

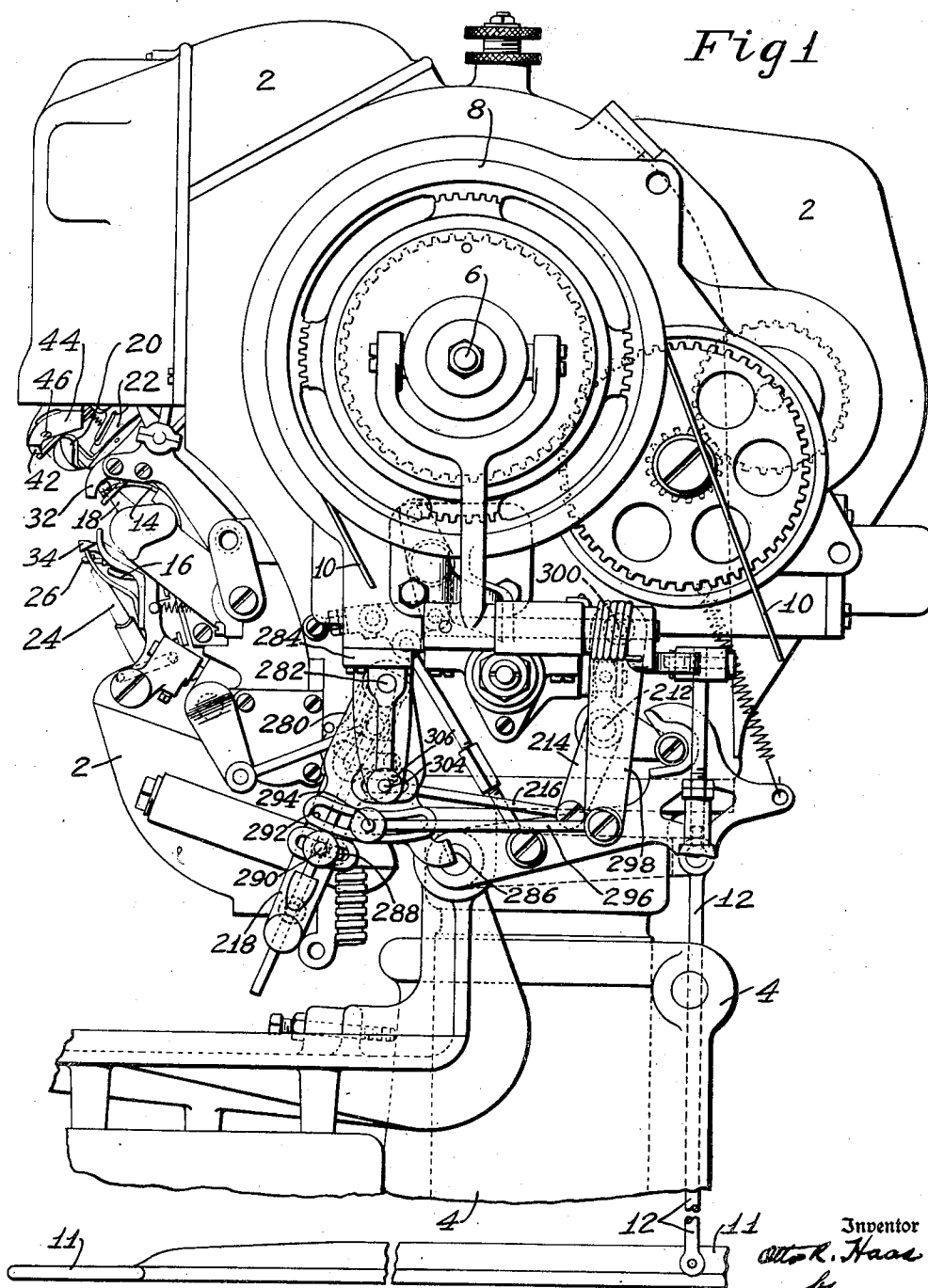
May 21, 1940.

