

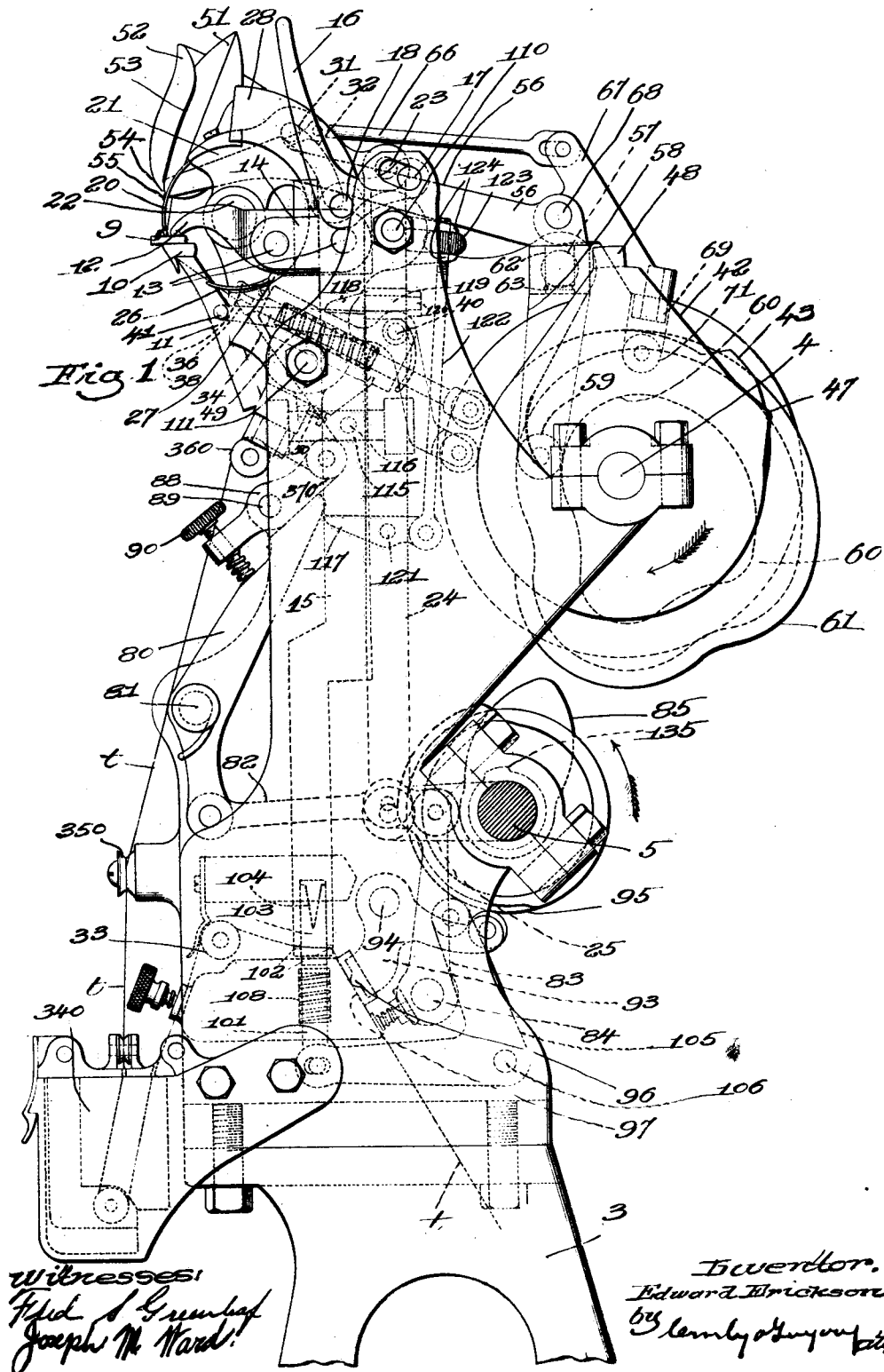
E. ERICKSON.
SEWING MACHINE.

APPLICATION FILED DEC. 11, 1909.

Patented July 23, 1912.

10 SHEETS—SHEET 1.

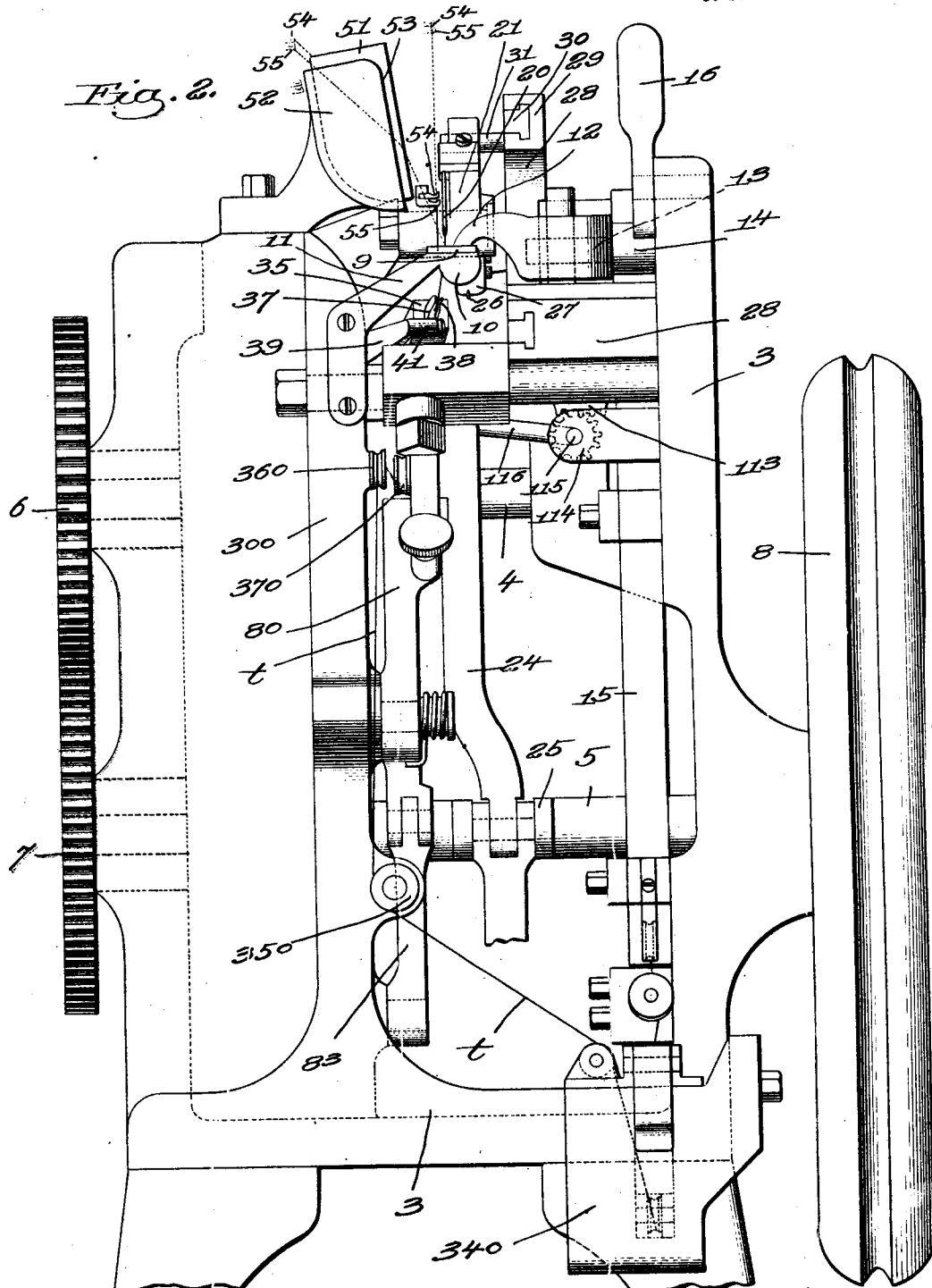
1,033,564.



