F. E. WILSON.

SEWING MACHINE.

APPLICATION FILED DEC. 24, 1914.

1,296,029.

Patented Mar. 4, 1919.

6 SHEETS—SHEET 1.

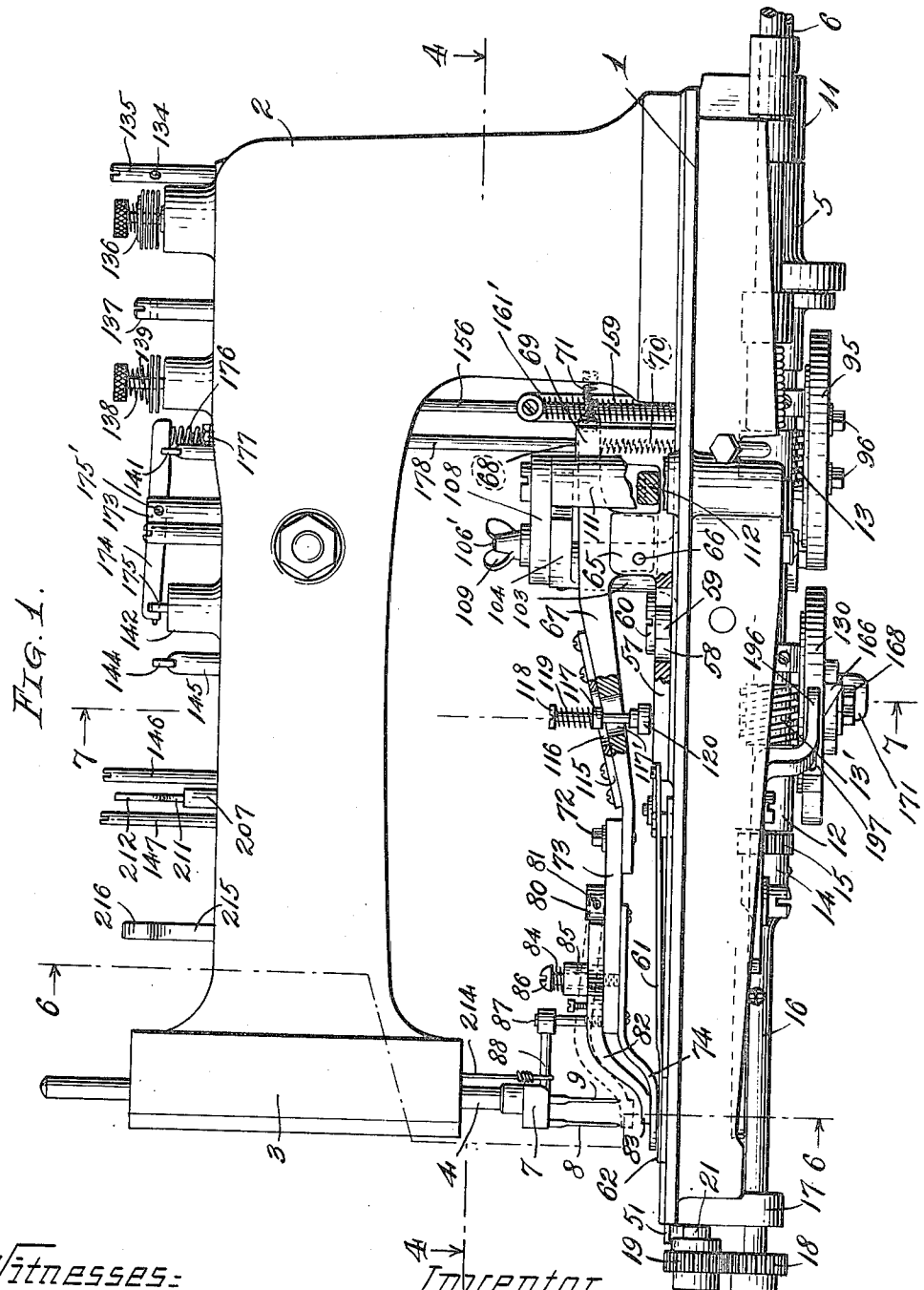


FIG. 1.

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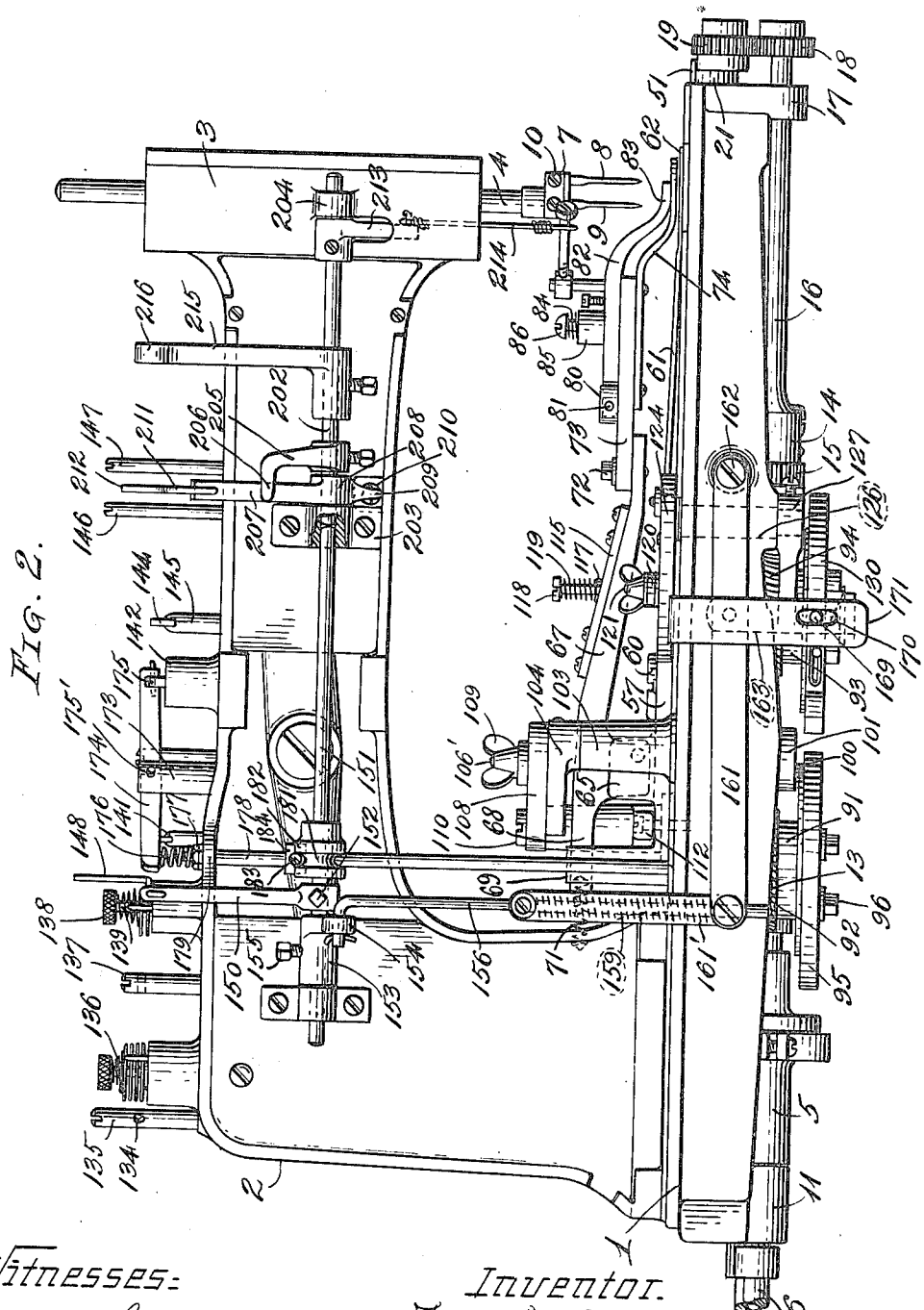
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6 SHEETS—SHEET 2.