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2,201,969

THREAD CUTTER FOR SEWING MACHINES

Original Filed April 29, 1936 7 Sheets-Sheet 1



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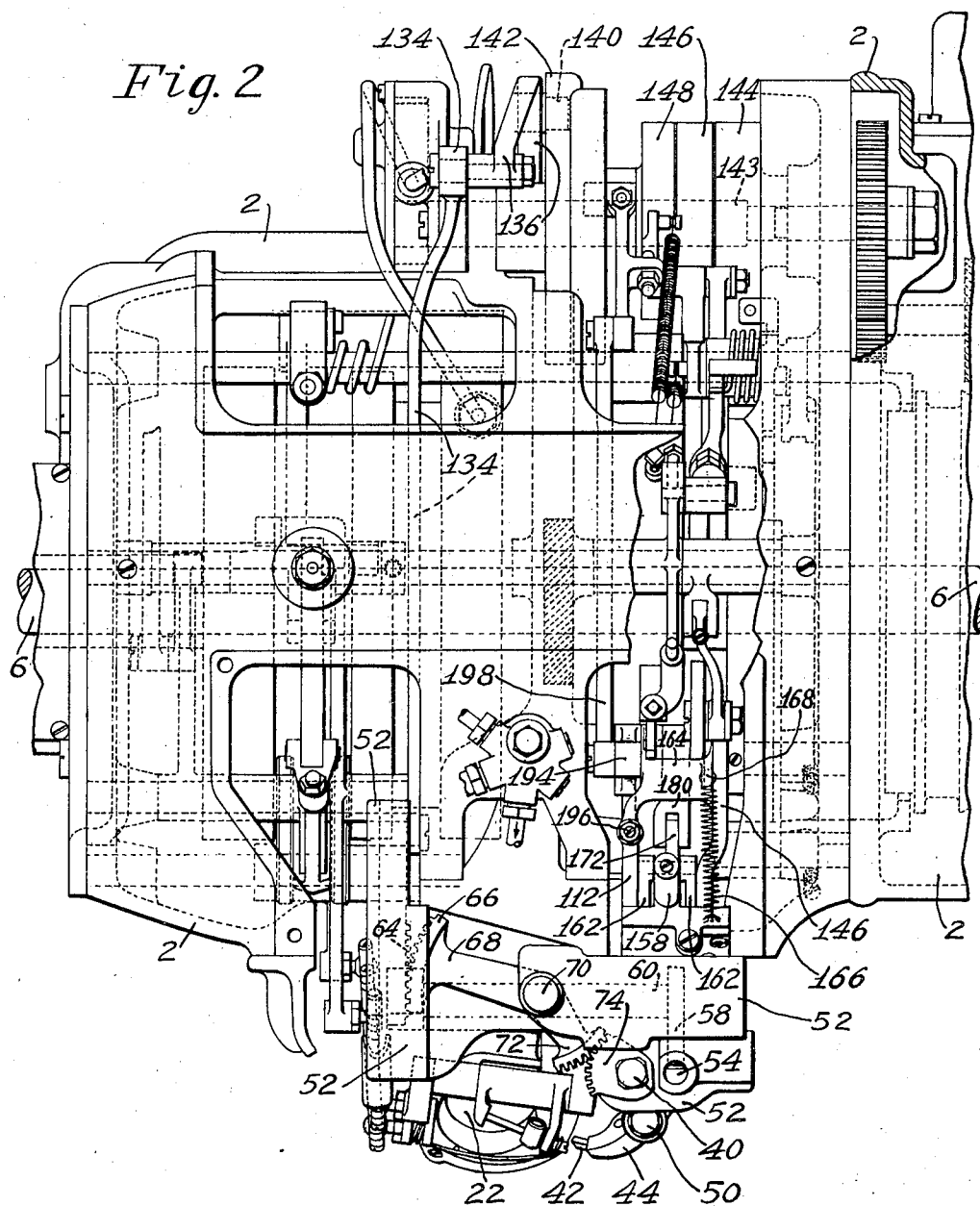
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THREAD CUTTER FOR SEWING MACHINES