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10 SHEETS—SHEET 2.

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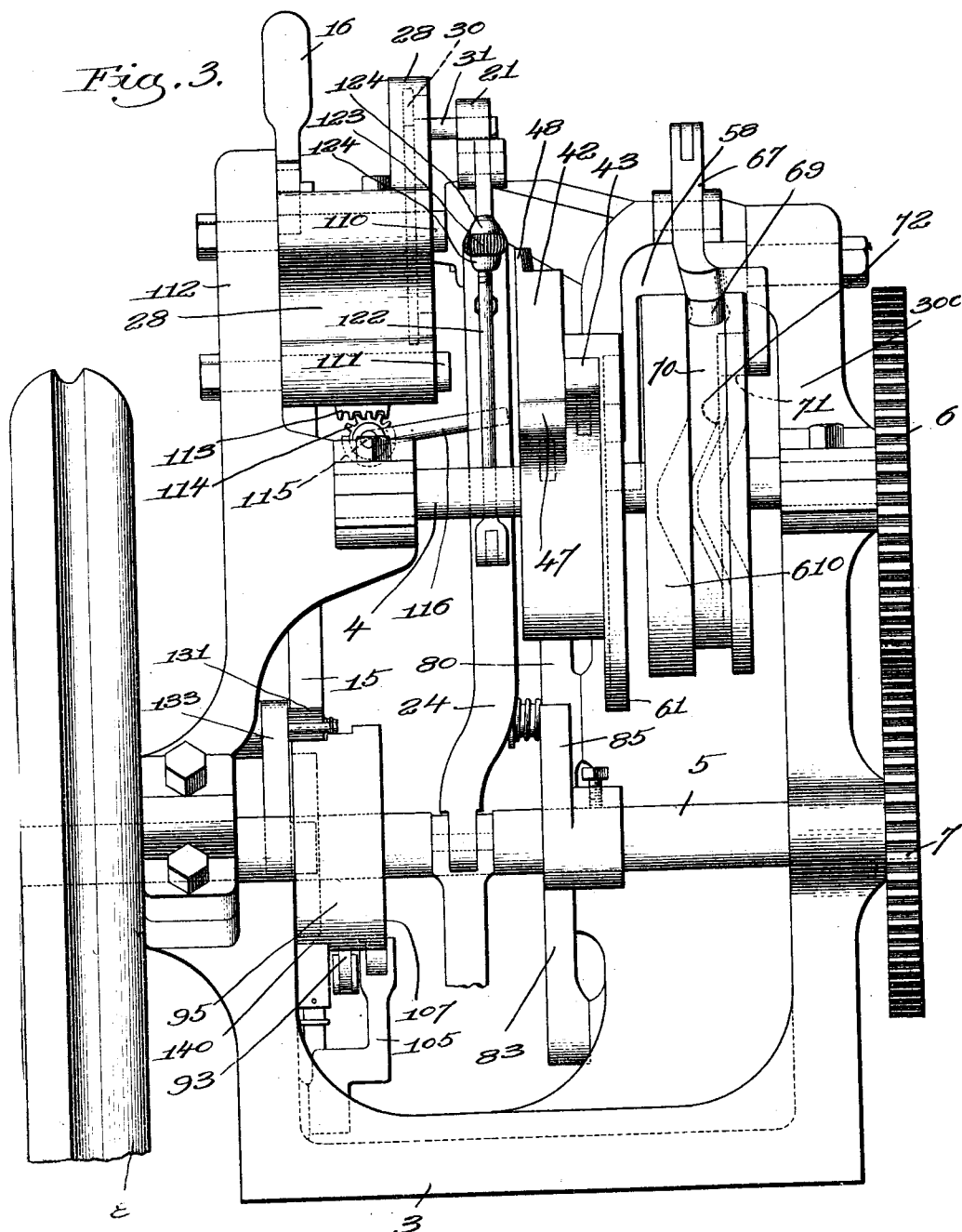


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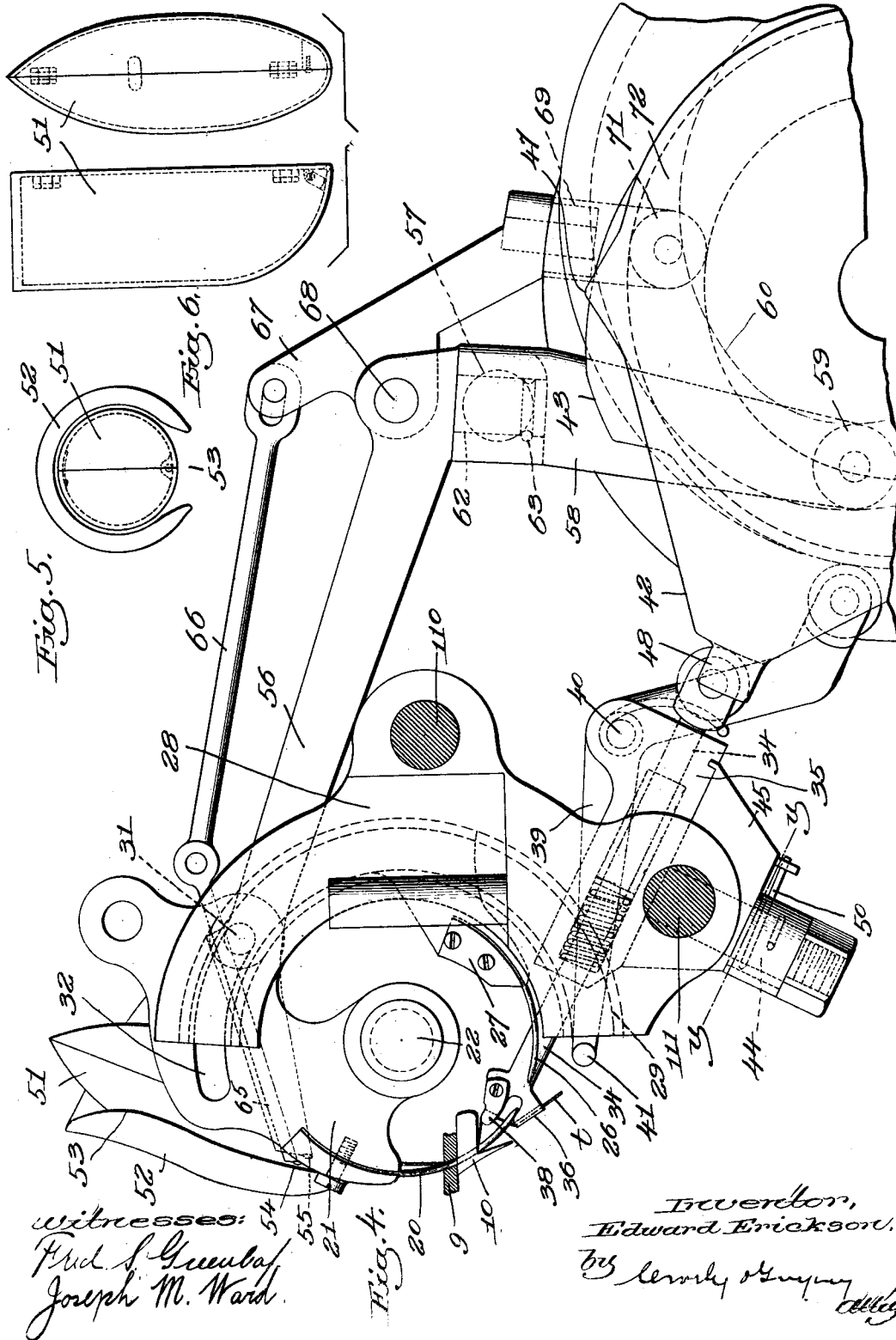
10 SHEETS—SHEET 3.



