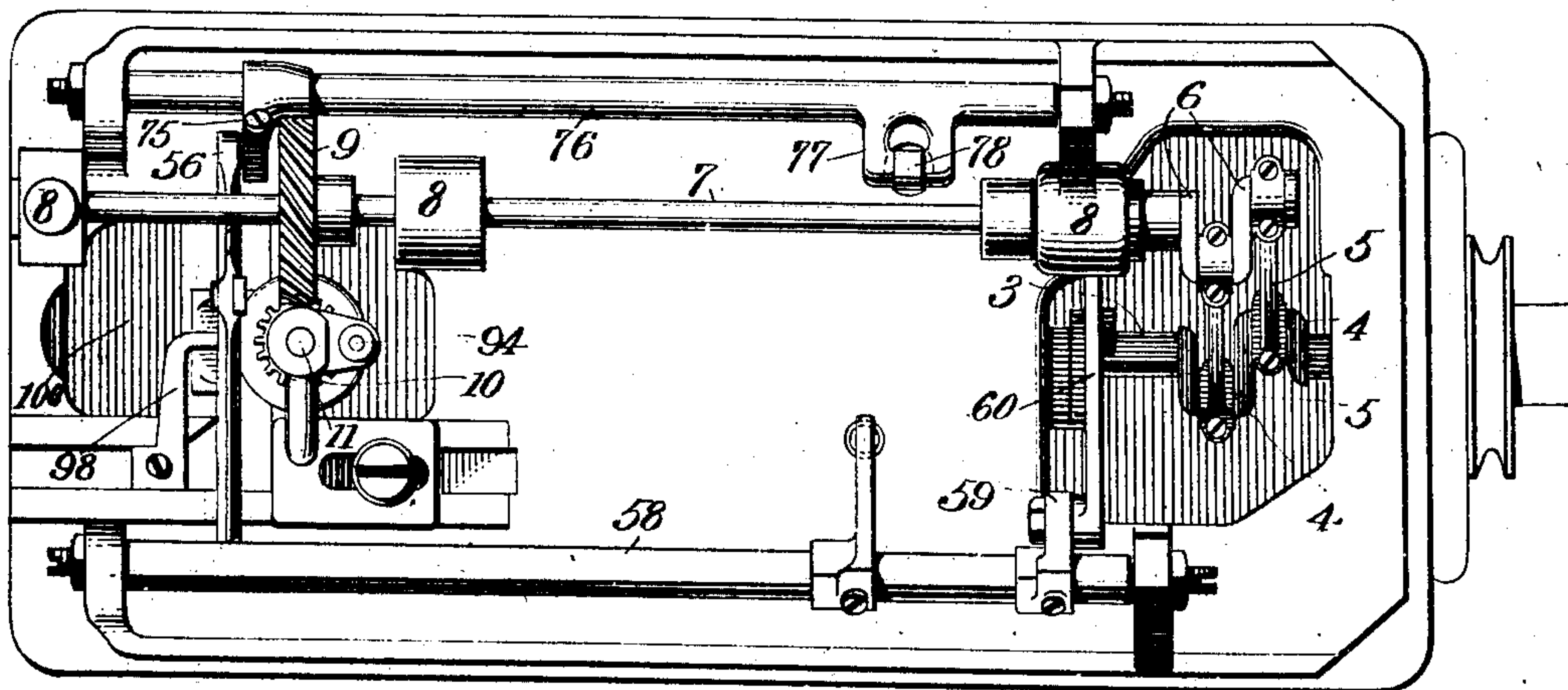
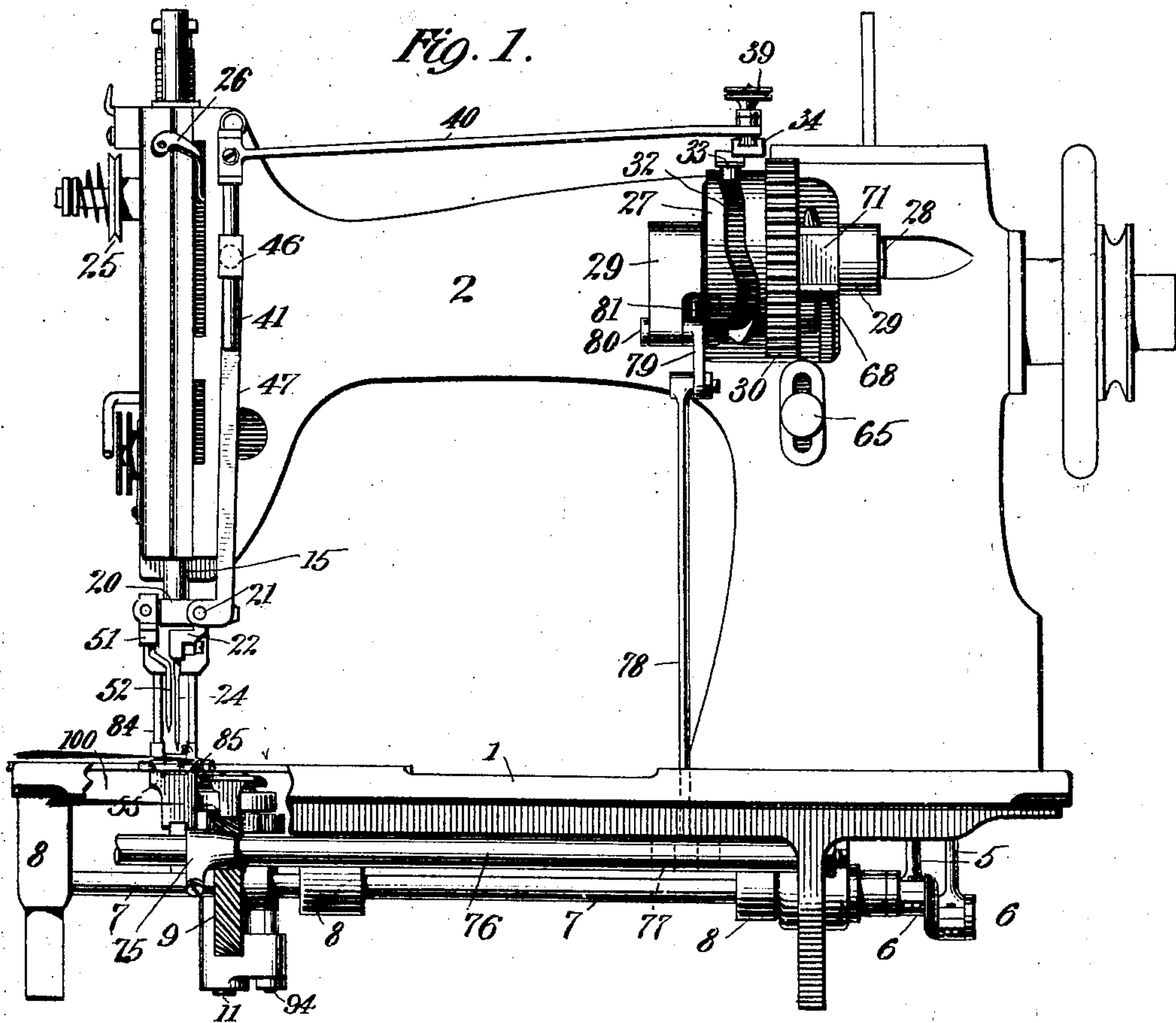