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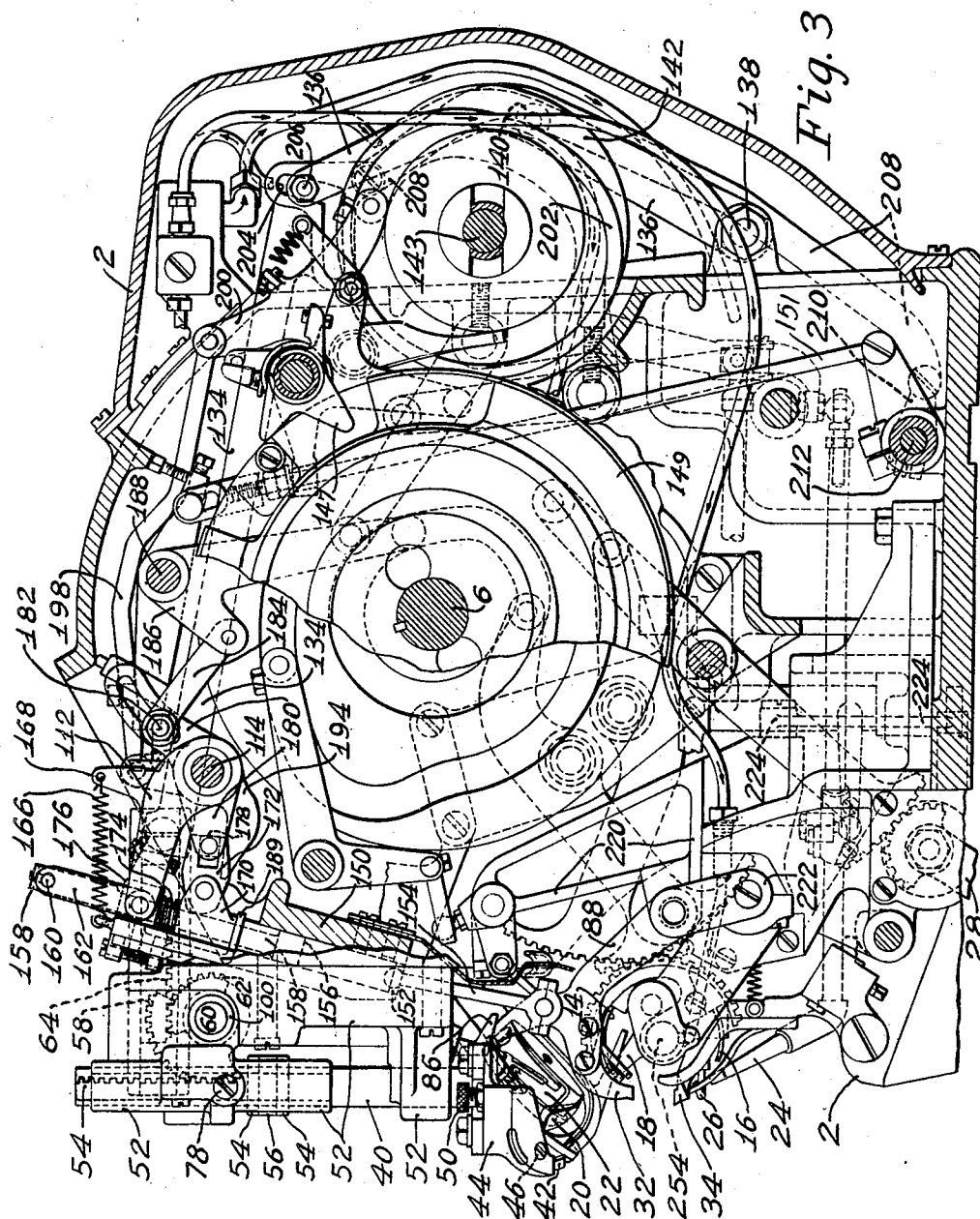
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THREAD CUTTER FOR SEWING MACHINES

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May 21, 1940.