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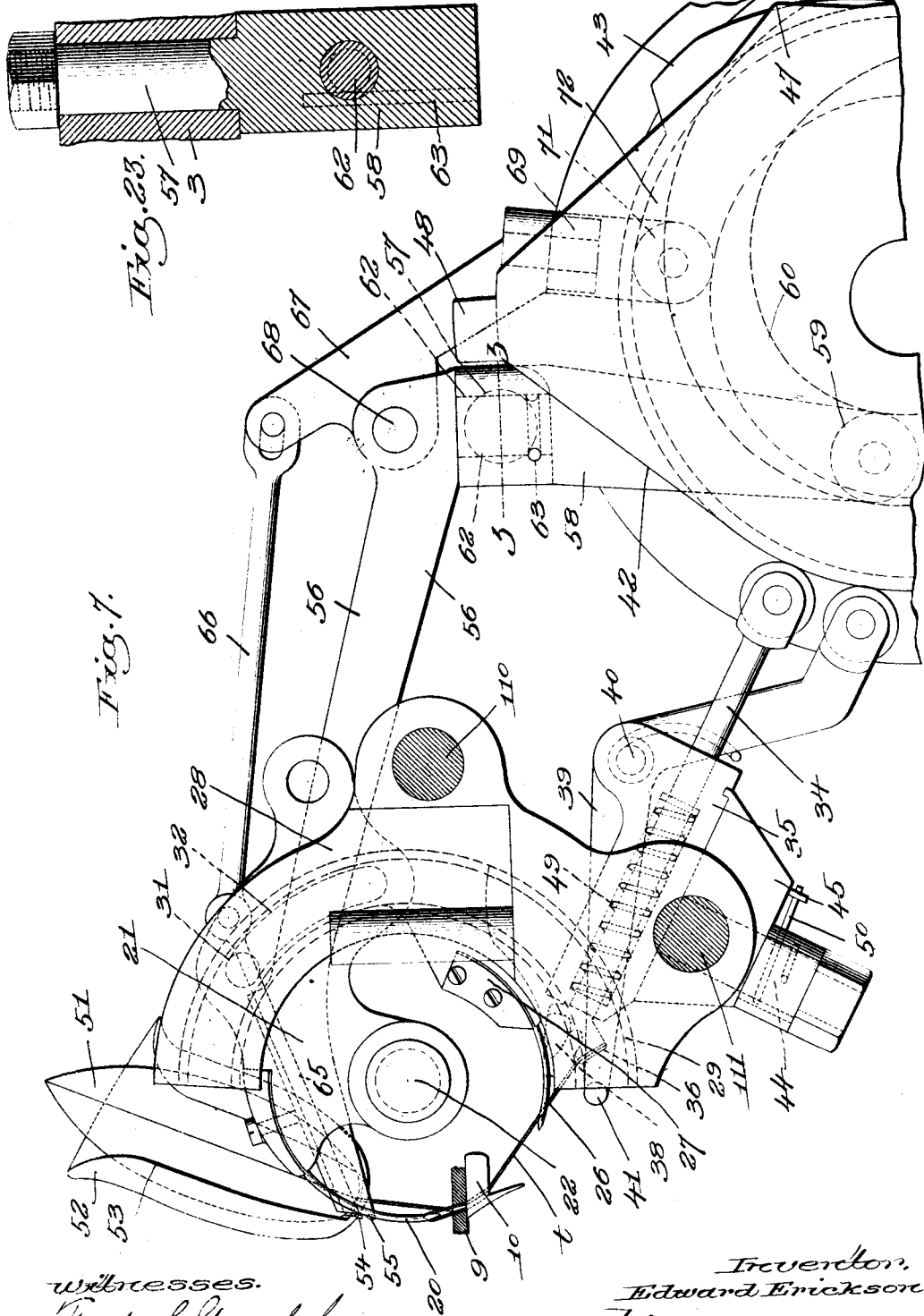


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10 SHEETS—SHEET 5.



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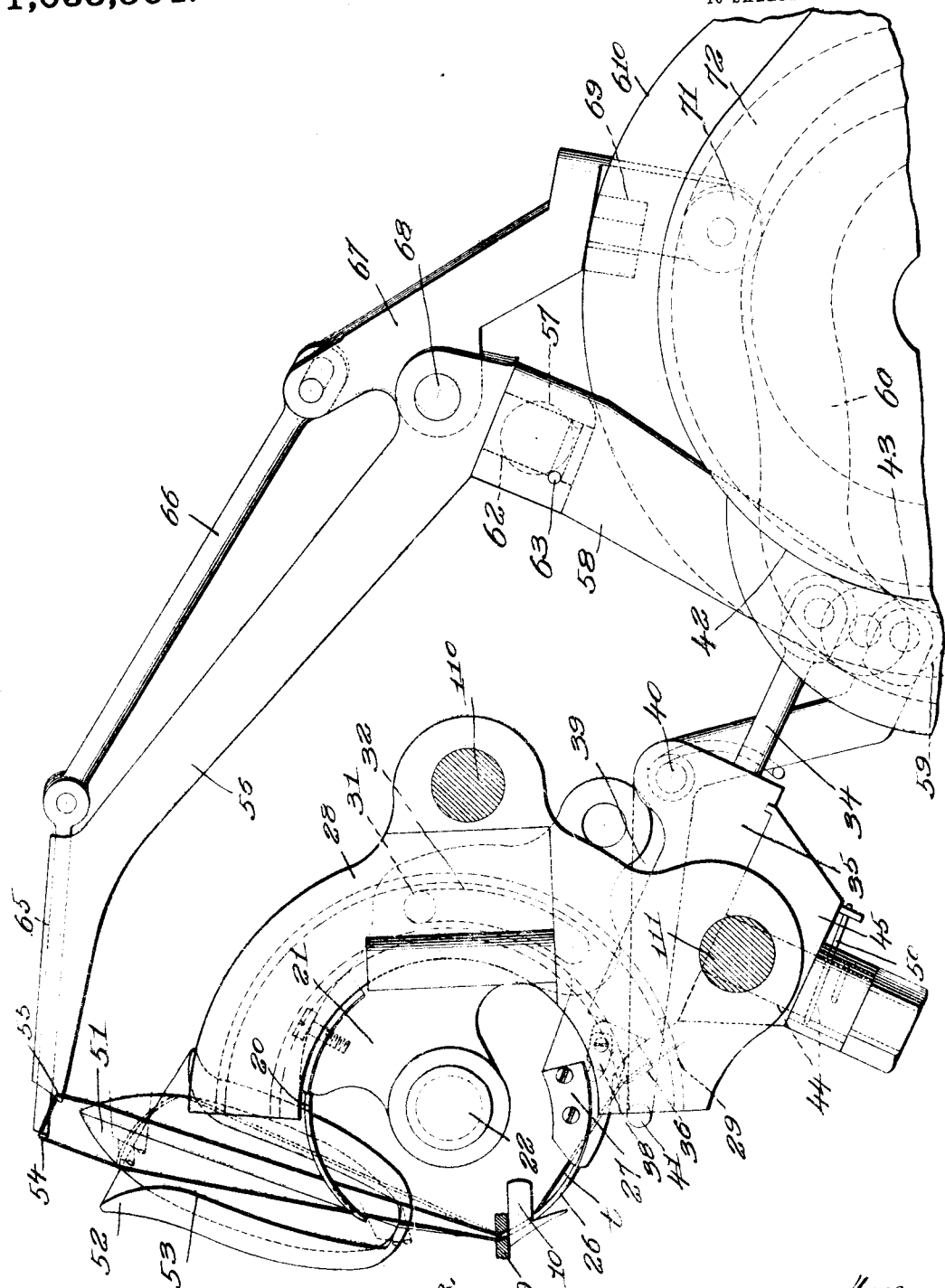


Fig. 8.