No. 883,879.

PATENTED APR. 7, 1908.

M. HEMLEB.
HEMSTITCH SEWING MACHINE.
APPLICATION FILED OCT. 7, 1907.

3 SHEETS—SHEET 1.



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By his Attorney
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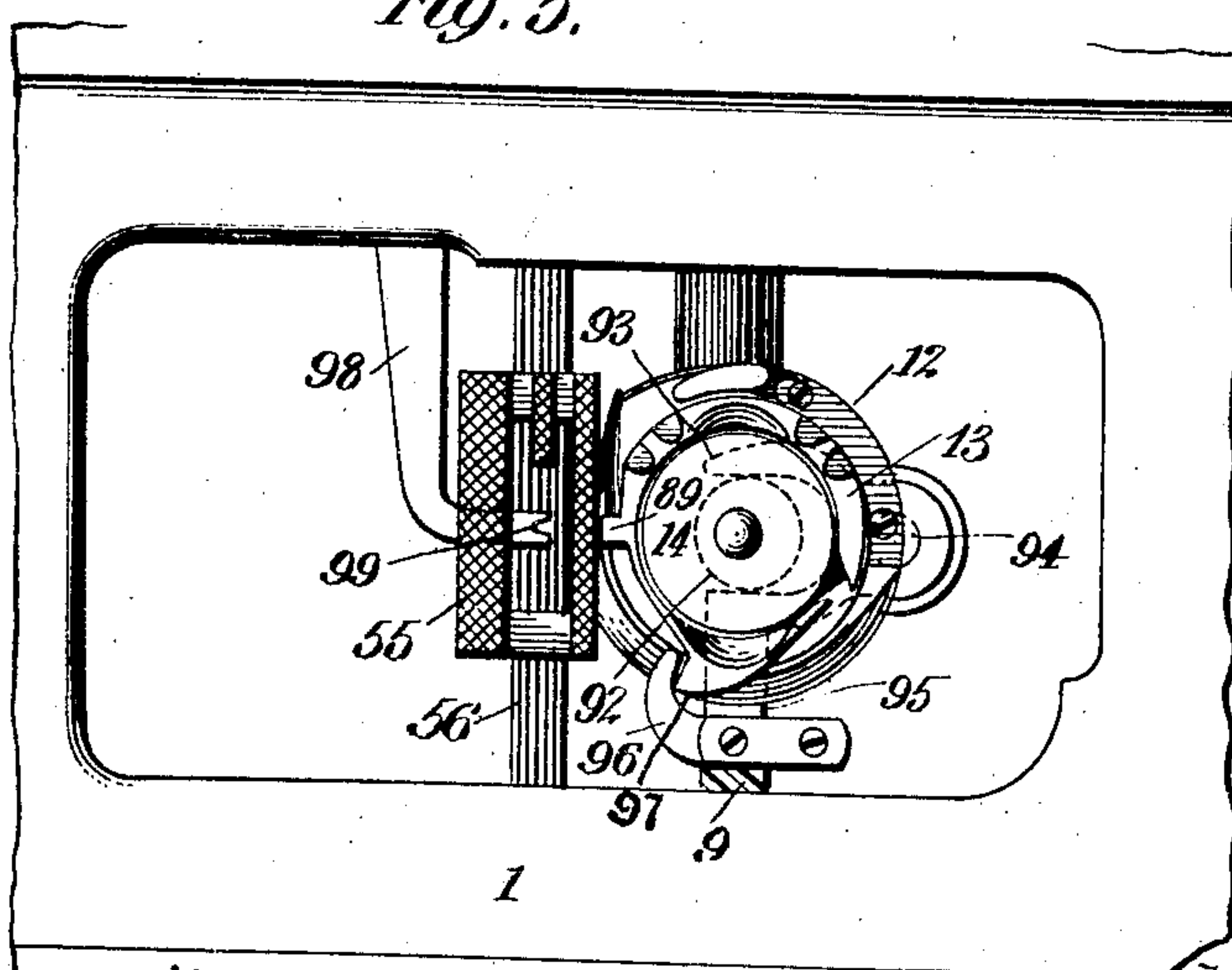
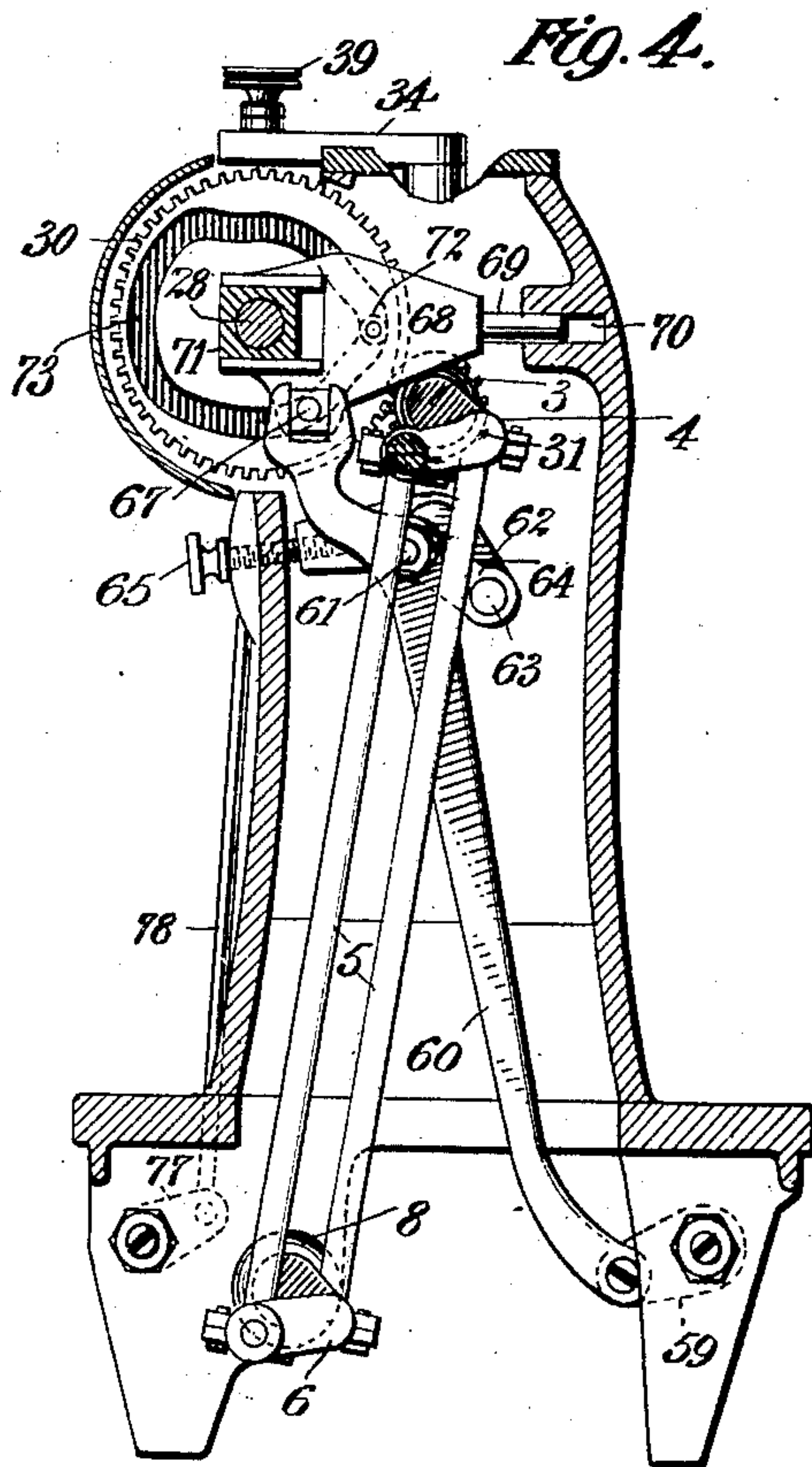
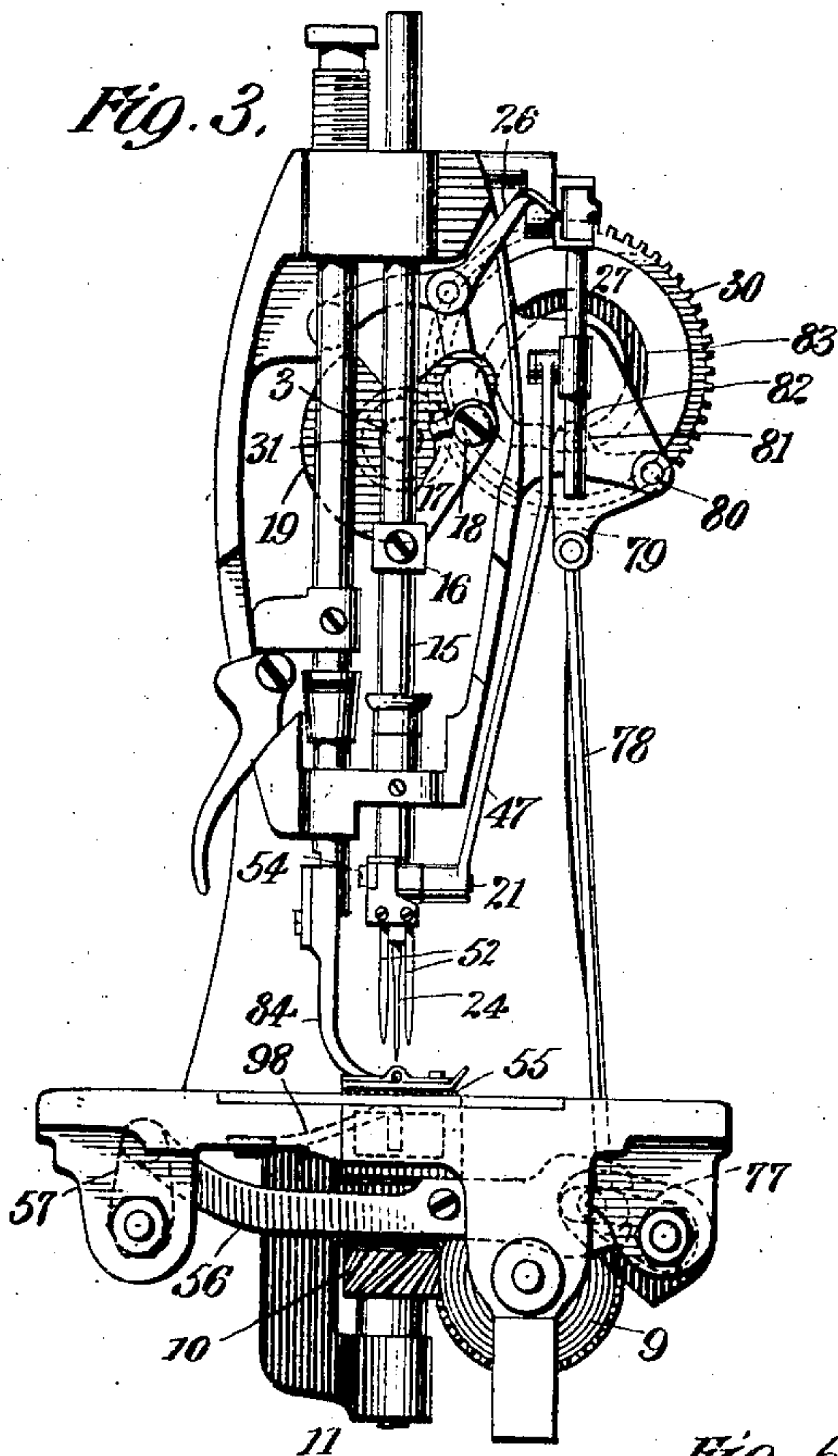
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3 SHEETS--SHEET 2.