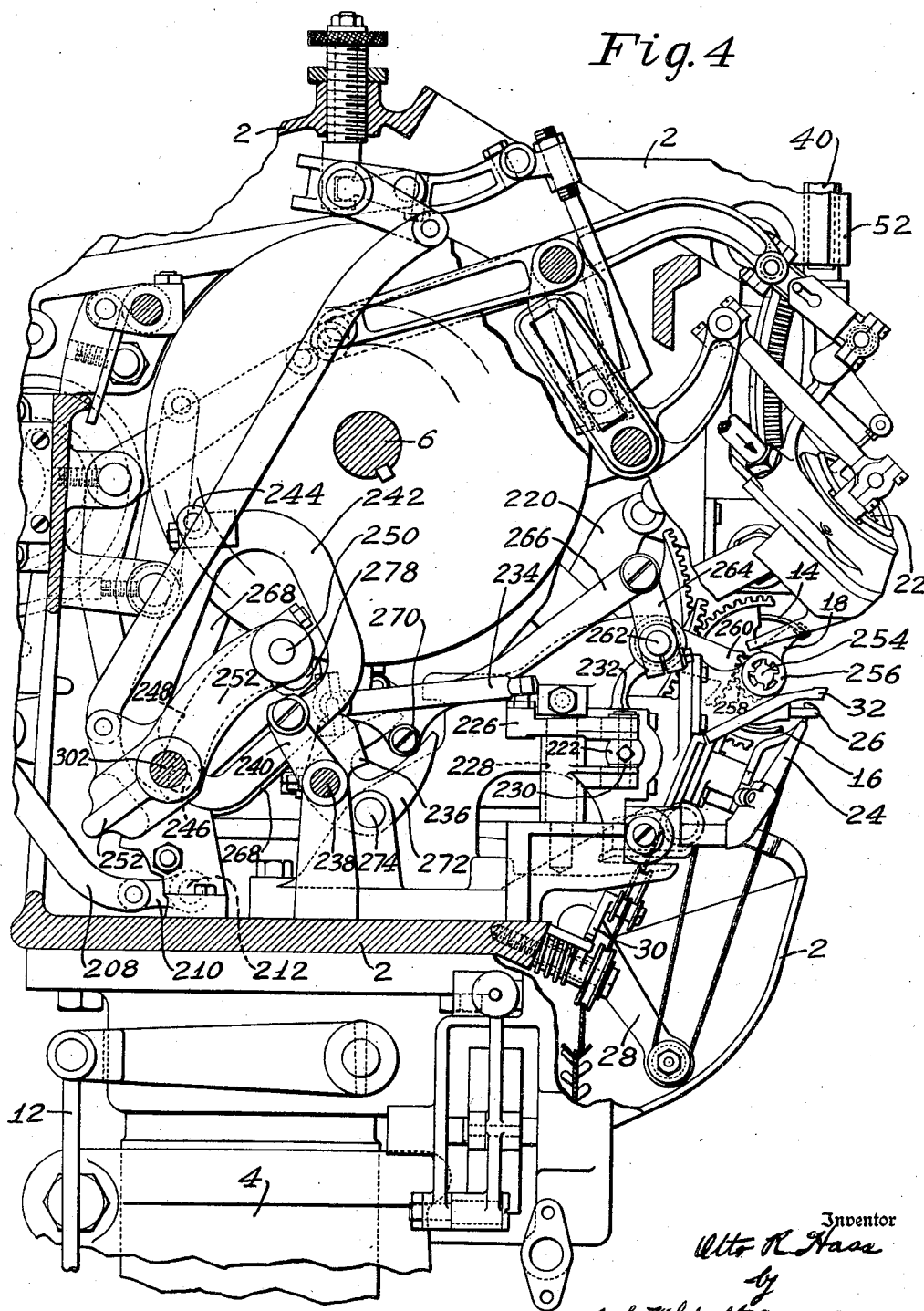
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THREAD CUTTER FOR SEWING MACHINES