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10 SHEETS—SHEET 7.

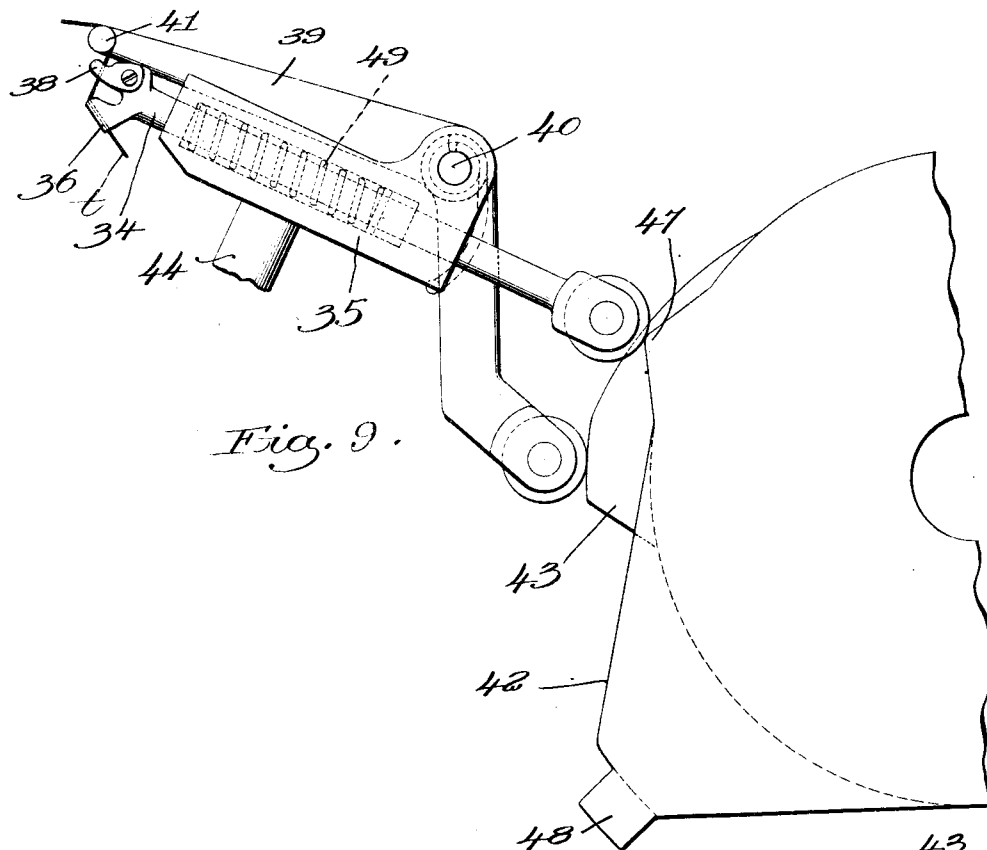


Fig. 9.

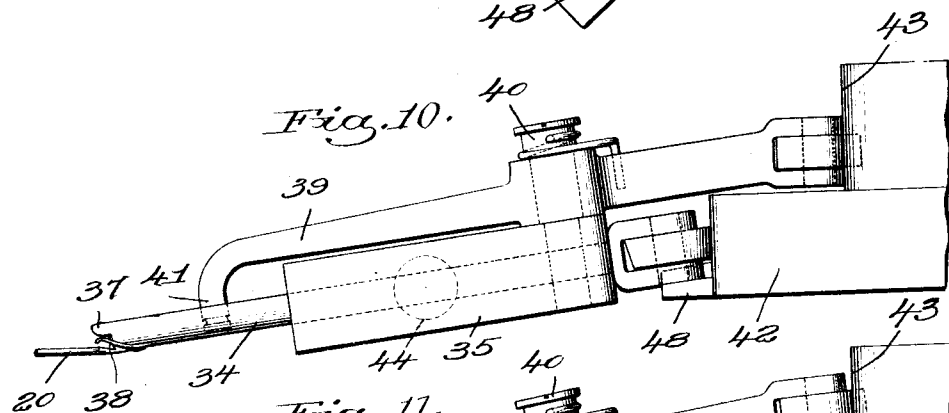


Fig. 10.

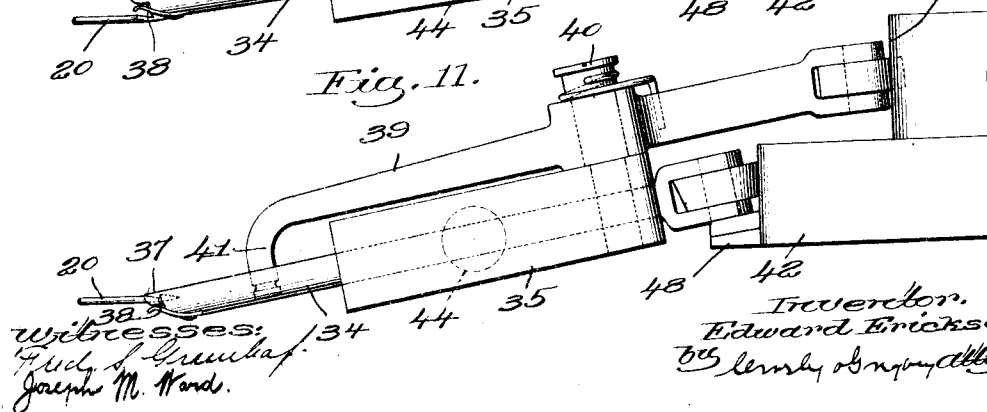


Fig. 11.

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10 SHEETS—SHEET 8.

Fig. 21 is a perspective view of the tool holder assembly. It shows the tool holder (20) and the tool (21) mounted on it. The tool holder is a rectangular block with a central slot. The tool is a long, thin rod with a pointed tip. The tool is inserted into the slot of the tool holder. The tool holder is shown in a perspective view, and the tool is shown in a side view.

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Fig. 18.