FIG. 2.



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6 SHEETS—SHEET 3.

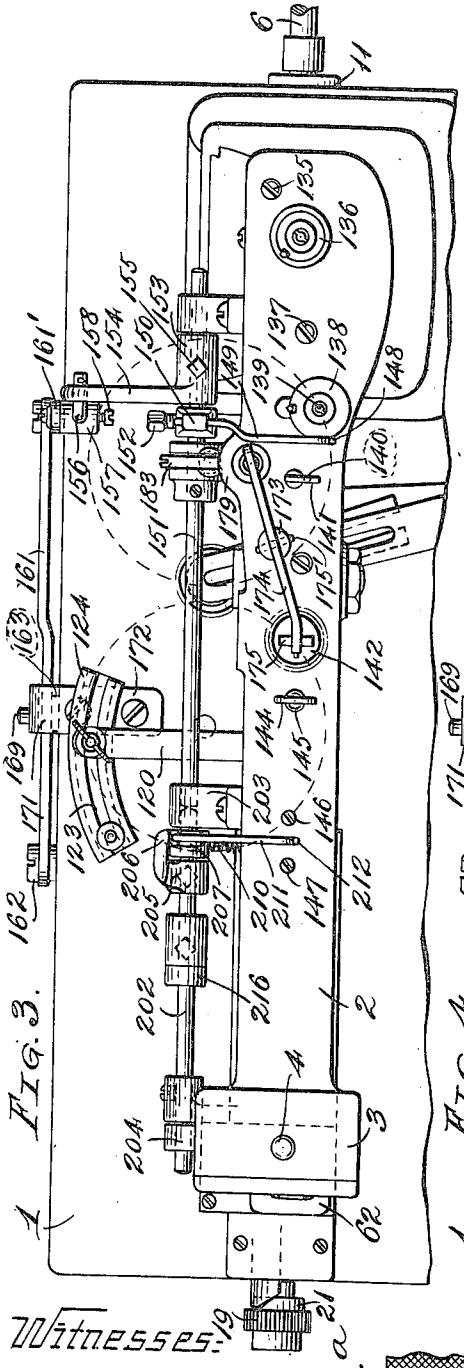


FIG. 3.

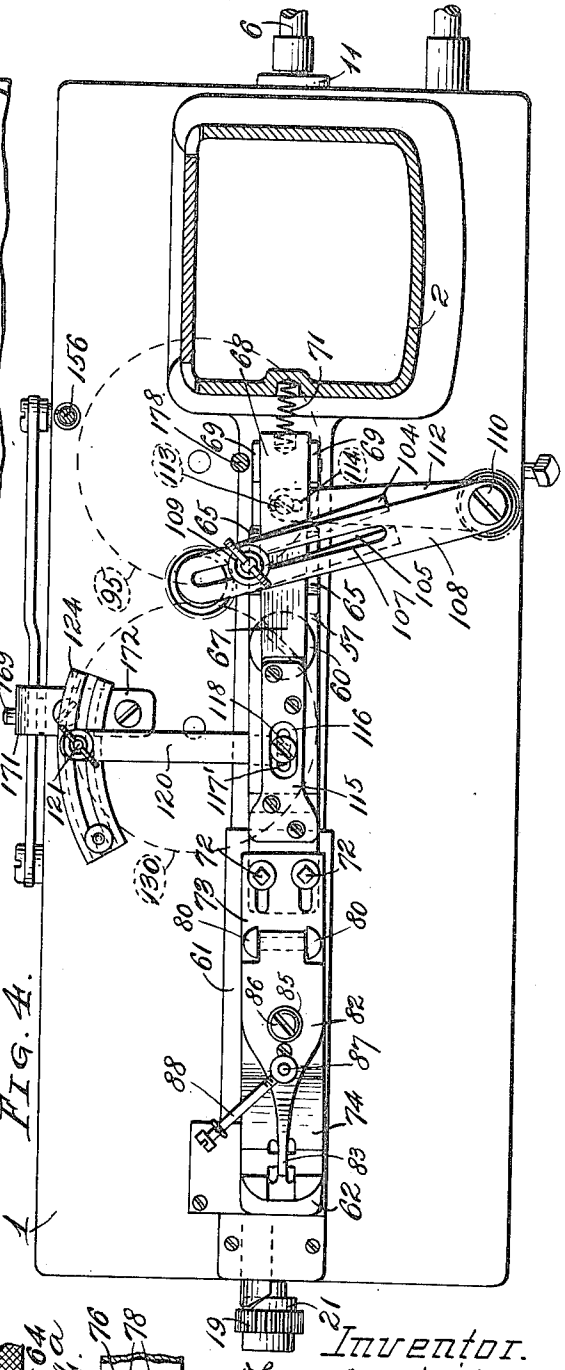


FIG. 4.

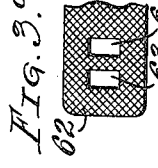


FIG. 3a.



FIG. 4a.

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6 SHEETS—SHEET 4.