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Fig. 4



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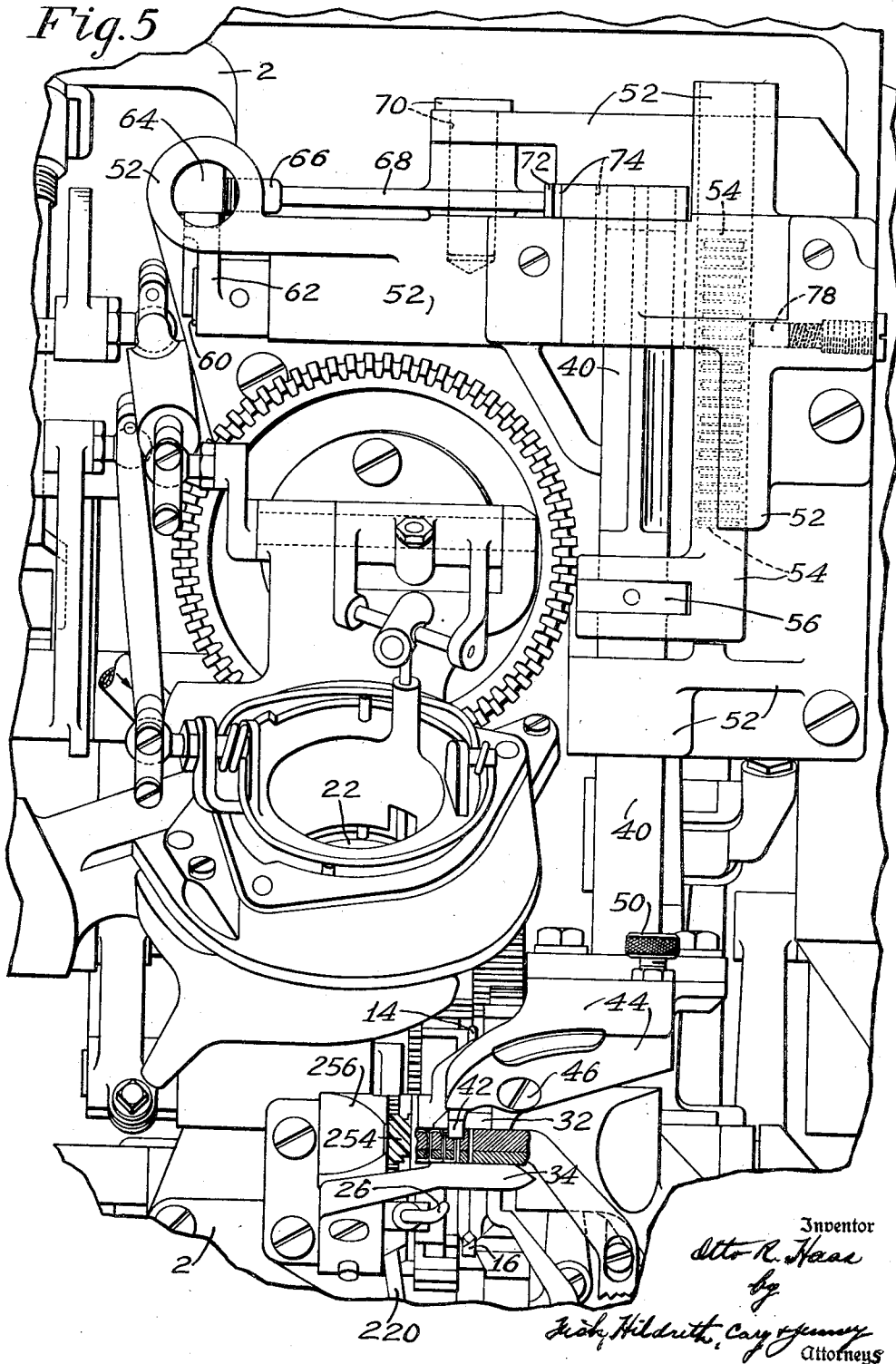
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THREAD CUTTER FOR SEWING MACHINES

Original Filed April 29, 1936 7 Sheets-Sheet 5

Fig. 5



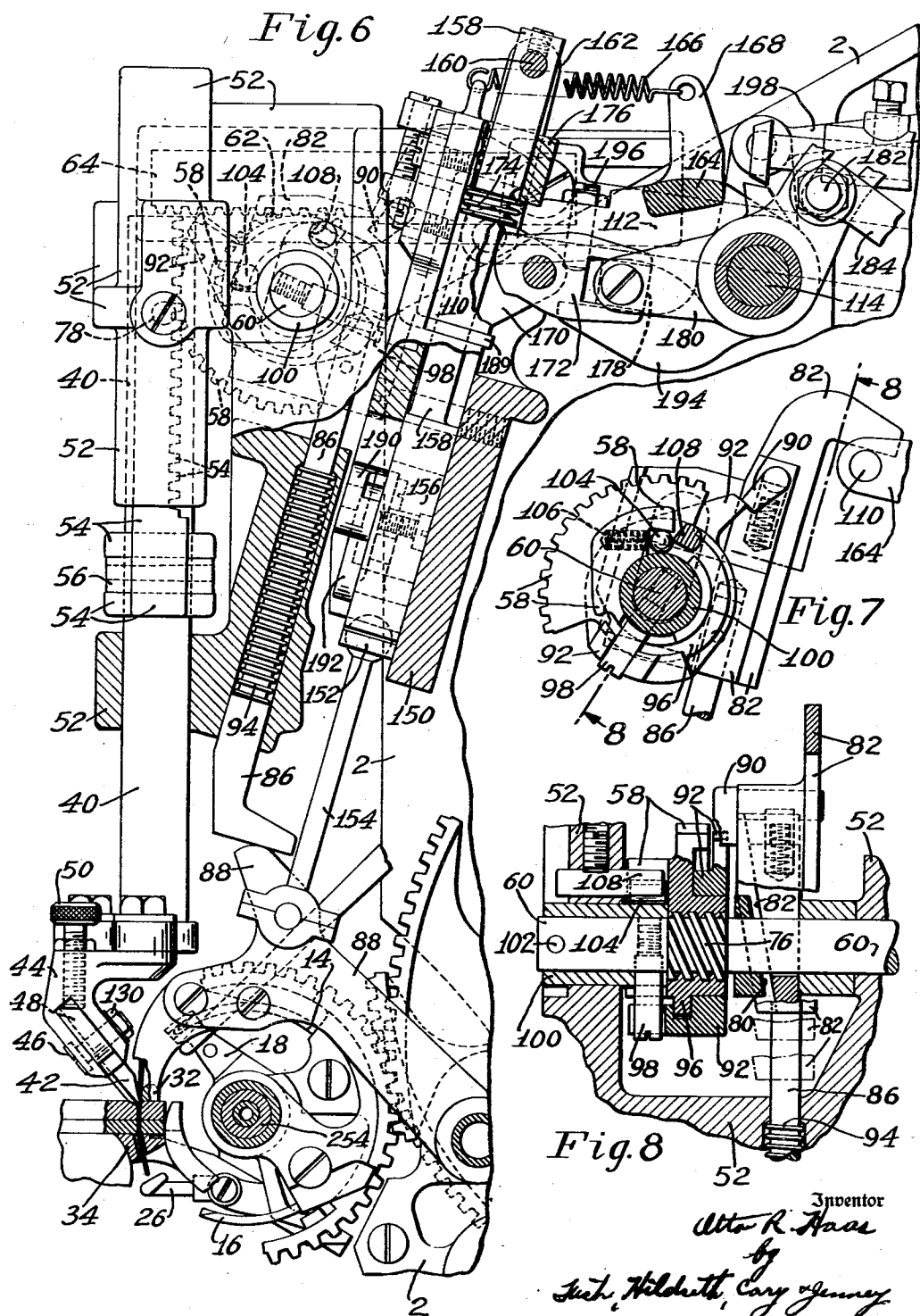
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THREAD CUTTER FOR SEWING MACHINES