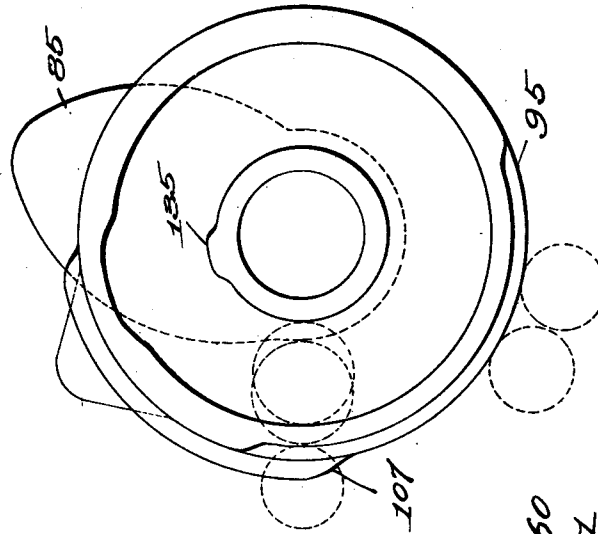
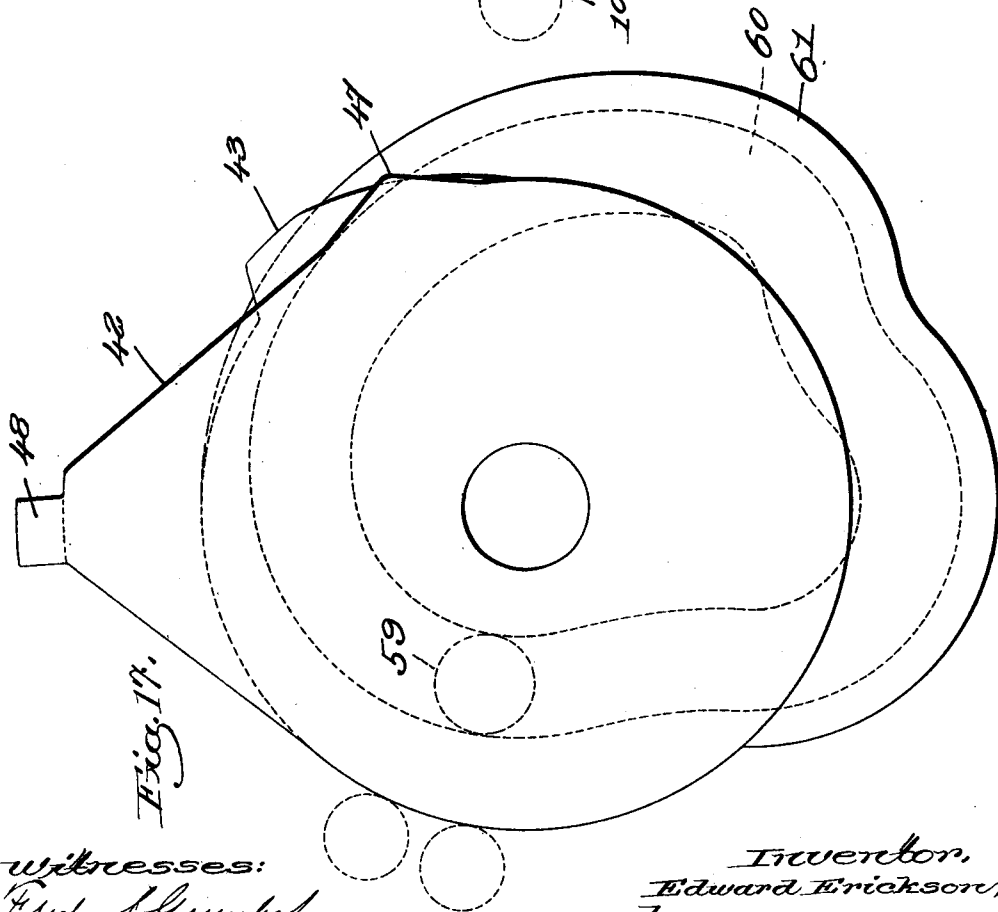


Fig. 17.



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Fig. 19.

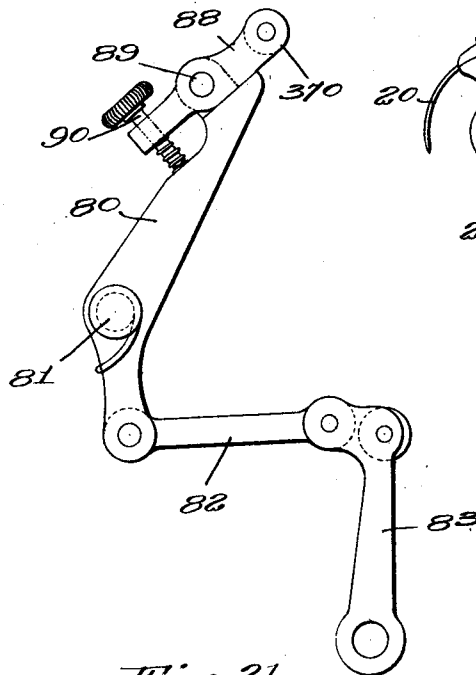


Fig. 20.

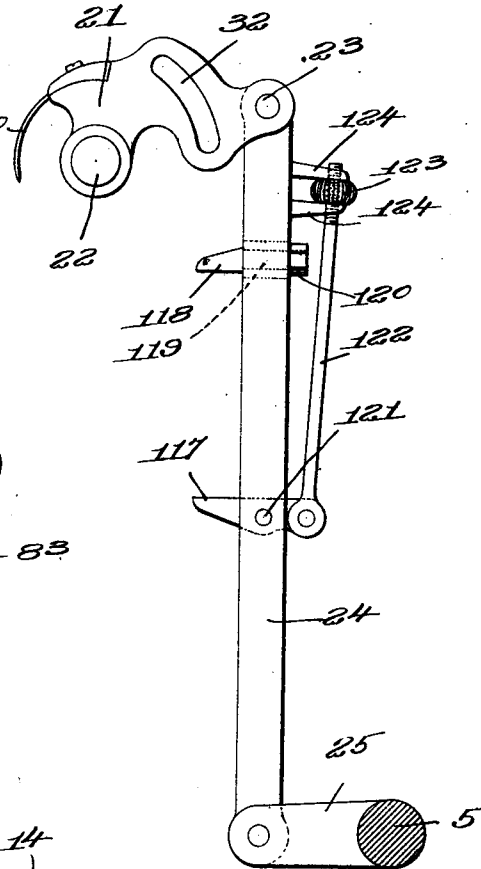


Fig. 21.

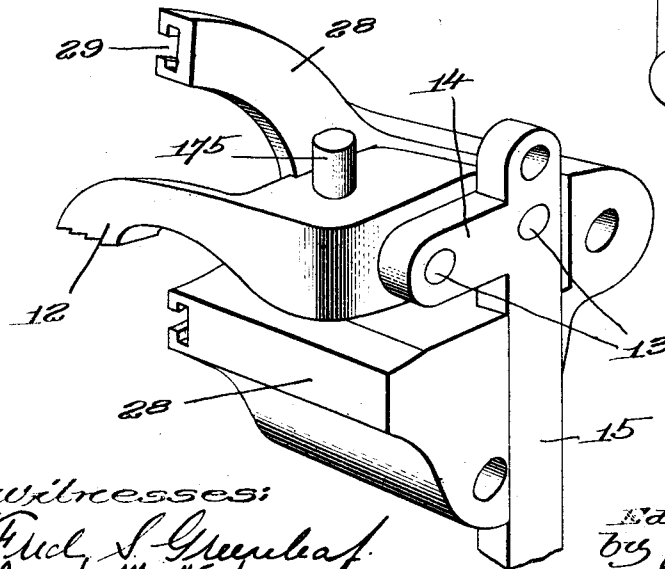
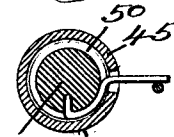


Fig. 22.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

1.033,564.

Specification of Letters Patent.

Patented July 23, 1912.

Application filed December 11, 1909. Serial No. 532,602.

To all whom it may concern:

Be it known that I, EDWARD ERICKSON, a subject of the King of Sweden, residing at Lynn, county of Essex, and State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to sewing machines and especially to machines of the lock-stitch type wherein the stitch is made by the interlocking of a needle thread and a shuttle thread. In all sewing machines of this character with which I am familiar, the shuttle is a movable element and the interlocking of the threads is secured by driving the shuttle through a loop formed in the shuttle thread. In my improvement the shuttle is a stationary affair and the interlocking of the threads is secured by passing the loop of needle thread from the needle over the stationary shuttle.

My invention also comprehends a novel arrangement whereby the awl-carrier is operated from the needle-carrier, thus obviating any separate mechanism for giving the awl its movement, and said invention also comprehends other novel features relating to the manner of feeding the work and of making the stitch, all as will be more fully hereinafter described and then pointed out in the appended claims.