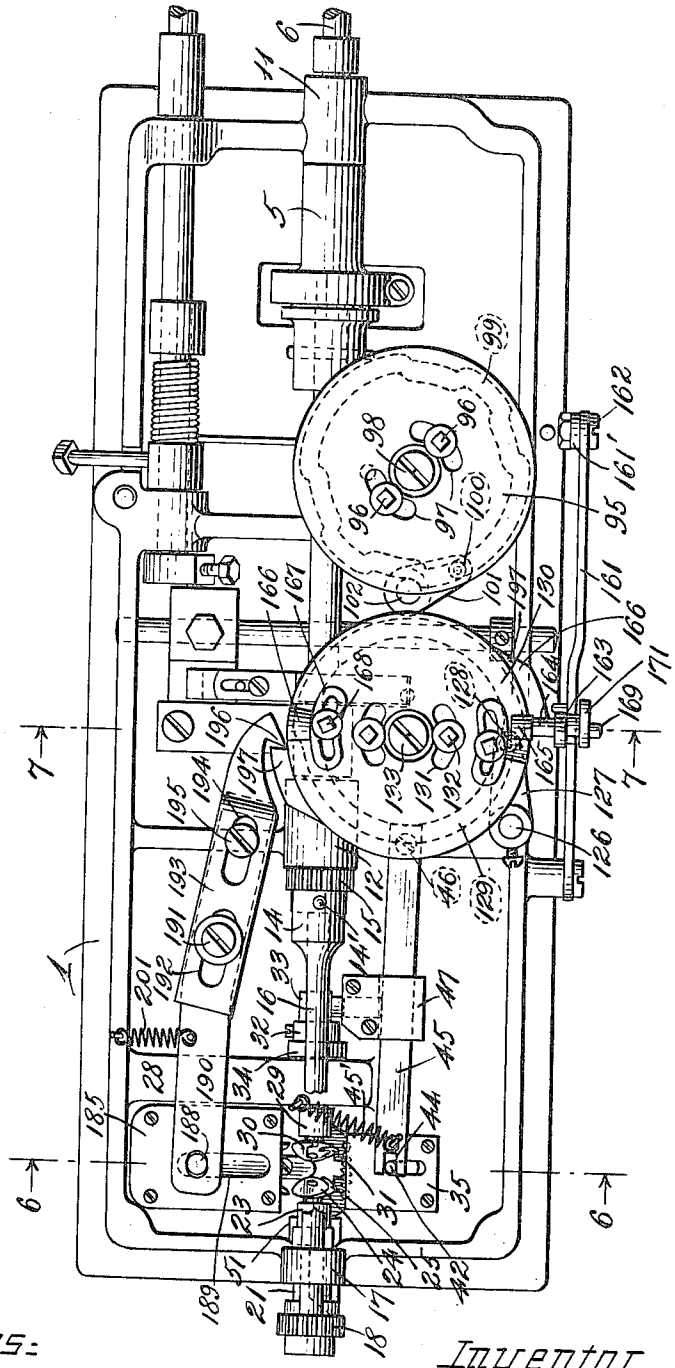


FIG. 5.

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6 SHEETS—SHEET 5.

FIG. 7.

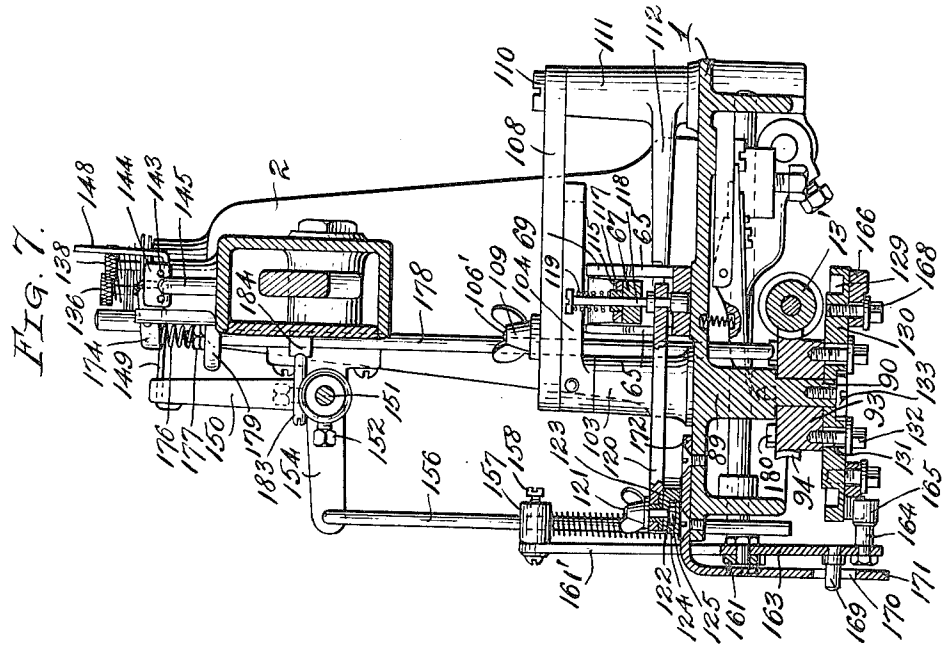
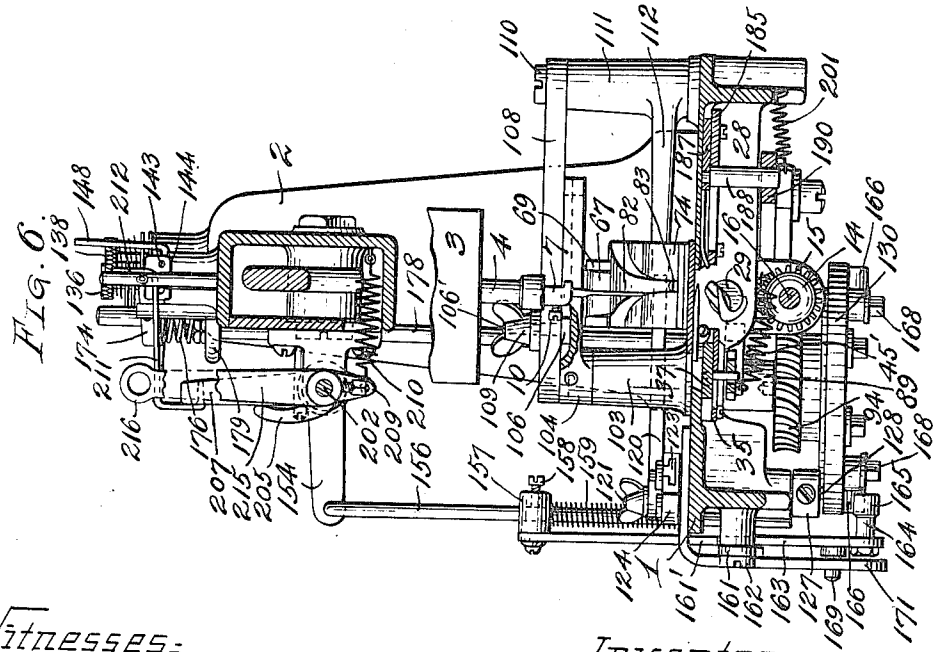


FIG. 6.



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6 SHEETS—SHEET 6.

FIG. 8.

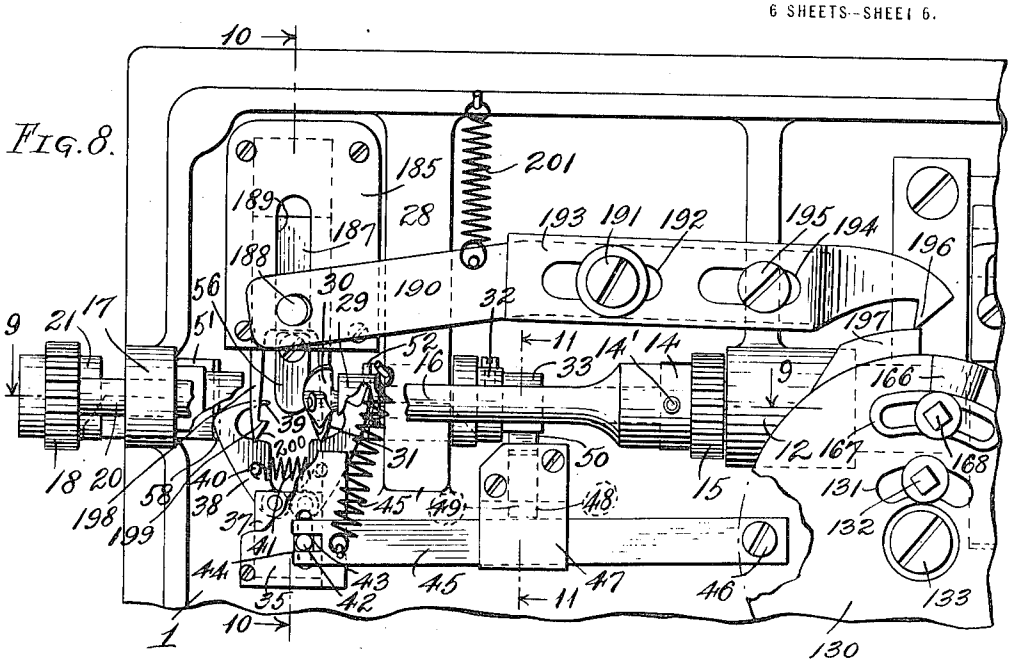


FIG. 9.