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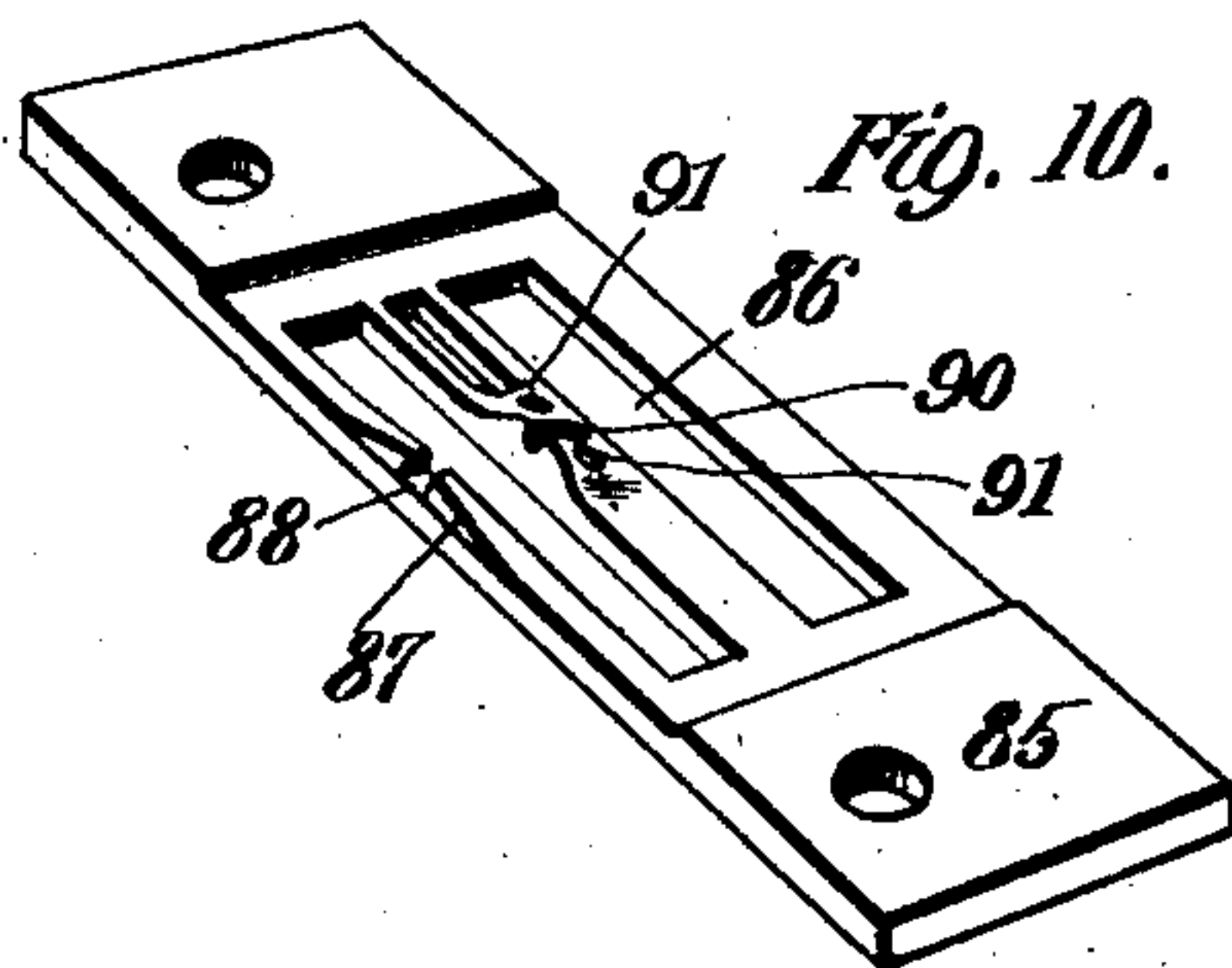
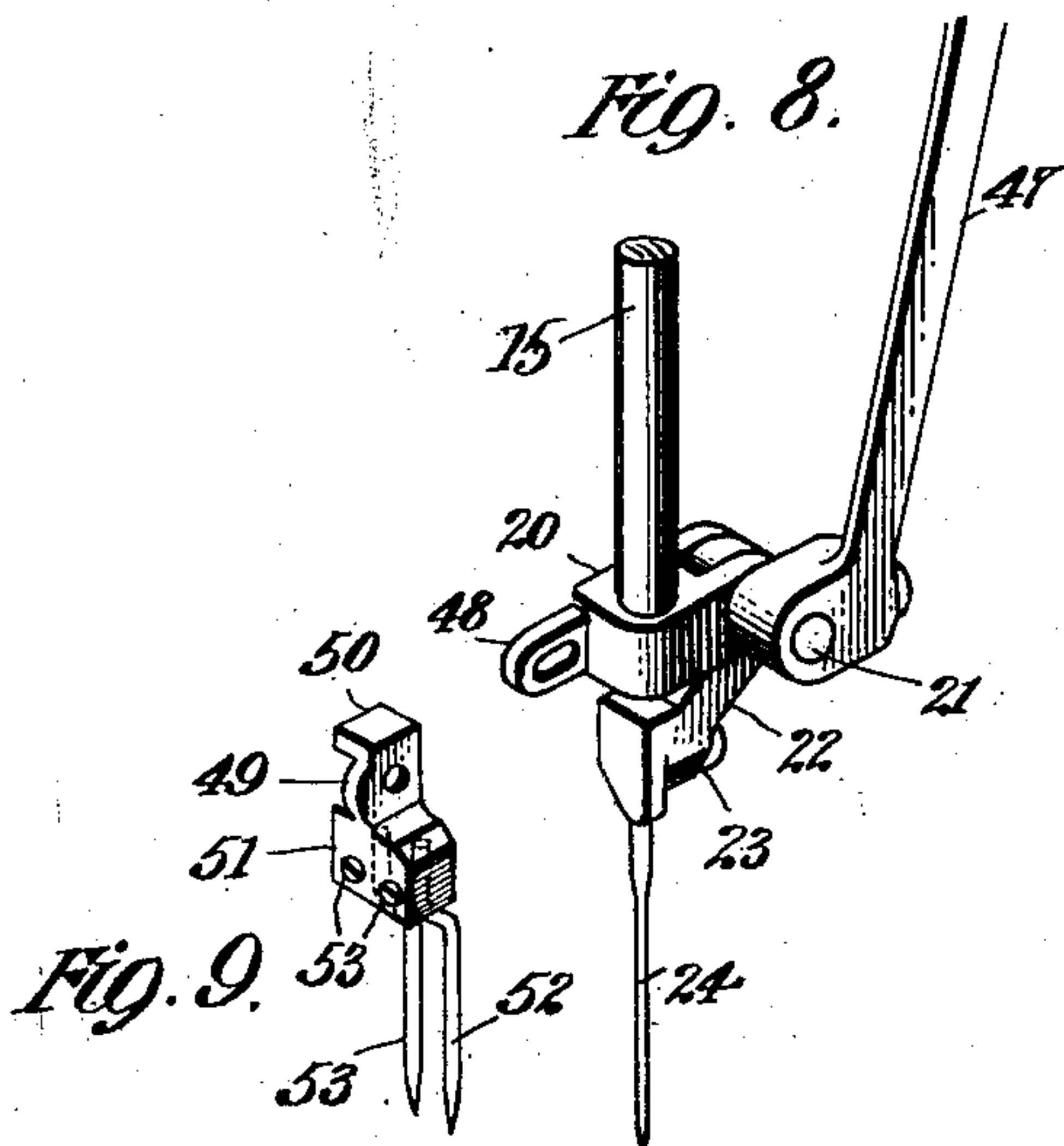
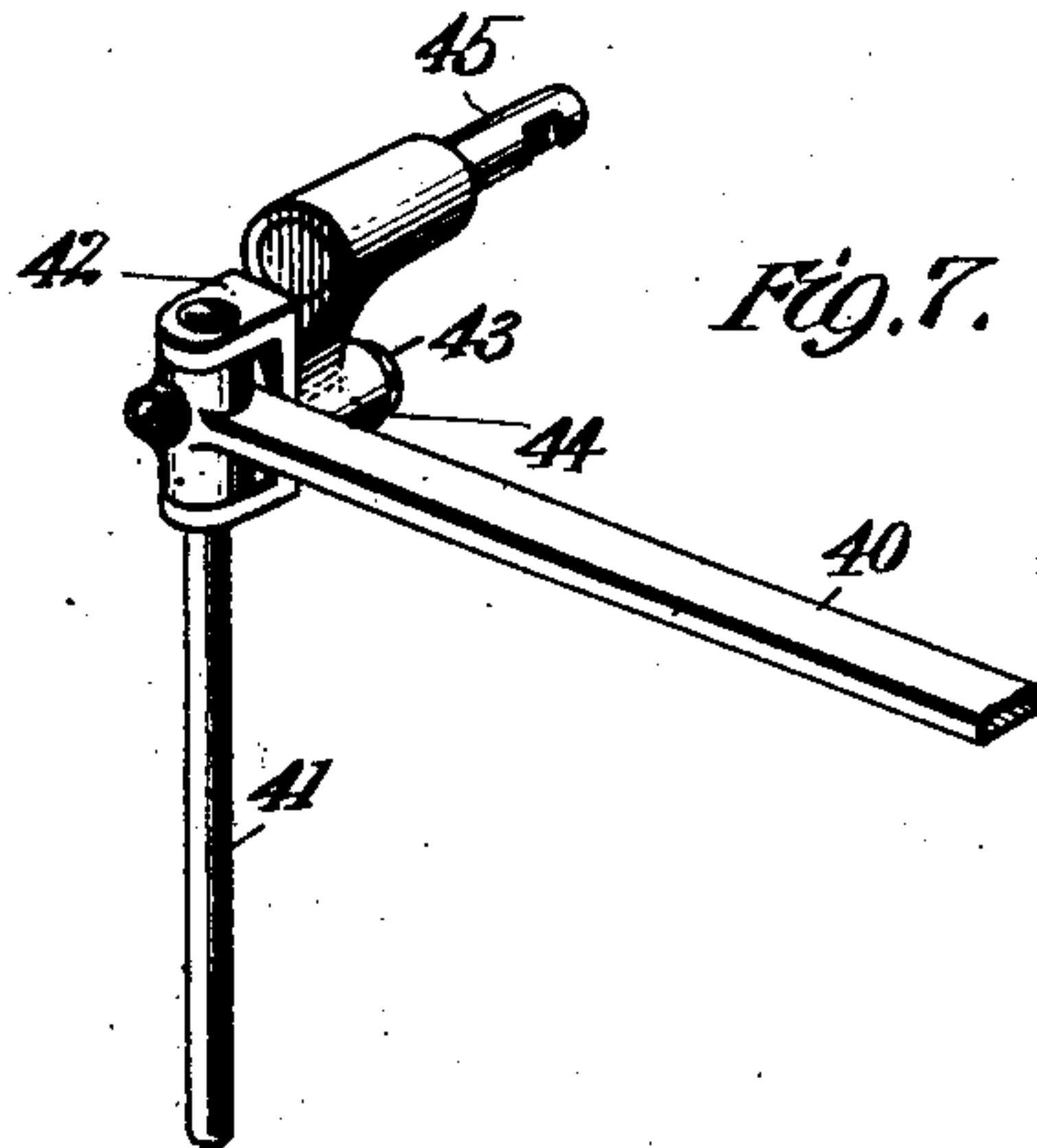