In the drawings I have illustrated in detail a selected embodiment of my invention which is sufficient to demonstrate the principle of the invention, but I wish it understood that the invention is not confined to the particular constructions illustrated.

Figure 1 is a side view of a sewing machine embodying my invention; Fig. 2 is an enlarged front view of the head; Fig. 3 is an enlarged rear view of the head; Fig. 4 is a view showing the stitching mechanism; Fig. 5 is a plan view of the shuttle and its holder; Fig. 6 is a side view of the shuttle; Figs. 7 and 8 are views of the stitching mechanism similar to Fig. 4 but showing the parts in different positions; Fig. 9 is a side view of the looping mechanism; Figs. 10 and 11 are plan views of the looping mechanism; Fig. 12 is a side view of the needle-carrier and needle; Fig. 13 is a front view thereof; Fig. 14 is a view of the guide

for the awl-carrier; Fig. 15 is a side view of the awl-carrier; Fig. 16 is a front view of the awl-carrier; Fig. 17 is a view showing some of the cams on the cam-shaft; Fig. 18 is a similar view showing the cams on the main shaft; Fig. 19 is a detail showing the take-up; Fig. 20 is a detail showing the mechanism for operating the needle-carrier; Fig. 21 shows the presser-foot and the holder or slide for supporting the awl-carrier; Fig. 22 is a section on the line $y-y$, Fig. 4; Fig. 23 is an enlarged section on the line $z-z$, Fig. 7.

My improved sewing machine embodies the principal elements usually found in sewing machines, that is, an awl for penetrating the work, a needle for drawing the loop of needle thread through the work, a looper to loop the thread into the eye of the needle, a shuttle carrying a shuttle thread which is interlocked with the needle thread for forming the stitch, feeding mechanism for feeding the work, and a take-up for tightening the stitch. My improved sewing machine, however, differs from prior sewing machines in many features, all as will be more fully hereinafter described.

The various parts of the device are supported on a frame 3 which may have any suitable or usual construction and which carries a cam-shaft 4 on which are mounted the cams for operating the loop-opener and the looper mechanism, and a main or driving shaft 5 on which are mounted the cams for operating the needle, the take-up and the thread-measuring device. The cam-shaft 4 is driven from the main shaft 5 by means of intermeshing gear wheels 6 and 7 that are carried by said shafts respectively. The main shaft 5 may be driven in any suitable way, either by a foot treadle or by a driving pulley 8. When said shaft is driven by foot power, the pulley 8 may act as a balance wheel. The work or material 9, which is being sewed, is supported on a work rest 10 which is herein shown as supported by an arm 11 secured to the side 300 of the head of the frame 3. The work is held to the work rest by means of a presser-foot 12 which in the present embodiment has a rising and falling movement to permit feeding of the work and also a lateral movement, all as will be more fully hereinafter described. This presser-foot is slidably mounted on two

pins 13 extending from the head or end 14 of a rising and falling bar 15, the function of which will be more fully hereinafter described. A hand lever 16 pivoted to the frame at 17 and also pivoted at 18 to the upper end of the bar 15 serves as a means for manually lifting the presser-foot.

The needle, shown at 20, is a curved needle and is carried by a needle-carrier 21 which is mounted to oscillate on a fixed stud 22 extending from the side 300 of the frame. This needle-carrier receives its oscillating movement from the main shaft 5, and for this purpose said carrier has pivoted thereto at 23 a link 24 which is connected to a crank 25 formed on the main shaft 5. The awl, which is also curved, is shown at 26 and is secured to an awl-carrier 27 that is mounted to have an oscillating movement about the stud 22 as a center. The awl-carrier, however, is not mounted on the stud but is mounted to slide in a guiding member 28 which is provided with the curved way 29 into which fits a curved rib 30 formed on the awl-carrier. The awl is operated by the needle-carrier and for this purpose said awl-carrier has projecting therefrom a stud 31 which extends into and through a curved slot 32 formed in the needle-carrier so that when the needle oscillates, the pin 31 will be engaged by the ends of the slot 32 and the awl-carrier will thus be given its proper movement. For instance, when the parts are in the position shown in Fig. 4 with the needle inserted through the work, the awl will be retracted and upon movement of the needle-carrier from the position shown in Fig. 4 to that shown in Fig. 7, the awl will remain stationary because the slot 32 will merely move over the pin 31. Upon further movement of the needle-carrier into the position shown in Fig. 8, however, the awl-carrier is moved with the needle-carrier, thus causing the awl to penetrate the work. One advantage of thus operating the awl-carrier from the needle-carrier is that the number of parts is reduced and the mechanism is simplified.

The thread *t*, which may be taken from any suitable source of thread supply, if first passed through a thread measurer, hereinafter described, then is fed over a guide roll 33, see Fig. 1, through a wax pot 340 of any suitable construction, and from the wax pot over a tension roll 350 and thence over a guide roll 360 to a take-up 370, and from the latter to a looper mechanism which places the thread *t* in the hook of the needle. This looper mechanism is shown in detail in Figs. 9 to 11, and it comprises a looper and a thread placer. The looper is shown as a member 34 slidably mounted in a block 35 and carrying at one end an eye 36 through which the thread *t* passes and provided also with a thread-

holding finger 37 separated from the eye. This thread-holding finger has co-acting therewith a spring 38 which forms a space between it and the finger into which the thread may be laid, said spring 38 serving to yieldingly hold the thread against the finger 2. The finger 37 and spring 38 constitute an open eye having a resilient throat into which the thread may be placed. The thread placer is shown at 39 and it comprises an arm pivoted at 40 on the block 35 and having at one end a lateral extension 41 adapted to engage the thread and place it between the spring 38 and the finger 37. The looper 34 has a sliding movement through the block 35 and such movement is given to the looper by a cam 42 mounted on the cam-shaft 4. The thread placer is operated by a cam 43 also mounted on the cam-shaft 4. When the parts are in their normal positions such as shown in Fig. 1, the arm 41 of the thread placer is below the thread and the latter passes simply through the eye 36. While the needle is passing down through the work the cam 43 first operates the thread placer to lift the thread up, as shown in Fig. 9, and at the same time, the rise 47 on the cam 42 engages the roll at the end of the looper and forces the same forwardly with the result that the thread is carried in between the finger 37 and the spring 38. After this occurs the cam 42 throws the looper forwardly so that when the needle has completely entered the work, as shown in Fig. 4, the hooked end of the needle will be in line with the space between the eye 36 and the finger 37. The block 35 is mounted to turn laterally, this being provided for by supporting said block on a stud 44 which is mounted to turn in a part 45 of the frame. When the parts are in the position shown in Fig. 4 a cam projection 48 on the cam 42 engages the end of the looper and turns the block 35 laterally, thus swinging the opposite end of the looper toward the needle and carrying the portion of the thread between the eye 36 and the finger 37 into the barb or hook of the needle, as clearly seen in Fig. 11. While the parts are in this position, the needle is retracted, as shown in Fig. 7, and at the same time the looper passes off from the rise of the cam 42 and is returned to its normal position by the spring 49, during which operation the thread is drawn out from between the finger 37 and the spring 38. The block 35 is restored to its normal position by a spring 50 which encircles the stud 44 and is connected thereto at one end. The loop of thread which is drawn through the work by the needle is then passed over the shuttle so as to be interlocked with the shuttle thread.