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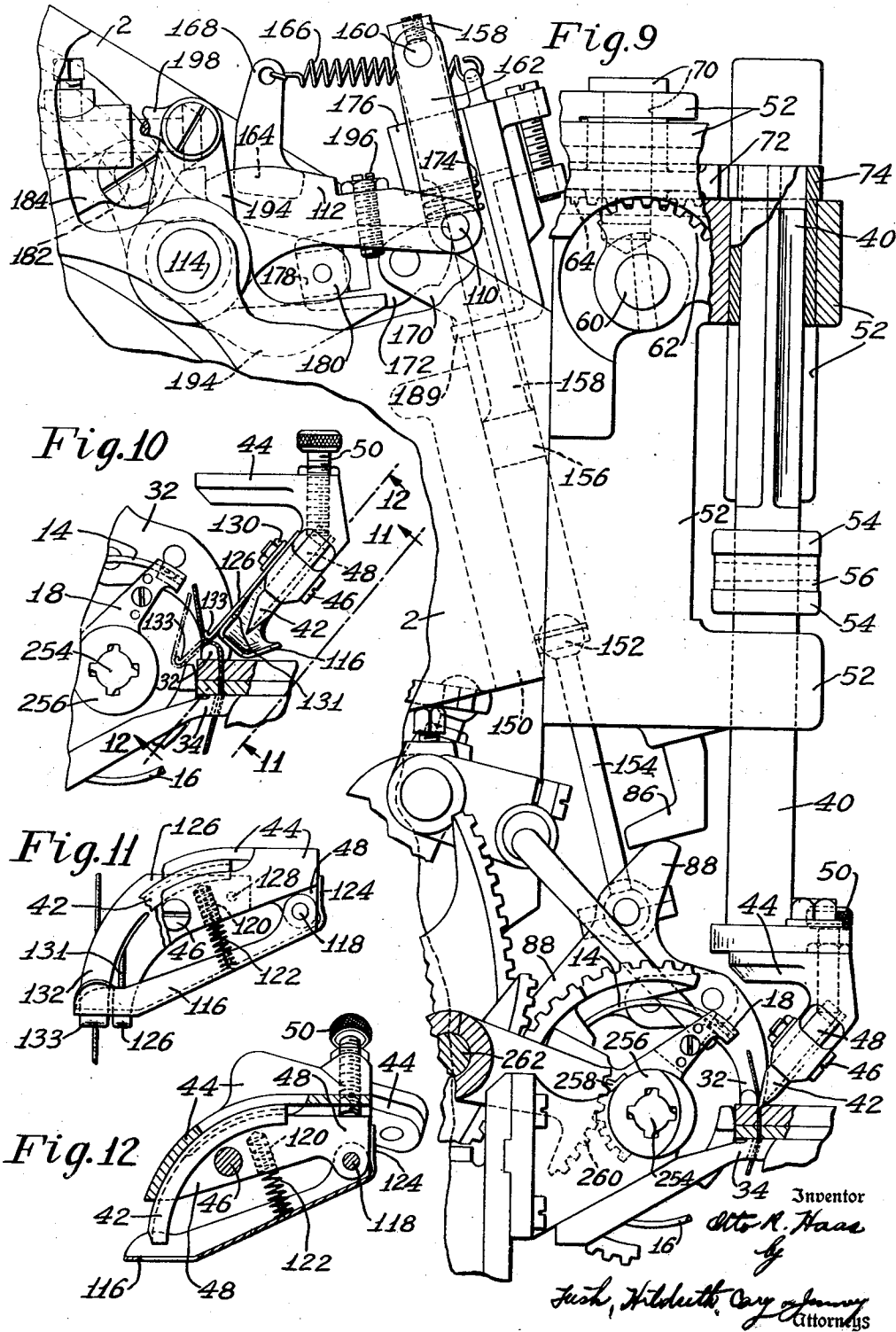
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THREAD CUTTER FOR SEWING MACHINES