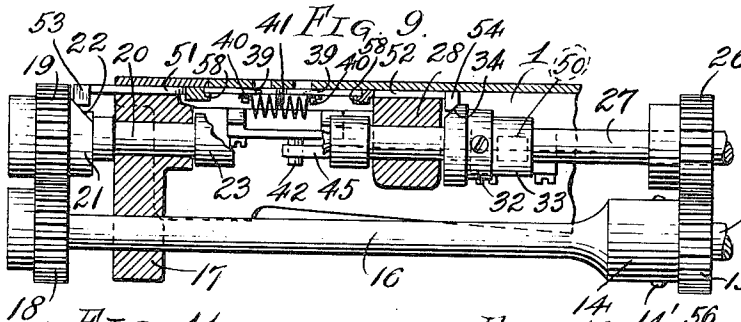


FIG. 12.

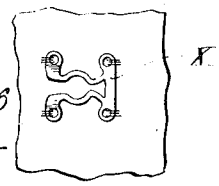


FIG. 11.

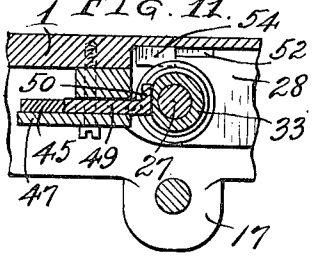
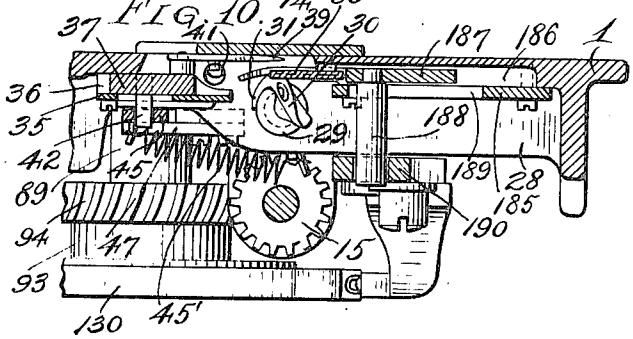


FIG. 10.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

1,296,029. Specification of Letters Patent. Patented Mar. 4, 1919.

Application filed December 24, 1914. Serial No. 878,886.

To all whom it may concern:

Be it known that I, FRANK E. WILSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates generally to sewing machines and particularly to that class of such devices utilized for sewing fasteners to garments or to cloth.

More specifically the invention relates to a sewing machine of the button sewing type and it consists of suitable mechanism for operating preferably a plurality of needles, mechanism for controlling the thread supplied thereto, mechanism for forming a loop in the thread below the throat plate, mechanism for shifting the garment or material, mechanism for holding and shifting the fastener with the material, and mechanism for severing the thread after stitching in one set of openings and for severing the thread after stitching in the other set of openings, suitable means for shifting from one set of openings to the other, and suitable mechanism for driving and operating the several parts.

The invention may be further briefly summarized as consisting in the construction and combination of parts hereinafter set forth in the following description, drawings and claims.

Referring to the drawings, Figure 1 is a front elevation of the machine; Fig. 2 is a rear elevation; Fig. 3 is a top plan view; Fig. 3ª is a top plan view of the end of the tongue 62 showing the opening for the needles; Fig. 4 is a section upon the line 4—4 looking in the direction of the arrows indicated in Fig. 1; Fig. 4ª is a top plan view of the outer end of the work clamp with the button clamp removed; Fig. 5 is a bottom plan view; Fig. 6 is a vertical section upon the line 6—6 indicated in Figs. 1 and 5; Fig. 7 is a section upon the line 7—7 indicated in the same figures; Fig. 8 is a bottom plan view enlarged, of the mechanism immediately under the throat plate or of the loop forming mechanism; Fig. 9 is a section upon the line 9—9 of Fig. 8; Fig. 10 is a section upon the line 10—10 of Fig. 8; Fig. 11 is a detail section upon the line 11—11 of Fig. 8; and Fig. 12 shows a portion of material with a fastener, of the type applied by this machine, secured thereto.

In carrying out the invention any preferred form and construction of machine may be employed so long as it meets with the necessary requirements, but an embodiment is shown which is in accordance with the invention and in describing this embodiment the several elements will be taken up for description.

Framework.

The framework of the machine comprises a main bed plate member 1 provided with the usual arm 2 of any preferred type. Other brackets and parts are secured to these portions for supporting and accommodating the several pieces of mechanism.

Forming a part of the arm 2 is a head 3 which is provided with the usual needle bar 4 of any preferred type. Within the arm and the head is any suitable mechanism for conveying a reciprocating motion to the needle bar. A portion of this mechanism, however, will be referred to as it is connected to the main operating shaft, this drive consisting of an eccentric strap shown in Fig. 5 engaging an eccentric in the usual manner, the eccentric having a hub 5 secured to the main driving shaft 6.

Needles.

I prefer to provide the needle bar with a needle holder 7 adapted for receiving a pair of needles 8 and 9 held in place by suitable screws 10.

Loop forming mechanism.

The shaft 6 is supported in a bearing 11 on the underside of the bed to the right, as shown in Fig. 5, and another bearing 12 toward the head end of the machine but back of the needles, as shown in Fig. 5, and this shaft is provided between these bearings and preferably between the eccentric 5 and the bearing 12 with a pair of worms 13 and 13′ for a purpose to be described. Forward of the bearing 12 this shaft 6 fits into an opening in a hub 14 of a gear 15, the shaft being secured in this hub by a pin 14′. The hub 14 is provided with an extension 16 extending out through a suitable bearing bracket 17 at the left end of the frame, as shown in Figs. 1, 2, 5, 8, and 9, where it is provided with a gear 18. This gear 18

meshes with the outer looper hook gear 19 supported upon the outer looper hook shaft 20, shown in Fig. 9, supported in the bearing bracket 17. The inner face of the gear 19 is provided with a cam member 21 having a cam face 22 for a purpose to be described. The inner end of the shaft 20 is provided with a hub 23 carrying an outer looper 24 having a looper hook 25, this looper hook coöperating with the outer needle 8 in the formation of the stitch.

In like manner the gear 15 meshes with a gear 26 mounted upon a shaft 27 supported in the bearing 12 and the bearing 28 shown in Fig. 9. The projected end of this shaft 27 is provided with a looper hub 29 carrying a looper 30 having a looper hook 31, these parts being a duplicate of the looper hook parts already described except that the hook 31 coöperates with the inner needle 9. On the opposite side of the bearing 28 the looper shaft 27 is provided with a cam member 32 having a peripheral cam 33, for a purpose to be described, and an end face cam 34 also for a purpose to be described.

Loop pulling mechanism.

It is necessary in the formation of the stitches and after the formation of the loop to pull the loops to the rear of the machine and down, so that they will not interfere with the formation of other loops and so that the pull of the material or cloth will not distort the loops in the formation of the stitches and this mechanism comprises a pair of devices one for each needle and looper and operated by the same mechanism, and the description will now be confined to the construction of one of these hooks and the operating mechanism for both. One of these hooks is clearly shown in Fig. 8.