In my invention the shuttle is stationary and this interlocking of the shuttle thread

and the needle thread is secured by removing the loop from the needle and then passing it over the stationary shuttle. The shuttle is shown at 51 and it is mounted in a shuttle holder 52 which is open at the side adjacent the needle, as at 53, and which is flared at its upper end, the shuttle being also pointed at this end so that when the loop of needle thread is dropped over the top of the shuttle, said loop will pass down between the shuttle and the holder 52 and will be drawn off at the lower end of the shuttle. The loop of needle thread is taken from the needle after said loop has been drawn through the material by means of a loop-opener, and said loop-opener is arranged to spread the loop and drop it over the shuttle. The loop-opener which I have herein shown comprises two fingers 54 and 55 which are mounted to have a movement relative to the needle to pick the loop of thread off from the needle, and which also have a movement relative to each other to spread the loop and drop it over the shuttle. The finger 55 is shown as carried by the end of an arm 56 which is swiveled to another arm 58 that is provided with a roll 59 that runs in a cam groove 60 formed in a cam member 61 on the cam-shaft. The arm 58 is mounted on a stud 57 that is journaled in the frame (see Fig. 23) and by its movement the arm 56 is raised and lowered. Said arm 56 is swiveled to the arm 58 by providing the former arm with a stud 62 which sets in an aperture in the end of the arm 58, said stud being locked in place by the key 63 which fits into a groove formed in the end of the stud 62, and this construction permits the arm 56 to swing laterally to cause the fingers 54, 55 to enter the loop of needle thread as more fully hereinafter described. The finger 54 is carried by a slide 65 which slides back and forth in the arm 56 and which is connected by a link 66 with a lever 67 that is pivoted to the arm 56 at 68 and that is provided with a roll 69 working in a cam groove 70 formed in a cam member 610 mounted on the cam-shaft 4. Said lever 67 is also provided with a roll 71 that works in a concentric face groove 72 formed in said cam member 610. These cams are so arranged that the fingers operate as follows:

While the loop of thread is being drawn through the material, the fingers occupy the position shown in Fig. 7, and when the needle has lifted the loop of needle thread up to a level with the fingers, the cam groove 70 operates on the roll 69 thereby to throw the fingers laterally slightly, so that they will enter the loop of needle thread, and the cam groove 60 then operates to rock the lever 56 and elevate the fingers into the position shown in full lines in Fig. 8, thus carrying the loop of needle thread out from

the needle and up above the shuttle. The relation between the cam grooves 70 and 60 is such as to give the fingers 54 and 55 a movement away from each other as the arm 56 rises, as shown in Fig. 8, thus opening the loop, and when the loop is opened, the cam groove 70 gives the lever 67, and consequently the lever 56, a lateral turning movement about the stud 62, thus moving the loop laterally, as shown in dotted lines Fig. 2, and passing it over the top of the shuttle, the two sides of the loop at this time entering the open side of the shuttle holder. The cam grooves 60 and 70 then permit the fingers to be lowered slightly, and as the fingers drop below the top of the shuttle holder, the loop of thread will be removed therefrom. The cams 60 and 70 then return the fingers to their normal position, as shown in full lines in Figs. 1 and 2. After the thread is thus looped about the shuttle, the extra length of thread used in forming the loop is taken up by a take-up mechanism and the stitch is thus formed in the material by the action of the needle thread interlocking with the shuttle thread. This take-up device is in the form of a take-up lever 80 carrying the take-up roll 370 over which the thread passes and pivoted to the frame at 81. The lever has connected thereto a link 82 which is pivotally connected to an arm 83 that is pivoted to the frame at 84 and that carries a roll adapted to be engaged by a take-up cam 85 mounted on the main shaft 5. With this arrangement the take-up roll 370 will have a long sweep sufficient to take up all the slack in the loop of the needle thread which was passed over the shuttle. The roll 370 is shown as carried on a block 88 that is pivoted to the arm 80 at 89 and this block can be adjusted by the set-screw 90 so as to vary the amount of take-up if necessary. While the loop is being taken up by the take-up roll, the thread is clamped between the source of supply and the take-up roll so as to prevent the take-up from drawing more thread from the source of supply rather than taking up the loop and tightening the stitch. This thread clamp is shown as a lever 93 pivoted to the frame at 94 and acted on by a cam 95 carried by the driving shaft. The lever is provided with a foot 96 under which the thread passes and that clamps the thread against a fixed surface or abutment 97 while the take-up is being actuated.

After the stitch has been set, a fresh quantity of thread is drawn off from the source of supply sufficient for the next stitch by means of any suitable thread-measuring device. As herein shown the lower end of the bar 15 is formed with a recess in which is received one end of the thread measurer 101. The bar 15 is provided with the eyes or passage-ways 102 through which the thread

passes, and the upper end of the thread measurer is provided with a slot 103 through which the thread also passes. This thread measurer is formed with the thread-measuring finger 104 which occupies said slot. The normal position of the thread measurer 101 is shown in Fig. 1 in which position the finger 104 is above the thread so that the thread will pass straight through the slot 103. This thread measurer is capable of vertical movement relative to the bar 15 and when it is drawn downwardly, the finger 104 will engage the thread and measure off a length, depending on the amount of movement of the thread measurer. The thread measurer is actuated by an elbow-lever 105 pivoted to the frame at 106 and acted on by a suitable cam 107 mounted on the driving shaft 5. A spring 108 surrounding the lower end of the thread measurer serves to keep the lever 105 in engagement with the cam. The cam 107 is so timed that the thread measurer will have its movement at a time when the thread is released by the thread clamp 93. I make no claim herein to this thread measurer as it has been made the subject of another patent, to wit: Patent No. 1003176, dated September 12, 1911.

As stated above, this sewing machine is arranged so that the work will be fed by the awl, and the work rest 10 is provided with a longitudinal slot in which the awl will move during the feeding of the work. In order to give the work its feeding movement, the awl-carrier 27 is mounted for horizontal movement, and this is accomplished by mounting the holder 28 so that it may have the proper horizontal movement, thus carrying the awl-carrier and awl with it. This holder 28 is mounted to slide on two studs 110 and 111 extending laterally from the cheek-piece 112 of the frame and has rack-teeth 113 thereon which mesh with a pinion 114 carried by a shaft 115. The shaft has extending therefrom an arm 116 which is adapted to be engaged by fingers 117 and 118 carried by the link 24, so that as the link rises and falls, these fingers will engage the arm 116 at proper times and turn the shaft 115 and pinion 114 first one way and then the other thereby to give the awl-carrier its reciprocating movement.

Since the length of the stitch depends upon the extent of feeding movement given at each reciprocation of the awl-carrier I have provided for adjusting the length of this movement by adjustably mounting the fingers 117 and 118 on the link 24. The finger 118 is rigidly but adjustably secured to the link, said finger having a shank 119 which passes through a slot in the link and is secured thereto by a nut 120. This permits the finger to be adjusted vertically relative to the link. The finger 117 is pivoted to the link at 121 and has pivotally connect-

ed thereto a connection 122 which has screw-threaded to its upper end an adjusting nut 123 that is received between two arms 124 formed on the link, so that by turning the adjusting nut 123 the position of the finger 117 can be varied. This gives a means for fine adjustment. It will be seen from the above that by adjusting the fingers 117, 118 either toward or from each other the length of the stitch may be lengthened or shortened.

The presser foot 12 has a movement laterally with the awl-carrier and during the time that the awl-carrier moves forwardly to feed the work, the presser foot is in engagement with the work, but after the awl has been retracted and the needle has entered the work, then the presser foot is elevated and the presser foot and awl-carrier returned to their initial position. For securing this movement of the presser-foot I have shown it as mounted on a stud 175 rising from the guiding member or block 28 so that the block 28 will carry the presser foot back and forth with it. As stated above, the presser foot is mounted on the pins 13 carried by the upper end of the bar 15 and during the lateral movement of the presser foot it slides back and forth on the pins, it being understood that the bar 15 has merely a rising and falling movement. Any suitable means may be employed to give the bar 15 its rising and falling movement to lift the presser foot off from the work and permit it to drop onto the work again. One means suitable for this purpose is illustrated in my co-pending application. See No. 566,301, filed June 11, 1910, but as I make no claim herein to any particular means for accomplishing this purpose I have deemed it wisest not to confuse the drawing by illustrating any mechanism in detail. It will be understood, however, that the bar 15 has an appropriate up and down movement to give the proper movement to the presser foot.