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UNITED STATES PATENT OFFICE

2,201,969

THREAD CUTTER FOR SEWING MACHINES

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76,924. Divided and this application April 6,
1938, Serial No. 200,409

29 Claims. (Cl. 112—252)

The present invention relates to shoe sewing machines, and more specifically to improvements in thread cutting mechanism particularly adapted for use in wax thread lockstitch outsole shoe sewing machines, similar in construction and operation to the machine illustrated and described in applicant's Patent No. 2,148,197 dated February 21, 1939, of which the present application is a division. The invention, however, is by no means limited to use in such machines, but may be employed to advantage in connection with chain stitch sewing machines or with sewing machines other than outsole stitchers.

The several features of the invention are herein illustrated as embodied in a curved hook needle lockstitch shoe sewing machine in which the stitch forming devices are similar in many respects to those disclosed in United States Letters Patent No. 2,031,479 of February 18, 1936, and No. 2,045,643 of June 30, 1936, both in the name of the present inventor. In machines of the type disclosed in the above patents, on account of the close assemblage of the stitch forming devices and their actuating mechanisms, there is no extra available space. Addition of other accessory devices, such as a thread cutter, is therefore likely to prevent proper presentation of the work to the machine or to bar convenient access to the stitch forming devices for adjusting the same or for other purposes.

In the present inventor's U. S. Patent No. 2,037,721 of April 21, 1936, there is disclosed a cutter acting between the work support and the presser foot to sever the thread at the end of a seam, the knife of the cutter being mounted on a carriage movable perpendicularly towards and from the work. During the sewing operation, the cutter is held in raised position above the point of operation of the stitch forming devices. Such arrangement, while satisfactory to sever the thread upon the completion of a seam, does not, when the cutter is raised, permit complete freedom of manipulation of the shoe during the stitching operation, nor is adequate access to the stitch forming devices afforded.

It is the object, therefore, of the present invention to provide novel and improved thread-cutting mechanism for use in outsole and other types of shoe sewing machines, which will operate satisfactorily to sever the thread at the end of a seam and will not cause interference either with the stitch-forming instrumentalities or with the manipulation of the shoe while sewing.

According to a feature of the present invention,

there is provided in a sewing machine of the type above referred to, a thread cutter arranged to be actuated through a path directed not only towards and from the work in the same general way as in Patent No. 2,037,721, but also to be actuated through a path extending from one side of the point of operation of the stitch forming devices in the direction of the seam line. To this end, the cutter, as hereinafter described, is mounted on a shaft which is both rotated and reciprocated while moving towards and away from the work. By such an arrangement, the stitch forming devices and their actuating mechanisms are more readily accessible and the cutter does not interfere with the sewing devices or with the manipulation of the shoe in presenting it to the machine.

As a further feature of the invention, the thread cutter mechanism is so arranged that the reciprocating movement of the cutter supporting shaft is adjusted automatically by the position which the presser foot assumes in clamping the work, so that the cutter is caused to penetrate the work a predetermined uniform distance below the upper surface thereof during each cutting operation, regardless of the thickness of the work.