Secured to the underside of the main bed 1 to the rear of the throat of the machine is a guide block 35 having a guide-way 36 therein, shown in Fig. 10, for guiding a hook block 37 in a transverse direction to the axis of rotation of the loopers. This hook block is provided on its underside with a pair of hook members 38 each pivoted on the block and provided with a transversely extending loop engaging hook 39, Fig. 8. Each of the hook members is further provided with a pin 40 and between these two pins is a suitable spring 41 for throwing the hook members apart. The hook block 37 is provided with a pin 42 passing through a slot 43 in the guide block 35 and adapted for engagement in an open-ended slot 44 arranged in the end of a lever 45 pivotally mounted upon a suitable screw 46 secured to the underside of the bed. This lever engages back of a guide plate 47 secured to the underside of the frame and having a guideway 48 therein for receiving a slide 49 having a cam engaging foot 50 arranged in the path of the cam 33, these parts being clearly shown in Fig. 11 and the arrangement being such that upon the rotation of this cam 33 the lever 45 will be shifted and the hooks will be moved transversely of the bed of the machine.

In order to move the hooks into engagement with the loops when they are drawn down by the loopers, I provide a pair of slides 51 and 52 arranged in suitable guideways, and the former is provided with a cam engaging portion 53 for engagement with the cam 22 carried by the outer looper gear 19, while the latter 52 is provided with a cam engaging portion 54 for engagement with the side face cam 34 mounted upon the inner looper driving shaft cam member 32. Each of these slides is provided with a suitable lip 58 engaging under the corresponding hook member 38 to form a guide for the same, these hook members being guided against the underside of the throat plate. The timing of these parts is such that when the needles move down and the thread loop is engaged by the looper hooks 31 the cam faces 22 and 34 are in such a position that the slides 51 and 52 are outward, as shown in Fig. 8, and as the looper hooks continue their further operation, these same cam faces cause the hook members to move inward so that their hooks 39 engage the loops above the loopers as the parts are shown in Fig. 8. The cam 33 then causes the shifting of the lever 45 against the tension of its spring 45′ and the loop engaging hooks 39 pull the loops transversely of the machine as the parts are shown in Fig. 8, or pull them backward as the machine stands normally. The looper hooks then engage other loops formed by the needles and at the proper time the cam faces 22 and 34 release the loop engaging hooks to their normal tendency, and they move outward and release the loops which they have previously engaged, the continual operation of the machine merely being a repetition of the operation already described.

In order to back up the needles against the action of the looper hooks a suitable separator block 56, Fig. 8, is secured to the underside of the throat plate and is adapted to pass between the two needles which miss the edges of this block in their downward movement.

Work and fastener clamping mechanism.

In order to hold the work and the fastener or other article, suitable mechanism is provided. This mechanism comprises a work clamp supporting member 57 adapted for endwise and oscillatory movement upon the finished face of a portion of the main bed plate 1. In order to permit these two movements and to guide the member 57, it is provided with a longitudinal slot 58 receiving a screw 59. Secured to the forward end

of this work clamp supporting member is a work shifting tongue 61 preferably of thin steel having a serrated portion 62 adapted to be located under the cloth or other material to which the fasteners are to be secured. This serrated portion 62 is provided with openings 63 and 64, as shown in Fig. 3ª, and these openings are of a dimension such that the edges of the tongue at these openings will not interfere with the needles as the clamp is moved. The work clamp supporting member is provided with a pair of upwardly extending ears 65, Figs. 1 and 4 particularly, and these ears receive a pin 66 upon which is pivotally mounted a work clamp member 67 having a rearwardly extending portion 68 passing between upwardly extending guides 69 at the rear and adapted to be forced upward by means of a spring 70 arranged vertically between the rearwardly extending portion 68 and the supporting member, as shown in Fig. 1. This gives a tendency to the work clamp member to move downward at the left end as shown in Fig. 1 Any lost motion in the pivotal mounting of the work clamp member 67 is taken up by an additional spring 71 arranged horizontally between the end of the rearwardly extending portion 68 and the arm 2 of the machine. This spring also exerts the tendency to give the member a counter clockwise movement, as shown in Fig. 1.

Secured to the end of the work clamp member 67 by means of screws 72 is a block 73 carrying a work clamp 74, the end of which is flat and engages above the openings 63 and 64 in the work clamp tongue 61. The flat end of this work clamp 74 is provided with suitable openings 75 and 76, the former having outwardly extending notches 77 arranged near the ends of the opening, and the latter having notches 78 similar in all respects to the notches 77. The opening in the work clamp is of a shape such that it will receive and guide the fastener onto the material so that the fastener clamp finger may engage the fastener and force it through this opening against the material. The fastener represented by x in Fig. 12 is of such size and shape that the notches 77 and 78 form openings beyond the eyes of the fasteners for the needles in the formation of the stitches. The needles are so spaced that one is in an eye and the other is outside of the opposite eye on one downward movement and vice versa on the next downwardly movement. In other words, the stitches are formed alternately in and out of the openings. The metal between the openings 75 and 76 is cut away to form a recess or slot 79 for receiving a portion of the fastener clamp which passes through this plate in forcing the fastener onto material, as will later appear. Extending upwardly from the block 73 is a pair of ears 80 carrying a pin 81 upon which is pivoted the fastener clamping member 82 having a clamping finger 83 extending down, as shown in Figs. 1 and 4, to the point where it can enter the slot 79 and press the fastener against the material. This fastener clamping member 82 is forced downward by means of a spring 84 arranged between a sleeve 85 and the head of a screw 86 passing down through the spring and through the sleeve 85 and secured in the block 73.

The clamping mechanism, including the fastener clamp and the cloth or material clamp is raised by means of a pin 87 carrying an arm 88 to be manipulated by mechanism to be later described. It is obvious that when the arm 88 is raised the fastener clamping member will be elevated first and when it has reached the limit of its operation, resulting from the complete compression of the spring 84, the work clamping mechanism above the work tongue 61 will be elevated from the work, the fastener which has been secured to the material passing down through the openings 75 and 76 and the slot 79.

Work and fastener clamp operating mechanism.

It is necessary to impart the proper operation to the work clamp in order to move the material and the fastener so as to cause the needles and the loopers to form the stitches, and this mechanism will now be described.

Extending downward from the underside of the frame is a pair of bosses 89 arranged to one side of the driving shaft and each provided with a reduced bearing portion 90. The rear one of these bearing portions 90 receives a gear hub 91 provided with a worm gear 92 adapted to mesh with the worm 13 mounted upon the driving shaft 6, while the bearing portion 90 toward the front of the machine is adapted to receive a gear hub 93 carrying a worm wheel 94 meshing with the worm 13′ also mounted on the driving shaft 6. The rear gear hub 91 is provided with a cam disk 95 secured to this hub by means of bolts 96 threaded into the hub and passing through slots 97 in the disk, these slots being arc-shaped and permitting the adjustment of the cam disk with respect to the hub. The disk and the gear hub are held in place on the bearing portion 90 by means of a suitable screw 98. The upper face of this cam disk is provided with a cam groove 99, shown in dotted lines in Fig. 5, and of the proper configuration to give the proper stitch forming motion to the mechanism which will now be described and which operates between this cam groove and the work and fastener clamping mechanism already described.