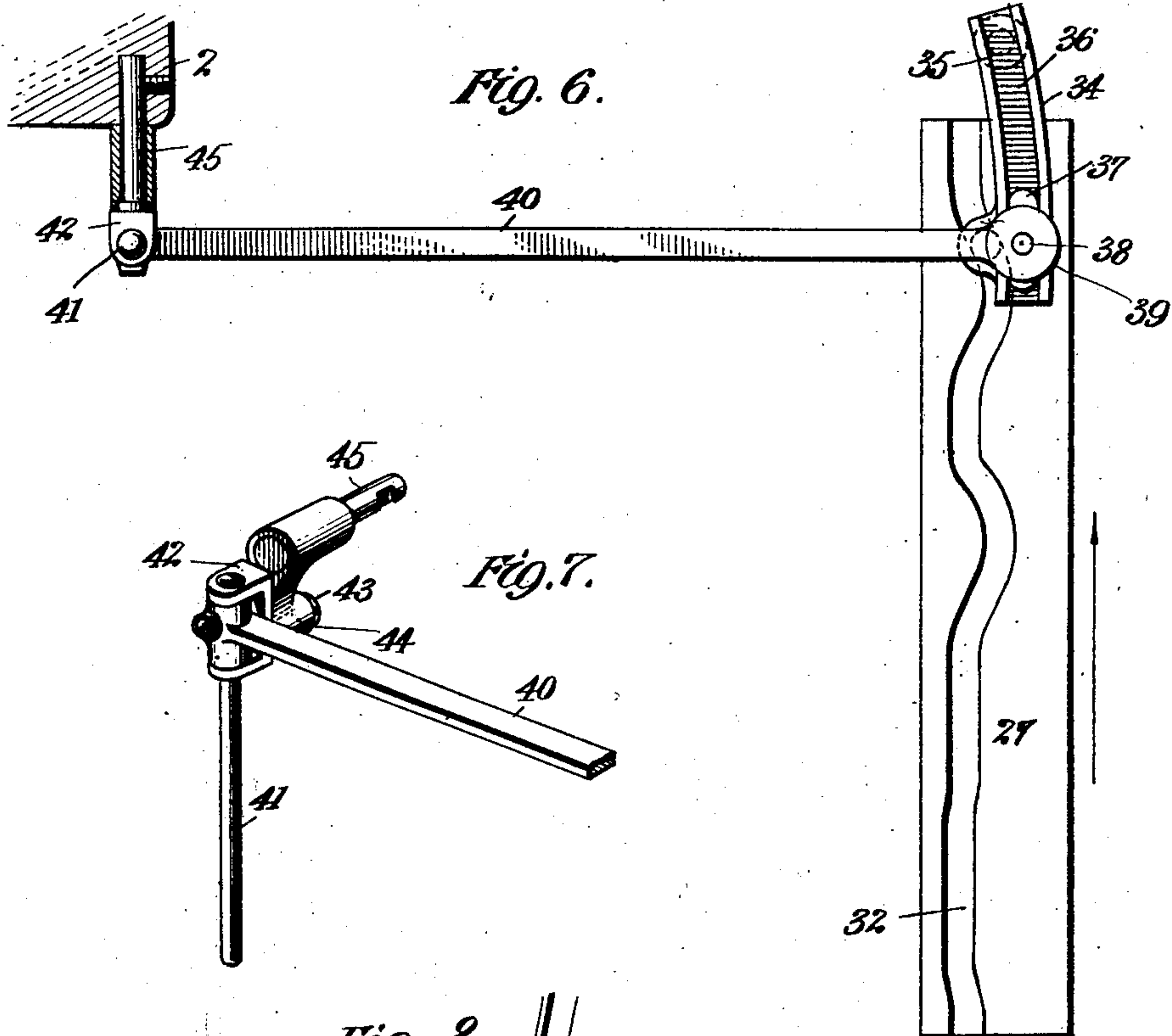
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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HEMSTITCH SEWING-MACHINE.