While I have illustrated herein one embodiment of my invention I do not wish to be limited to the constructional details as various changes may be made without departing from the invention.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a sewing machine, the combination with a curved needle and needle-operating mechanism, of a stationary shuttle above and at one side of the needle, a loop opener extending substantially parallel to the plane of movement of the needle, and means to move said loop opener in the direction of its length and also in a direction transverse thereto and then in a lateral direction to take the loop of thread from the needle, spread said loop and carry the loop over the shuttle.

2. In a sewing machine, the combination

with a curved needle and needle-operating mechanism, of a stationary shuttle above and at one side of the needle, a loop opener comprising two fingers extending substantially parallel to the plane of movement of the needle, means to move the fingers relative to the needle to cause them to enter the loop of thread and then relative to each other to spread the loop and also to move them relative to the shuttle while they are separated to carry the loop over the shuttle.

3. In a sewing machine, the combination with a needle and needle-operating mechanism, of a stationary shuttle, a loop-opener comprising two fingers, and means to move the fingers laterally toward the needle to cause them to enter the loop of the needle thread, then upwardly and relatively to each other to spread the loop, and then laterally to place the loop over the shuttle.

4. In a sewing machine, the combination with a needle and needle-operating mechanism, of a looper having a forked end with a closed eye formed in one arm of the fork and an open eye with a resilient throat in the other arm, means to place the thread in the open eye where it is held by the resiliency of the throat, and means to move the looper relative to the needle to place the thread in the needle eye.

5. In a sewing machine, the combination with a needle and needle-operating mechanism, of a looper having a forked end, one arm of the fork having means to permanently engage the thread and the other having an open eye provided with a resilient throat, means to place the thread in the open eye where it is frictionally held by the resilient throat, and means to move the looper into a position with the arms thereof situated either side of the needle and then laterally to cause the thread between the arms to engage the needle eye.

6. In a sewing machine, the combination with a needle and needle-operating mechanism, of a looper having a forked end, one arm of the fork having means to permanently engage the thread and the other arm of the fork having a thread finger, and a spring resiliently engaging the finger thereby to form an open eye with a resilient throat, means to place the thread in the open thread eye where it is frictionally held by the spring finger, and means to move the looper relative to the needle to place the thread in the needle eye.

7. In a sewing machine, the combination with a needle and needle-operating mechanism, of a looper having a forked end, one arm of which is provided with a closed eye and the other of which has an open eye with a resilient throat, a block in which said looper is slidably mounted, means for supporting said block for turning movement, means for placing the thread in the

open eye where it is frictionally held by the resilient throat, and means to turn the block to bring the portion of the thread between the arms of the looper into position to be engaged by the needle eye.

8. In a sewing machine, the combination with a needle and needle-operating mechanism, of a pivoted block, a looper slidably carried thereby and provided with a forked end, one arm of which has a closed eye through which the thread passes and the other arm of which carries a spring which forms with it an open eye with a resilient throat, means to place the thread in the open eye, and means to turn the block to bring the looper into position to cause the thread to be engaged by the needle.

9. In a sewing machine, the combination with a needle and needle-operating mechanism, of a looper comprising a sliding member having a pair of arms, one of which has a closed eye and the other of which has an open eye provided with a resilient throat, a pivoted block in which said member slides, a thread-placer to place the thread in the open eye, and means to move the member in the block and to turn the block thereby to bring the portion of the thread between said arms in position to be engaged by the needle.

10. In a sewing machine, the combination with a curved needle and an oscillatory carrier therefor, of an awl carrier support having a curved guideway, an awl carrier separate from the needle carrier and movable relative thereto in and guided by said guideway, and means to give movement to the awl carrier by or through the needle carrier.

11. In a sewing machine, the combination with a curved needle, of means for supporting the same for oscillatory movement, an awl carrier support separate from the needle-supporting means and having a curved guideway, an awl carrier movable in and guided by said guideway, means to give movement to the awl carrier by or through the needle carrier, and means to move the awl carrier relative to the needle in a direction at right angles to the plane of movement of the awl.

12. In a sewing machine, the combination with a frame having a stud, of a needle-carrier mounted on the stud for oscillatory movement, an awl carrier support separate from the stud and having a curved guideway, an awl carrier movable in and sustained by said guideway, means to give movement to the awl carrier by or through movement of the needle carrier, and means to move the awl carrier relative to the needle carrier in a direction at right angles to the plane of movement of the awl.

13. In a sewing machine, the combination with a frame having a stud, of a needle-car-

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rier mounted on the stud for oscillatory movement, an awl carrier support separate from the stud, and having a curved guideway, an awl carrier movable in and sustained by said guideway, means to move the awl carrier by movement of the needle-carrier, and means to move the awl carrier laterally relative to the needle to effect feeding movement of the work.

14. In a sewing machine, the combination with a frame having a stud, of a needle-carrier mounted on the stud for oscillatory movement, an awl carrier support separate from the stud and having a curved guideway, an awl carrier separate from the needle carrier and movable in and sustained by said guideway, means to oscillate the needle carrier, means to move the awl carrier by or through the movement of the needle carrier, and means to move the awl carrier support laterally relative to the needle thereby to effect feeding of the work.

15. In a sewing machine, the combination with a curved needle and an oscillatory carrier therefor, of an awl carrier support, an awl carrier mounted thereon, means to operate the awl carrier by or through movement of the needle carrier, a presser foot sustained by the awl carrier support, and means to give said support a lateral movement to effect feeding of the work.

16. In a sewing machine, the combination with a curved needle and an oscillatory carrier therefor, of a laterally-movable support, an awl carrier mounted thereon, means to operate the awl carrier by or through movement of the needle carrier, means to move the support laterally to effect feeding of the work, and a presser foot carried by said support and movable vertically thereon.

17. In a sewing machine, the combination with a curved needle and an oscillatory carrier therefor, of a laterally-movable support, an awl carrier mounted thereon, means to operate the awl carrier by or through movement of the needle carrier, means to move

the support laterally to effect feeding of the work, a presser foot carried by said support and movable laterally therewith, and means to move the presser foot vertically relative to said support.

18. In a sewing machine, the combination with a needle, of a pivotally-mounted carrier therefor, a reciprocating member for giving the needle carrier its movement, an oscillatory awl, means to give the awl its oscillatory movement by movement of the needle carrier, and other means separate from the needle carrier and operated by movement of the reciprocating member to give the awl a movement to feed the work.

19. In a sewing machine, the combination with a needle, of a needle carrier, a reciprocating member for operating the needle carrier, an awl, an awl carrier, means operated by the needle carrier to give the awl carrier a movement to cause the awl to penetrate the work, an awl carrier support movable laterally to give the awl its feeding movement, and other means separate from the needle carrier and operated by the reciprocation of said reciprocating member to give said support its lateral movement.

20. In a sewing machine, the combination with a needle, of a pivotally-mounted needle carrier, a crank, a pitman connecting the crank to the needle carrier and operating to give oscillatory movement thereto, an awl, an awl carrier, means operated by the needle carrier to give the awl a movement in a direction to penetrate the work, and means separate from the needle carrier and operated by the pitman to give the awl carrier a movement in another direction to feed the work.

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

EDWARD ERICKSON.

Witnesses:

LOUIS C. SMITH,
THOMAS J. DRUMMOND.