Engaging in the groove 99 is a roller 100, shown in dotted lines in Fig. 5, and rota-

tably mounted upon a crank arm 101 keyed to the lower end of a shaft 102 mounted in a suitable standard 103 extending above the bed. The shaft 102 is provided on its upper end above the bearing 103 with a crank arm 104, shown in Figs. 1, 2, 3, 4, 5 and 7, and this lever is provided with a slot 105 in its upper surface, and this slot is engaged by the head 106, shown in Fig. 6, of a bolt 106' extending through a slot 107 in a crank arm 108 and held therein by means of a wing nut 109. This crank arm 108 is pivotally mounted upon a bolt 110, shown in Figs. 1, 2, 4, 6 and 7, and is connected to operate a sleeve 111 loosely mounted upon the bolt 110. This sleeve has an arm 112 provided with a pin 113 in the end thereof and engaging in a transverse slot 114, shown in dotted lines in Fig. 4, arranged in the clamp supporting member 57 to the rear of the pivot screw 60. It will be seen from the foregoing construction that upon the operation of the cam disk 95 the crank arm 101 will be rocked and with it the shaft 102, this operation conveying a rocking movement to the crank arm 104 thereby transmitting a rocking movement to the crank arm 108 which, through its connection with the lever 112, causes the work clamp supporting member 57 to be moved longitudinally on the bed, and since this longitudinal movement is conveyed to the work and fastener clamps the work and fastener will be reciprocated under the needles in the formation of the stitches in an obvious manner.

It is also necessary in securing the fasteners to the material to have the work clamp shift from one set of holes to the other when only two needles are utilized, and this mechanism will now be described.

Secured to the upper face of the work clamp member 67 is a plate 115 provided with a longitudinal slot 116 adapted to receive a block 117 loosely mounted on the shank of a bolt 118 extending through the block 117, through a slot 117' in the work clamp member 67 and threaded into the work clamp supporting member 57. A spring 119 is arranged between the head of the bolt 118 and the block 117 causing the block to be held within the slot 116 and against the upper surface of the work clamping member 67. Pivotally mounted upon the bolt 118 above the work clamp supporting member 57 is a link 120 engaging pivotally the shank of a flanged sleeve surrounding the shank 121 of a clamping bolt 122 which passes into a T-shaped slot 123 in an arc-shaped crank arm 124 where it is provided with a T-shaped head 125. This bolt 122 serves as a means for permitting this bolt to be rigidly held at any suitable point in the arc-shaped slot 123 and still permits the link 120 to swing thereon. The arc-shaped crank arm is mounted on a vertically disposed shaft 126 extending through the bed to the underside thereof and there provided with an operating arm 127 carrying a friction roller 128 engaging in a cam groove 129, shown in dotted lines on a cam disk 130. This cam disk is provided with arc-shaped slots 131 near the center for receiving securing bolts 132 threaded into the gear hub 93, this disk and the gear hub being held in place by a suitable screw 133. The cam groove is of the proper configuration to give the lever 127 a slight rocking movement first in one direction and then in another for each revolution of the disk, which will transmit the proper rocking movement to the arc-shaped arm 124 so that the link 120 will shift the work and fastener clamp on the pivot screw 59 back and forth to bring the pairs of holes in proper position with respect to the needles and at the proper time in the cycle of operations of the machine.

Thread manipulation and control.

The thread is led from any suitable source to an opening 134 in a thread guide stud 135 secured to the rear of the arm of the machine and from thence to any suitable double thread tension device 136 from whence it is led through a suitable eye in a thread guide stud 137 to a second double thread tension device 138 of any preferred construction, the thread passing around a pin 139 which forms a part of this tension device. The thread is then led through an opening 140 in a thread guide 141 secured to the top of the arm of the machine. The threads are then separated and led across the top of a presser stud 142 secured in the top of the arm and through a pair of openings 143 arranged in a guide plate 144 integral with a stud 145 secured in the top of the arm. The threads then pass back of a pair of spaced studs 146 and 147 and from thence to any suitable guiding mechanism not shown, but leading the thread down to the needles 8 and 9.

Thread pulling mechanism.

It is essential that a supply of thread for the beginning of the stitching operation be drawn through the tension devices 136 and 138 from the spools or other supply, and this mechanism consists of a finger 148 bent up at the end of a rod 149 secured in the upwardly extending arm 150 secured to the shaft 151 by means of a set screw 152, as shown in Fig. 2. Secured to the shaft 151 to the left of the arm 150, as shown in Fig. 2, is a sleeve 153 carrying an arm 154 substantially at right-angles to the arm 150. This sleeve 153 is held in place on the shaft 151 by a suitable set screw 155. Pivotally connected in the outer end of the arm 154 is a rod 156 extending down through a suitable opening in the frame, as shown in Fig. 7, and guided there-

in. Adjustably mounted on this rod is a collar 157 held in any suitable position upon the rod by an adjusting screw 158. A spring 159 is arranged between this socket member and the upper surface of the bed of the machine so that an upward thrust is given to the rod and the normal tendency of the finger 148 is to remain in the position shown in Figs. 3, 6 and 7. Pivotally connected to the end of a lever 161 mounted at one end upon a fulcrum screw 162 secured in the frame is a link 161′ pivotally connected at the upper end to the collar 157. Intermediate its ends this lever is pivotally connected to a shifting bar 163 carrying at its lower end a pin 164 projecting inward under the cam disk 130 and there provided with a friction roller 165 adapted to engage cams 166 carried by blocks 167 each provided with an arc-shaped slot for receiving a securing bolt 168. This construction is shown in bottom plan in Fig. 5. In order to hold the shifting bar 163 in proper position so that the roller 165 will move in a vertical direction, a guiding pin 169 is provided on the bar, and this pin engages a slot 170 in a guide strip 171 having a right angle portion 172 secured to the frame by suitable screws or in any other preferred manner.

From the foregoing mechanism it will be seen that as the machine operates, the thread pulling device will be shifted, and the finger 148 will draw upon the thread, but to prevent the thread from being drawn through the needle, thread clamping means must be provided between the tension devices and the needles, and this mechanism will be later described, but when the thread is held between the finger 148 and the needles, this finger when operated will pull the thread from the spools or other supply.

Thread clamping means.

Mounted upon the upper face of the arm of the machine is a stud 173 carrying a lever 174 pivoted in the stud and carrying at one end a clamping block 175 pivoted at its center in the end of the arm upon a pin 175′. This block is provided with a flat bottom edge extending transversely of the arm and arranged to engage both threads and force them down against the pressure block 142, the block being adapted to swing and equalize the tension on the two threads. The opposite end of this lever engages a coil spring 176 which in turn engages suitable nuts 177 secured to a vertically movable rod 178 guided in a suitable ear 179 at the upper end and extending through the bed to a point above the gear hub 91 where it is adapted to engage cams 180 mounted upon the upper face of this gear hub. These cams 180 are shown in Fig. 7 and are arranged on the gear hub 91 back of the gear hub shown in section in this figure. The arrangement of these cams 180 is such that upon the rotation of the gear hub the rod 178 is raised and the lever 174 is rocked yieldingly so that the clamping block 175 is forced with a yielding pressure against the thread. This holds the thread at this point. This actuating of the rod 178, however, is not the actuation which is utilized in pulling the thread from the supply as just described but is one which is utilized in cutting off the thread, as will later appear. The operation of this holding means for the thread pulling operation is brought about by means of an eccentric groove 181 provided in a cam member 182 secured to the shaft 151. This cam groove receives a pin 183 secured in a collar 184 fastened to the rod 178, the arrangement being such that upon the rocking of the shaft 151, and the throwing of the finger to the left as shown in Figs. 6 and 7, the clamping block 175 will be brought down upon the thread before this finger creates any great pulling action on the thread, but after the block engages the thread will pull the thread through the tension devices from the supply.