No. 883,879.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed October 7, 1907. Serial No. 896,142.

To all whom it may concern:

Be it known that I, MARTIN HEMLEB, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Hemstitch Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Heretofore many machines have been devised and have gone into use for hemstitch sewing, both double and single, and my improvement consists in the combination of parts hereinafter described and set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine of the well known Singer type embodying my present improvements, with the forward portion of the bed-plate in section, and Fig. 2 a bottom plan view of the machine. Fig. 3 is an elevation of the machine with the face-plate removed, and Fig. 4 a transverse sectional elevation of the same through the upright portion of the bracket-arm rearward of the controlling cam, looking forwardly. Fig. 5 is an enlarged plan view of the forward portion of the bed-plate with the cover-slides removed to expose the loop-taker and adjacent operative parts. Fig. 6 is a plan view of a portion of the needle-vibrating mechanism, showing a development of the controlling cam-groove. Fig. 7 is a perspective view of another portion of the needle-vibrating mechanism. Figs. 8 and 9 are perspective views, respectively, of the needle-clamp with the needle and its connections and the awl-carrier. Fig. 10 is a perspective view of the under side of the throat-plate.

The machine is constructed with a frame comprising the usual bed-plate 1 and overhanging bracket-arm 2 in which is journaled the main-shaft 3 which is provided with the quartering cranks 4 connected by means of pitmen 5 with similar cranks 6 upon the rearward end of the loop-taker actuating shaft 7 journaled in depending bearings 8 of the bed-plate and carrying at its forward end an angular gear 9 meshing with a smaller angular gear 10 upon the vertical loop-taker shaft 11 journaled in a fixed bracket depending from the bed-plate and carrying at its upper end a multiple rotation loop-taker 12, herein represented as of the rotary hook type, in which is disposed the usual bobbin-case 13 provided with

a disk bobbin 14 containing the lower thread. As the gear 9 is double the size of the gear 10, and the shaft 7 is driven, through the crank and pitman connections 4, 5, 6, at the same speed as the main-shaft, it will be observed that the loop-taker shaft makes two rotations to each rotation of the main-shaft.

The usual vertically reciprocating needle-bar 15 is mounted in fixed bearings in the head of the bracket-arm and has a collar 16 connected by means of a link 17 with a crank-pin 18 carried by the crank-plate 19 which is mounted upon the forward end of the main-shaft 3. The lower end of the needle-bar is provided with a block 20 to which is pivoted by means of a pin 21 an oscillating needle-clamp or carrier 22 provided with the usual needle-socket in which is secured by means of the clamp-screw 23 the eye-pointed needle 24 adapted to cooperate with the loop-taker in the formation of stitches. The machine is provided with the tension device 25 and the usual needle-thread guiding devices, and with the link take-up 26 of well known construction.

The needle-vibrating and feeding movements are derived from a cam-cylinder 27 mounted loosely upon the stationary shaft 28 mounted in bearings 29 upon the side of the bracket-arm parallel with the main-shaft, such cam-cylinder having secured thereto a gear-wheel 30 meshing with a pinion 31 of one-third its size fixed upon the main-shaft, whereby the cam-cylinder is driven at one-third the speed of the main-shaft.

