45 and is connected by a universal joint with a short shaft 90, that is in turn connected by a universal joint with a vertical shaft 96, that is driven by bevel-gears 94 from the main shaft 5. The shaft 92 is provided with the cam-wheel 98, upon which rests a roll 101, upon the upper end of the lever 93. A notch is formed in the peripheral face of the cam-wheel, into which the roll 101 drops as the cam-wheel is rotated. At the point opposite the notch the side of the wheel is cut away so as to permit the upper end of the lever 93 to swing toward the side of the wheel, as indicated by Figs. 9 and 11. A spring 103 is preferably arranged to hold the upper end of the lever against the peripheral face of the cam-wheel. By the means described the loop-holder is brought into the various positions shown in Figs. 13 to 21. It first passes in front of the needle, as indicated in Figs. 16 and 17, then under the needle, as indicated in Fig. 18, to the position shown in Fig. 19, taking the thread and holding the loop while the needle passes down through it. It remains in this position, as indicated in Fig. 20, while the needle passes down and up, and is then withdrawn, as indicated in Fig. 21.

The operation of the machine is as follows: It being desired, for instance, to form a shell or series of shells on the edge of the fabric, the machine is provided with the desired pattern-wheel and the fabric is placed upon the feed-wheel with its edge over the spurs or points. The loop of the thread being held by

the hook of the needle, and the needle and thread-carrier being in the position shown in Fig. 1, the needle passes down through the fabric and through one of the notches in the feed-wheel. The loop in the hook of the needle slips up over the latch onto the body of the needle, as shown in Fig. 20. The latch descends part way with the needle and then stops, so that the hook is open when the needle reaches the lowest point in its travel. The thread-carrier winds the thread around the needle, laying it into the hook, as shown in Fig. 15. The needle then begins to ascend, carrying with it the loop last laid in the hook. This loop is drawn through the fabric. The latch is, however, now opened by the lug 89 striking the arm 85, and the loop already on the body of the needle drops into the hook with the other. The needle-bar is now moved laterally away from the feed-wheel; both loops being carried in the hook of the needle and the loops drawing over the horn on the presser-foot. The thread-carrier moves laterally in unison with the movement of the needle-bar. When the needle-bar reaches the outer point in its travel, the needle again descends, this time passing through both of the loops, which remain on the needle and which are held by the stitch or loop holder 91. When the needle has reached the lower point on its travel, the thread-carrier lays another loop in the hook. The needle now ascends and this loop is drawn through the loops on the needle, which are now cast off, forming a double stitch. When the needle ascends this time, the latch remains stationary until the hook on the needle strikes the point of the latch, after which the needle and latch move together. As the hook is not open this time the loop or loops on the needle are cast off and a stitch is formed. This operation may be repeated, as many times as desired, forming a series of chain-stitches. When as many stitches as desired have been formed, the needle and thread carrier are swung back to the position shown in Fig. 7 and the operation first described is repeated. These operations are continued, the feed-wheel remaining stationary and the needle descending through the same point in the fabric until a complete shell is formed. In order to form the shell of proper shape the needle-bar is moved laterally each time a little farther until the central point of the shell is reached. After that the lateral movements decrease until the shell is completed, these movements being governed by the shape of the groove 22 in the cam-wheel 21. Instead of forming a double stitch, as above described, a single or triple or other stitch may be formed. After the shell is completed the feed-wheel is turned automatically a sufficient distance and then remains stationary while the next shell is formed. As the feed-wheel advances, the shell already formed slips off from the horn on the presser-foot. One or more chain-stitches will ordinarily be formed

between the shells. By changing the pattern-wheel the size, shape, and style of the shells may be varied. After one series of shells has been formed another series may be formed on the edges of the first series, and so on, as indicated by the diagram Fig. 24, thereby forming a complete fabric. By arranging a thread on the feed-wheel over which the loops are formed a series of shells may be made without attaching them to a previously-formed fabric.