Thread cutting mechanism.

The present machine is specifically intended in the embodiment shown to sew on articles having four thread-receiving holes and the sewing mechanism is so constructed that the machine will sew with two needles in two holes before sewing in the remaining two holes, one needle in one hole the other being on the outside of the other hole, and in transferring from one pair of holes to the other, it is essential that the thread be severed after sewing in the first set of holes, as well as at the close of the sewing in the last pair of holes, and this mechanism comprises a guide plate 185 secured to the underside of the bed plate near the throat plate and having a guideway 186 therein for receiving a severing block 187 which is provided with a stud 188 projecting through a slot 189 in the plate 185 and extending into an opening in a lever portion 190. This lever portion 190 is provided with a screw 191 passing through a slot 192 in an operating lever portion 193. This screw clamps these two parts together. Both of the parts are provided with another slot 194 for receiving the shank of a fulcrum screw 195 which is rigidly secured in the frame. The end of the lever portion 193 is provided with a hook or cam engaging portion 196 adapted to coöperate with a pair of peripheral cams 197 which are diametrically disposed upon the periphery of the cam disk 130.

Secured to the severing block are the cutting devices, and each comprises a shank 198 having at the end thereof a laterally and inwardly extending hook forming a transverse severing edge 199. These hooks are ar-

ranged so that the edges extend inward in the path of one of the portions of the thread as the loop is drawn to the rear by the looper and in order to cause the thread to be guided into this cutting edge each is provided with a guiding face 200. A spring 201 normally tends to pull the lever formed of the lever portions 190 and 193 into position so that the hook or cam engaging portion 196 normally engages the periphery of the cam disk 130 and when out of engagement with the cams 197, the block 187 is in its uppermost position, with reference to the view in Fig. 8, but when the cam engaging portion 196 is in engagement upon the periphery of one of the cams 197 this block is moved down, as shown in this figure, and the hooks stand in position so that when the cam 197 moves from under the cam engaging portion these hooks catch one of the portions of the thread as it passes down around the looper and severs the same.

In severing the thread in the manner just described, it is essential that it shall be more or less taut and that the cutter hooks when pulling against the thread may not draw the thread from the spools or other supply and the thread is held through the instrumentality of the rod 178 engaging one of the cams 180 at this particular time and causing the tension block 175 to engage the threads and prevent the pull from the thread supply.

Mechanism for pulling oversupply of thread back through the needles.

It is essential that the extra supply of thread utilized in forming the loop and extending through the needles after the severing operation, be drawn back through the needles so that the free ends extending from the articles, when sewed, will not be too long and unsightly, and this is brought about by means of thread pulling device arranged between the thread clamping mechanism and the needles and it comprises a shaft 202 mounted in alinement with the shaft 151, as shown in Fig. 2, on the back side of the arm and supported in the bearing 203 which also supports the end of the shaft 151, and an ear 204 extending rearwardly from the head of the machine. This shaft is provided with an arm 205 keyed thereto and having a lug 206 extending behind a thread pull lever 207 which is provided with a sleeve portion 208 loosely mounted upon the shaft 202. The pull lever is provided with a portion 209 extending in the opposite direction and is connected to a spring 210 arranged between it and some stationary part of the frame. The upper end of the pull lever 207 is provided with a rod 211 bent in a horizontal direction above the arm and provided with an upturned finger 212 adapted to pass between the studs 146 and 147. The shaft 202 is also provided within the head with an operating lever 213 connected by any suitable connection such as a chain or light cable 214 with the pin 88, as shown in Fig. 2, so that when the shaft is rocked the lug will be shifted and the spring will cause the pull lever to follow the lug unless there is too great a resistance against the finger 212. The shaft 202 may be operated in any suitable manner, but I have shown an operating lever 215 with an eye 216 at the upper end which may be connected to any suitable foot treadle, not shown. When the thread is properly placed upon the machine, it is led to the right of the pins 146 and 147 or to the right of the pin 147, as shown in Fig. 6, and behind or to the left of the finger 212, so that when this finger is pulled to the left by the mechanism just described the thread will be pulled between these two pins and will be drawn from the needle as the parts are properly timed so that the clamping or tension block 175 is engaging the thread.

Complete operation.

Assuming that power is transmitted to the shaft 6 for a proper number of revolutions to complete the sewing operation, and that this mechanism is thrown in and out by the operator as is customary in machines of this type, the operator causes this movement either by foot treadle or any other suitable means to be conveyed to the lever 215 with the result that the fastener clamp is raised and when it reaches the limit of its movement, the work clamp is raised and the material or work may be placed upon the serrated portion 62. In the meantime, however, the finger 212 has pulled the thread back through the needle until there is just a short end extending out. The operator then lowers the member 74 and places a fastener in the guiding openings 75 and 76 and the slot 79 so that it rests on the material and is held in this position by the fastener clamp which is then released by a further release of the lever 215. The operator then applies the power to the shaft 6 which rotates and brings about the operation of the several mechanisms which are actuated in the following manner:

The reciprocation of the needles and operation of the loopers will form stitches in a well known manner, and the material or cloth together with the fastener will be reciprocated longitudinally through the instrumentality of the mechanism operated from the cam 95. After a suitable number of stitches corresponding to the number of irregular changes in the cam groove 99 have been made, or in other words, when the cam 130 has made a half revolution the roller 165 will engage one of the cams 166 and will cause a tension to be placed upon the thread

through the parts connected therewith. In the meantime, however, the cam engaging portion 196 has dropped off the top of the cam and the thread has been severed and at substantially this time, or preferably a little later, the cam 130 causes the shifting of the work clamp so as to bring the other holes of the fastener into alinement with the needle. Stitching takes place in this set of holes. At the end of the stitching in this set of holes cams operate to sever the thread and return the work clamp to its original position.

Having described my invention, I claim.

1. In a sewing machine a frame, a needle carrying member, a needle carried thereby, a work clamp having an opening for receiving a fastener and forming guiding means for guiding the fastener onto the material, means for shifting the work and the fastener in the formation of the stitches, and means for operating the several parts.

2. In a sewing machine a frame, a needle carrying member, a needle carried thereby, a work clamp having a recess therein for receiving the fastener and for guiding it to the material, a fastener clamp adapted to clamp the fastener upon the work and move the same out of the work clamp at the end of the sewing operation, means for bringing about a relative movement of the work and the needle in the formation of the stitches, and means for operating the several parts.

3. In a sewing machine, a frame, a needle bar, a needle carried thereby, a work clamp having a suitable guide for receiving the fastener, means for bringing about such a relative movement of the needle, the work and the fastener, that the stitches will be formed in the thread receiving openings of the fastener beyond the edges thereof in the material, and means for bringing about another relative movement of the needles, the work and the fastener, to cause the stitches to be formed first in one group of thread receiving openings of the fastener and then in the other.