The cam-cylinder 27 is provided with a peripheral cam-groove 32 entered by a roller-stud 33 depending from a vibrating lever 34 fulcrumed by means of a vertical stud 35 upon the top of the bracket-arm 2 and provided with a dovetailed groove 36 entered by a block 37 of similar form adjustable in said groove toward and from the stud 35 and adapted to be clamped in position therein by means of the screw-stud 38 and clamp-nut 39. Pivottally connected with the block 37 by means of the screw-stud 38 is one end of a link 40 whose opposite end is fixed to the upper end of a vertical guide-pin 41 journaled in a forked bearing block 42 pivottally connected by means of a stud-screw 43 with a depending crank-arm 44 journaled upon a horizontal stud 45 mounted upon the head of the bracket-arm. To the guide-pin 41 is loosely fitted a sleeve 46 swiveled to the up-

per end of a vibrating lever 47 having its offset lower end fixed to the needle-clamp fulcrum-pin 21. The rotation of the cam-cylinder 27, imparts vibratory movements to the lever 34 which are communicated through the link 40, guide-pin 41, lever 47, and needle-clamp 22, to the needle 24, whose lateral movements are in a direction transverse to the path of rotation of the beak of the loop-taker at the loop-taking position.

The block 20 at the lower end of the needle-bar is provided with a lateral ear 48 to which is fitted the transverse channel 49 in an ear 50 of the awl-carrier 51 having vertical sockets entered by the offset shanks of the awls 52 secured therein by means of clamp-screws 53, the awl-carrier 51 being secured adjustably in place by means of a clamp-screw 54. The awls 52 are shown herein arranged in line with the needle in one of its lateral positions, and are spaced respectively a stitch-length in front of and behind the same, and are adapted to be adjusted toward and from the needle by turning in their respective sockets in the carrier 51 to conform with the adjustment of the feeding mechanism.

The feed-dog 55 is mounted upon the usual feed-bar 56 pivotally connected at one end with the vertical arms 57 upon the forward end of the rock-shaft 58 journaled beneath the bed-plate and provided at its rearward end with a crank-arm 59 pivotally connected with the lower end of a link-bar 60 fulcrumed near its upper end upon a pin 61 at one end of a link 62 pivoted at 63 to one arm of the feed-adjusting angle-lever 64 fulcrumed at the junction of its arms upon the bracket-arm and having its other arm provided with a thumb-screw 65; the upper extremity of the link-bar 60 being forked to embrace a block having a perforation entered by a lateral pin 67 upon the transversely reciprocating slide-member 68. The slide-member 68 is provided at one end with a pin 69 entering a guiding socket 70 in the bracket-arm and forked at its other end to embrace a guide-block 71 mounted upon the shaft 28; the slide-member 68 having a laterally projecting roller-stud 72 entering a cam-groove 73 in the rearward face of the cam-cylinder 27. The laterally reciprocating movement of the slide-member 68 derived from the cam-groove 73 operates through the link-bar 60 and rock-shaft 58 to communicate to the feed-dog the to-and-fro work-shifting or feeding movements transverse to the lateral movements of the needle.

The end of the feed-bar opposite that connected with the rocker-arms 57 is forked to embrace the usual roller-stud carried by a crank-arm 75 mounted upon the feed lifting rock-shaft 76 journaled beneath the bed-plate and provided with spaced lateral arms 77 intermediate which is pivoted the lower

end of a link 78 pivotally connected at the upper end with a depending arm 79 of an angular lever fulcrumed at 80 upon the bracket-arm and provided with a lateral arm 81 having a roller-stud 82 which enters a cam-groove 83 in the forward face of the cam-cylinder 27; the cam-groove 83, through the link 78 and rock-shaft 76 controlling the rising and falling movements of the feed-bar, and hence of the feed-dog between which and the presser-foot 84, of usual or well-known form, the work is fed.

The throat-plate 85 is provided with the usual feed-dog apertures 86 and has on the side adjacent the loop-taker a depending lug 87 provided with a notch 88 entered by the lateral lug 89 upon the top of the bobbin-case, whereby the latter is prevented from rotation with the hook by which the same is supported. The throat-plate is also provided with a transverse needle-slot 90 and with awl-holes 91 forward and rearward of the same to receive the awls 52.

As herein represented, the loop-taker shaft is provided with an eccentric 92 embraced by a yoke 93 upon a rock-shaft 94 mounted in the loop-taker shaft supporting bracket and provided with an arm 95 carrying a bobbin-case shifting finger 96 engaging a laterally projecting shoulder 97 upon the bobbin-case, whereby the latter is turned in opposition to the hook to relieve the pressure of the lug 89 against the forward wall of the notch 88 in the throat-plate to release the needle-thread loop cast about the bobbin-case in the production of each stitch.

To insure the proper coöperation of the needle with the loop-taker, an arm 98 fixed to the under side of the bed-plate is extended into proximity with the needle path, where it is provided with a guiding notch 99 to receive the needle in its descents off the hem of the goods.

As represented in Fig. 1, the needle 24 is in the position which it assumes as it is about to penetrate the hem of the material, being parallel with the axis of the needle-bar 15 and the awls 52, and in operative relation with the path of movement of the beak of the hook in which position it presents its loops of needle-thread to the latter.

The operation of the several coöperative parts of the stitch-forming and feeding devices is substantially the same in the present improvement as in machines heretofore constructed, and is briefly as follows:—The needle first descends in its outer position, with the point substantially in line with the awls 52. After the needle has penetrated the goods, the lever 47 is shifted to the left so as to bring the needle to the right and into normal loop-presenting relation with the hook, and upon its initial rising movement offers the loop which is seized by the hook and cast about the thread-case and the stitch is set by

means of the take-up. Before the next descent of the needle the forward feeding movement is effected, and the needle being shifted into the hem penetrating position, represented in Fig. 1, descends and presents a second loop for seizure by the loop-taker and the second stitch is produced. A third stitch is produced after a second forward feeding movement of the goods, with the needle movements similar to those of the first stitch, after which a reverse feeding movement is effected preparatory to the repetition of the series of three stitches with intermediate feeding movements. The lateral movements of the needle while in the material in the production of the stitches off the hem not only serve to enlarge the needle-hole to crowd the threads of the body material toward the edge of the hem, but enables the needle to present its loop to the beak of the hook invariably at the same point so as to insure against skipping of stitches.

I prefer to have my loop-taker driven by a vertical shaft geared to the longitudinal shaft rather than driven directly by the longitudinal shaft itself, as is common in sewing machines for stitching in general, including hemstitching, for the reason that by having the loop-taker so arranged my machine is capable of being employed either for making a single or a double hemstitch. When used for the single hemstitch only one loop-taker will be employed as shown in the drawings. But if the double hemstitch or spoke-stitch is desired, the loop-taker may be duplicated on the opposite side of the needle because capable of being mounted upon a separate vertical shaft; a space being shown provided in the frame of the machine at 100, as represented in Figs. 1 and 2.