The machine by a proper modification of its pattern-wheel may be used to form a series of chain-stitches connected to the edge of a fabric or joined together, forming a fabric or network. The feed-wheel may be made to advance the fabric as each stitch is formed, thereby forming a plain straight edging to the fabric.

By the term "intermitting-acting feed mechanism," as herein employed, is meant a feeding mechanism so constructed or timed in its action that two or more complete stitches or a series of stitches may be produced by the stitch-forming mechanism, while the fabric or material remains uninfluenced by the feed as contradistinguished from the ordinary or four-motion feed, in which the material is advanced after the completion of each stitch. The functional difference between the two classes of feed mechanisms is this, that by the first a series of stitches may be made in substantially the same place, the fabric remaining stationary, while in the second the material or fabric is advanced and its relation to the needle changed between successive operations of the stitch-forming devices.

I am aware that in certain button-hole machines laterally-reciprocating stitch-forming mechanism has been employed in connection with ordinary feed mechanism; but in such cases the material is advanced after the formation of each stitch.

I claim as my invention—

1. In a crochet-machine, the combination of a stitch-forming mechanism provided with a thread-carrier and a looper movable laterally of the line of feed and co-operating in different planes to form and unite successive loops, a finger or horn over which said loops are formed, and an intermittingly-acting feed mechanism operating to advance the fabric after the formation of two or more loops, substantially as described.

2. In a machine substantially such as described for forming a scallop or shell-like border upon the edges of fabrics, the combination of the following co-operating parts or mechanisms: a stitch-forming mechanism having a thread-carrier and a looper co-operating to form stitches, a finger or horn located adjacent the edge of the fabric around which the stitches are formed, and a feeding mechanism operating upon the fabric to advance the latter after a series of stitches have been completed at one point by the stitch-forming mechanism, for the purpose set forth.