4. In a sewing machine, a frame, a needle, means for supporting the same, a work clamp having a fastener-receiving opening, a fastener clamp having a portion engaging in said opening adapted to force the fastener against the material during the sewing operation and to force the same through said opening at the end of such operation, means for causing said fastener clamp to force the fastener upon the material during the sewing operation, and means for operating the several parts.

5. In a sewing machine, a frame, a needle, a support therefor, a combined work and fastener support, and manipulating mechanism comprising a work clamp having a fastener-receiving recess, a fastener clamp coöperating with the work clamp and having a portion for engaging the fastener and clamping the same upon the material during the sewing operation and for forcing the fastener out of the opening at the end of the sewing operation, means for conveying an additional motion thereto to shift the fastener and the material to cause the needle to engage in the several openings, and means for operating the several parts.

6. In a sewing machine, a frame, a needle, a support therefor, a combined work and fastener support, and manipulating mechanism comprising a work clamp movably mounted upon the frame and having a fastener-receiving recess, a fastener clamp mounted upon said work clamp and having a portion engaging in said opening for clamping the fastener upon the material, means for conveying a stitching motion to this manipulating mechanism, means for conveying a transferring motion to this mechanism to cause the stitch to be formed in the several openings, and means for operating the several parts.

7. In a sewing machine, a frame, a needle, a support therefor, a work clamp support mounted for movement in one direction and for oscillating movement in another direction, a work clamp carried by said support and mounted for movement in a vertical plane, said work clamp having a fastener recess, a fastener clamp mounted upon said support and having a movement corresponding to the movement of the work clamp, means normally tending to force said clamps onto the material, means for conveying the proper movement to said support, and operating means for transmitting the proper actuation for each of said operating means at the proper step in the cycle of operation of the machine.

8. In a sewing machine, a frame, a needle, a support therefor, a work clamp support mounted for movement in one direction and for oscillating movement in another direction, a work clamp carried by said support and mounted for movement in a vertical plane, said work clamp having a fastener recess, a fastener clamp pivoted upon said work clamp having a movement in a plane corresponding to the movement of the work clamp, means for shifting said entire clamping mechanism in the formation of the stitches and conveying a further movement to transfer from one stitch-receiving opening of the fastener to another.

9. In a sewing machine, a frame, a needle bar, a pair of needles carried thereby, a pair of stitch-forming devices coöperating with said needles, means for operating the same, work and fastener clamping mechanism, means for shifting the same, and thread severing mechanism comprising means engaging the thread between the stitch formers and the needles for severing the thread, and

means for holding the thread against the action of the severing devices.

10. In a sewing machine, a frame, a needle bar, a pair of needles carried thereby, a pair of stitch-forming devices coöperating with said needles, means for operating the same, work and fastener clamping mechanism, means for shifting the same, and thread severing mechanism comprising means engaging the thread between the stitch formers and the needles for severing the thread, and a suitable clamp for holding the thread against the action of the severing devices.

11. In a sewing machine, a frame, a needle bar, a pair of needles carried thereby, a pair of stitch-forming devices coöperating with said needles, means for operating the same, work and fastener clamping mechanism, means for shifting the same, and thread severing mechanism comprising means engaging the thread between the stitch formers and the needles for severing the thread, and a suitable clamp for holding the thread against the action of the severing devices, and comprising an operating member and a clamping strip supported to exert an equal tension upon the threads.

12. In a sewing machine, a frame, a needle bar, a pair of needles carried thereby, a pair of stitch-forming devices coöperating with said needles, means for operating the same, work and fastener clamping mechanism, means for shifting the same, and thread severing mechanism comprising means engaging the thread between the stitch formers and the needles for severing the thread, and a suitable clamp for holding the thread against the action of the severing devices, and comprising an operating lever and a clamping strip pivotally mounted therein adapted to engage the threads.

13. In a sewing machine, a frame, a needle, supporting and operating means therefor, stitch-forming mechanism, a combined work and fastener holding mechanism, means for bringing about a relative movement between the needle and said mechanism for the stitching operation and for the transfer from one opening to the other, and means for severing the thread after stitching in each opening.

14. In a sewing machine, a frame, a pair of needles, means for supporting and actuating the same, a pair of stitch-forming devices coöperating with said needles in the formation of the stitches, a combined work and fastener clamping and supporting mechanism, means for actuating said mechanism to cause the needles and stitch-forming devices to form stitches in one group of openings of a fastener, means for bringing about a relative movement between the needles and said work and fastener supporting and clamping mechanism to cause the needles to engage in another group of openings, and means for severing the threads after each stitching operation.

15. In a sewing machine, a frame, a pair of needles, means for supporting and actuating the same, a pair of stitch-forming devices coöperating with said needles in the formation of the stitches, a combined work and fastener clamping and supporting mechanism, means for actuating said mechanism to cause the needles and stitch-forming devices to form stitches in one group of openings of a fastener, means for bringing about a relative movement between the needles and said work and fastener supporting and clamping mechanism to cause the needles to engage in another group of openings, means for severing the threads after each stitching operation, and means for drawing the surplus thread back through the needles before beginning each stitching operation in each group of thread-receiving openings of the fastener.

16. In a sewing machine, a frame, a pair of needles, means for supporting and actuating the same, a pair of stitch-forming devices coöperating with said needles in the formation of the stitches, a combined work and fastener clamping and supporting mechanism, means for actuating said mechanism to cause the needles and stitch-forming devices to form stitches in one group of openings of a fastener, means for bringing about a relative movement between the needles and said work and fastener supporting and clamping mechanism to cause the needles to engage in another group of openings, means for severing the threads after each stitching operation, and means for drawing the surplus thread back through the needles before beginning each stitching operation in each group of thread-receiving openings of the fastener, and comprising a thread-pulling device, and means for operating the same.

17. In a sewing machine, a frame, a pair of needles, means for supporting and actuating the same, a pair of stitch-forming devices coöperating with said needles in the formation of the stitches, a combined work and fastener clamping and supporting mechanism, means for actuating said mechanism to cause the needles and stitch-forming devices to form stitches in one group of openings of a fastener, means for bringing about a relative movement between the needles and said work and fastener supporting and clamping mechanism to cause the needles to engage in another group of openings, means for severing the threads after each stitching operation, and means for drawing the surplus thread back through the needles before beginning each stitching operation in each group of thread-receiving openings of the fastener, and comprising a thread-pulling

device, and means actuated by the work and fastener clamp for operating the same.

18. In a sewing machine, a frame, a pair of needles, means for supporting and actuating the same, a pair of stitch-forming devices coöperating with said needles in the formation of the stitches, a combined work and fastener clamping and supporting mechanism, means for actuating said mechanism to cause the needles and stitch-forming devices to form stitches in one group of openings of a fastener, means for bringing about a relative movement between the needles and said work and fastener supporting and clamping mechanism to cause the needles to engage in another group of openings, means for severing the threads after each stitching operation, and means for drawing the surplus thread back through the needles before beginning each stitching operation in each group of thread-receiving openings of the fastener, and comprising a pair of spaced studs having both threads upon one side, a thread pulling finger engaging the opposite sides of the thread, and means actuated by the work clamp for moving said finger between said studs to draw the threads back through the needles previous to the stitching operation in each group of openings.

In testimony whereof, I affix my signature in presence of two witnesses as follows.

FRANK E. WILSON.

Witnesses:
G. O. FARQUHARSON,
C. H. SHOTZBARGER.