In the accompanying drawings I have shown the awl carrier provided with two awls disposed, respectively, in advance and rearward of the needle, which is desirable in certain classes of work to insure the formation of holes of the requisite size off the hem, but in some instances only one awl is employed, in which case the forward awl is usually dispensed with, and the rearward awl only is employed to complete the enlargement of the hole formed by the needle.

From the foregoing description it will be observed that the present improvement involves a combination of certain constructive features which, while not individually new, are for the first time so associated together as to produce a high-speed hemstitch machine. One of the essentials involved in the accomplishment of this result is the adaptation to hemstitch mechanism of a loop-taker capable of effective cooperation with the needle at a high rate of speed, combined with actuating mechanism therefor deriving its operative movements directly from the main-shaft and entirely unloaded by other moving

parts of the machine for which such class of mechanism has heretofore been generally used.

So far as I am aware, the present is the first time in which a rotary loop-taker actuating shaft driven by the main-shaft has ever been used in hemstitch machines entirely unloaded by the feed or other actuating mechanism; as also the first instance in a hemstitch machine in which a rotary loop-taker has been given a plurality of rotations to each reciprocation of the needle through the instrumentality of a rotary actuating shaft driven from the main-shaft and entirely unloaded with mechanism for actuating other operative parts.

One form of the development of the principle of this invention is shown in my application filed December 20, 1907, Serial No. 407,413.

Having thus set forth the nature of the invention, what I claim herein is:—

1. A hemstitch sewing machine comprising a frame including a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a rotating loop-taker shaft journaled beneath the bed-plate, a loop-taker mounted upon said loop-taker shaft, speed accelerating actuating mechanism connected with and driven by the main-shaft and adapted to impart to the loop-taker shaft a plurality of rotations for each rotation of the main-shaft, a reciprocating and laterally movable needle adapted to cooperate with said loop-taker in the production of stitches, feeding mechanism for shifting the work in relation to the stitch-forming mechanism, and connections intermediate the main-shaft and the needle and feed mechanisms whereby reciprocatory and lateral movements are imparted to the needle and operative movements are imparted to the feed mechanism, said connections being independent of the actuating mechanism for the loop-taker.

2. A hemstitch sewing machine, comprising a frame including a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a loop-taker, a rotary shaft therefor mounted in fixed bearings beneath the bed-plate and secured from endwise movement, speed accelerating actuating mechanism connected with and driven by the main-shaft and adapted to impart to the loop-taker shaft a plurality of rotations for each rotation of the main-shaft, a needle-bar mounted in fixed bearings in said bracket-arm, means connected with said main-shaft for reciprocating said needle-bar, a needle-carrier movably mounted upon said needle-bar, a needle mounted in said needle-carrier and movable with the same laterally toward and away from the path of movement of the point of said loop-taker, an awl carried by said needle-bar and disposed rearward of

said needle, feeding mechanism operative in a direction transverse to the plane of lateral movement of said needle, a cam mounted on the bracket-arm of the machine and operatively connected with said main-shaft, and connections from said cam to the needle-carrier and to the feeding mechanism for imparting lateral movements to the former and operative movements to the latter.

10 3. A hemstitch sewing machine, comprising a frame including a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a loop-taker, a rotary shaft therefor mounted in fixed bearings beneath the bed-plate and secured from endwise movement, speed accelerating actuating mechanism connected with and driven by the main-shaft and adapted to impart to the loop-taker shaft a plurality of rotations for each rotation of the main-shaft, a needle-bar mounted in fixed bearings in said bracket-arm, means connected with said main-shaft for reciprocating said needle bar, a needle carrier movably mounted upon said needle-bar, a needle mounted in said needle-carrier and movable with the same laterally toward and away from the path of movement of the point of said loop-taker, an awl carried by said needle-bar and disposed rearward of said needle, feeding mechanism operative in a direction transverse to the plane of lateral movement of said needle, a cam mounted on the bracket-arm of the machine with its axis of motion parallel with the main-shaft, and connected with the latter by means of intermeshing spur gears to impart to said cam rotations at one-third the speed of the main-shaft, and connections from said cam to the needle-carrier and to the feeding mechanism for imparting lateral movements to the needle-carrier and operative movements to the feeding mechanism.

45 4. A hemstitch sewing machine, comprising a frame including a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a loop-taker, a rotary shaft therefor mounted in fixed bearings beneath the bed-plate and secured from endwise movement, speed accelerating actuating mechanism connected with and driven by the main-shaft and adapted to impart to the loop-taker shaft a plurality of rotations for each rotation of the main-shaft, a needle-bar mounted in fixed bearings in said bracket-arm, means connected with said main-shaft for reciprocating said needle-bar, a needle-

carrier pivotally mounted upon and movable with said needle-bar, a needle mounted in said carrier and movable with the same laterally toward and away from the path of movement of the point of said loop-taker, an awl carried by said needle-bar and disposed rearward of said needle, feeding mechanism operative in a direction transverse to the plane of lateral movement of said needle, a cam-carrying countershaft mounted on the bracket-arm, a cam upon said cam-shaft, gearing intermediate the main-shaft and said cam for producing the rotation of the latter at one-third the speed of the former, and connections from said cam to the needle-carrier and to the feeding mechanism for imparting operative movements to the same.

5. A hemstitch sewing machine, comprising a frame including a bed-plate and an overhanging bracket-arm, a main-shaft journaled in said bracket-arm, a loop-taker, a rotary shaft therefor mounted in fixed bearings beneath the bed-plate and secured from endwise movement, speed accelerating actuating mechanism connected with and driven by the main-shaft and adapted to impart to the loop-taker shaft a plurality of rotations for each rotation of the main-shaft, a needle-bar mounted in fixed bearings in said bracket-arm, means connected with said main-shaft for reciprocating said needle-bar, a needle-carrier pivotally mounted upon and movable with said needle-bar, a needle mounted in said carrier and movable with the same laterally toward and away from the path of movement of the point of said loop-taker, an awl carried by said needle-bar and disposed rearward of said needle, feeding mechanism operative in a direction transverse to the plane of lateral movement of said needle, a cam mounted on the bracket-arm of the machine and operatively connected with said main-shaft, connections intermediate said cam and needle-carrier for imparting to the needle its lateral movements, and connections from said cam to the feeding mechanism for imparting to the latter both feeding and rising and falling movements.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MARTIN HEMLEB.

Witnesses:

HENRY J. MILLER,
HENRY A. KORNEBANN.