3. In a crochet-machine, the combination of the following co-operating parts or mechanisms: a stitch-forming mechanism having a thread-carrier and a looper co-operating to form stitches, a horn or finger located in proximity to the path traversed by the stitch-forming devices, and an intermittently-acting feed mechanism provided with a spurred feed-wheel having points for penetrating the material or fabric, said feed-wheel serving to sustain the fabric against lateral displacement during the formation of the stitches, substantially as described.
4. In a crochet-machine, the combination of a stitch-forming mechanism comprising a thread-carrier and a looper movable laterally of the line of feed to lay loops at an angle thereto, a horn or finger located intermediate the path traversed by looper and thread-carrier in forming the stitches, an intermittently-acting feed mechanism provided with spurs or pins upon which the fabric is impaled and held, and a presser-foot for holding the fabric on the spurs or pins, substantially as described.
5. In a crochet-machine, the combination of a stitch-forming mechanism movable laterally of the line of feed and provided with a thread-carrier and a looper, a horn or finger supported between the planes in which the looper and thread-carrier have lateral movement, and a spurred feed-wheel for engaging the fabric to advance the latter and sustain it during the lateral movements of the stitch-forming mechanism.
6. In a crochet-machine, the combination of a stitch-forming mechanism reciprocating laterally of the line of feed and provided with a thread-carrier and a looper co-operating in different planes to draw loops around a support, a horn or finger around which said loops are drawn, and a feed mechanism provided with spurs upon which the fabric is impaled, said spurs being located to one side of and projecting vertically beyond the said horn or finger.
7. In a crochet-machine, the combination of a stitch-forming mechanism provided with a thread-carrier and a looper and movable laterally of the line of feed, a finger or horn on which the loops are formed, and a spurred feed-wheel beneath said horn or finger and having its spurs or pins projecting above said horn or finger.
8. In a crochet-machine, the combination of a stitch-forming mechanism movable laterally of the line of feed, an intermittently-acting feed mechanism, and a cam mechanism controlling the lateral movements of the stitch-forming mechanism and operating to vary the extent of movement during the formation of successive stitches.
9. In a machine such as described, the combination of a stitch-forming mechanism having a thread-carrier and a looper, the latter engaging the thread in the carrier and drawing loops on alternately-opposite sides of the fabric and interlooping said loops to form stitches on or near the edge of the fabric, and a feeding mechanism operating upon the fabric to advance the latter after a series of stitches have been completed by the stitch-forming mechanism.
10. In a crochet-machine, the combination, with a reciprocating latch-needle movable laterally of the line of feed, of a rotary and laterally-movable thread-carrier with which the needle co-operates at the extremes of its lateral movement, and an intermittently-acting feed mechanism.
11. In a crochet-machine, the combination, with the intermittently-acting spurred feed-wheel and the presser-foot opposite the periphery of said wheel and provided with a horn or finger, of the reciprocating and laterally-movable needle and the laterally-movable thread-carrier, substantially as described.
12. In combination with a reciprocating and laterally-movable latched needle, a thread-carrier oscillating about an axis substantially parallel with the needle and mounted upon a laterally-reciprocating support.
13. In combination with a reciprocating and laterally-movable latched needle, a laterally-movable thread-carrier having a rotary motion about the needle.
14. In combination with a longitudinally and laterally reciprocating latched needle, a spurred feed-wheel mounted upon an axis transverse to the needle, and an oscillatory thread-carrier movable toward and from the feed-wheel.
15. In combination with a reciprocating latched needle, a thread-carrier rotated about the needle in a plane transverse to the axis of the needle, said thread-carrier and needle being mounted upon supports reciprocating laterally of the line of feed, and a loop-holder movable laterally of the needle and between the latter and the thread-carrier.
16. A stitch-forming mechanism provided with a thread-carrier and a looper movable laterally of the line of feed and co-operating in different planes, the looper engaging the thread borne by the carrier to form loops thereof and interloop the latter, thereby forming stitches, in combination with an intermittently-acting feed mechanism operating to advance the material after the formation of two or more complete stitches by the stitch-forming mechanism, whereby two or more stitches are made in the interval between successive feed movements, substantially as described.
17. A stitch-forming mechanism provided with a reciprocating latch-needle movable laterally of the line of feed, and a thread-carrier also moving laterally of the line of feed to present the thread to the latch-needle in different planes to form successive loops and interloop the latter, in combination with an intermittently-acting feed mechanism operating to advance the material after the formation of two or more stitches and remaining idle during the formation of successive stitches.

by the stitch-forming mechanism, substantially as described.

18. The combination of a stitch-forming mechanism movable laterally of the line of feed, and comprising a thread-carrier and a looper, the latter co-operating with the thread-carrier to grasp the thread carried thereby and form and interloop loops thereof, a variable shifting mechanism controlling the lateral movements of the stitch-forming mechanism and determining the length of successive loops, and an intermittingly-acting feed mechanism, substantially as described, whereby successive stitches varying in length may be formed at substantially the same point in the interval between successive actions of the feed mechanism.

19. The combination, with a stitch-forming mechanism provided with a thread-carrier and a looper engaging the thread in the carrier at intervals, said carrier and looper co-operating at intervals and in different planes and

being moved laterally of the line of feed and an intermittingly-acting feed mechanism, of actuating devices controlling the lateral movements of the stitch-forming mechanism and operating to vary the extent of movement for successive stitches, substantially as described.

20. The combination, with a needle reciprocating in two planes, the one longitudinally of the needle and the other laterally thereof, a support movable laterally of the needle, and an oscillating thread-carrier mounted upon said support to oscillate about a vertical axis and operating to present the thread to the needle at or near opposite extremes of its lateral movements, substantially as described.

In testimony whereof I have hereunto set my hand this 13th day of October, 1888.

GEORGE D. MUNSING.

In presence of:

A. C. PAUL,
A. M. GASKELL.