To render the operation of the stitch forming devices free from any detrimental effects resulting from the addition to the machine of the thread cutter mechanism, the adjustment of the said mechanism by the position of the presser foot is controlled, not through a permanent connection to the presser foot as in the machine of the patent above identified, but instead by a presser foot feeler rod which is held out of engagement with the presser foot during sewing. While the feeler rod and means for holding it out of engagement with the presser foot, as outlined, are well adapted to cooperate with the stitch forming devices of a sewing machine when a cutter actuating mechanism including a rotary and reciprocating cutter supporting shaft is employed, this feature of the invention is also useful in connection with other forms of cutter mechanism such as with the mechanism described in the prior patent.

Other features of the invention contemplate a new and improved guard mechanism for the thread cutter knife, a new and improved locking thread pull-off actuated by the thread cutter for withdrawing an extra length of locking thread from the thread case preparatory to starting a new seam, and novel and improved means in a treadle controlled machine for preventing opera-

tion of the thread cutter along certain portions of the seam.

Other objects and features of the invention will become apparent to those skilled in the art from the following description, taken in conjunction with the accompanying drawings, in which Figure 1 is a view in right hand side elevation of the head portion of a shoe sewing machine embodying the invention, illustrating the control handle and certain of the connections for disabling the thread cutter; Figure 2 is a plan view of a portion of the head of the machine, showing certain of the cutter actuating elements; Figure 3 is a sectional side elevation of the machine head looking from the right; Figure 4 is a left side sectional elevation of the machine head, showing the feed adjusting mechanism; Figure 5 is a detail view in front elevation on an enlarged scale of the head of the machine adjacent the sewing point, showing the thread cutter in actuated position; Figure 6 is a sectional view, looking from the right, of the thread cutter and presser foot actuating mechanism in operating position; Figure 7 is a detail view of a portion of the thread cutter actuating mechanism with the machine in stopped position; Figure 8 is a sectional view taken along the line 3—3 of Figure 7; Figure 9 is a sectional view, looking from the left, showing the thread cutter actuating mechanism; Figure 10 is a detail view illustrating a modified form of the invention in which a guard is provided for the cutting edge of the thread cutter knife; Figure 11 is a view of a portion of the cutter guard, as seen along the line 11—11 of Figure 10; and Figure 12 is a sectional view of the cutter guard, taken along the line 12—12 of Figure 10.

The invention is illustrated as embodied in a high speed manually controlled wax thread shoe sewing machine, the starting and stopping of which is effected by a driving and stopping mechanism actuated by a foot treadle. The work is guided in the machine by the operator, instead of automatically as provided for in the machines of the patents above referred to.

The head frame of the machine, indicated at 2, includes the stitch forming devices, and is supported on a vertical pedestal 4 secured to a base, not illustrated. The main sewing shaft 6 is rotated by pulley 8 of the driving and stopping mechanism by means of belt 10 from a driving motor, not shown, located at the base of the machine. The driving and stopping mechanism is substantially the same as that illustrated and described in the present inventor's U. S. Patent No. 2,078,942 dated May 4, 1937, and is controlled by the usual foot operated treadle, a portion of which is indicated at 11, mounted on the base of the machine and connected with the driving and stopping mechanism through a treadle rod 12.

The stitch forming and work feeding devices of the machine include a curved hook needle 14, a curved awl 16, a needle guide 18, a shuttle or loop taker 20 within a guideway of which is mounted a hollow circular thread case 22, a looper 24, a thread hook or finger 26, main and auxiliary take-ups 28 and 30, respectively (see Fig. 4), a presser foot 32, and a work support 34. The stitch forming devices of the machine are so actuated that the awl penetrates the work after the needle has pulled a loop of thread through the work and before the stitch being formed is set, in substantially the same manner as in inventor's prior machines. The work is fed continuously by alternate feeding movements of the

presser foot and work support as a unit and of the needle as a unit while engaging the work.

The thread cutter mechanism constituting the present invention and embodied in the illustrated machine is adapted to sever the thread while the work is held clamped between the work support and the presser-foot in substantially the same manner as in Patent No. 2,037,721 above referred to.

The cutter consists of a curved knife 42 of right angle section clamped in place within a suitably shaped block 44 secured at the lower end of a shaft 40. The lower end of the shaft is formed with a flanged portion to which the block 44 is bolted. The block 44 is formed at its lower portion with a slot inclined at an angle to the axis of the shaft 40 and within the slot is fulcrumed by means of a bolt 46, a clamping lever 48, the lower end of which grips the knife near its cutting edge, and secures it in place. The other end of the lever 48 is engaged by a clamp screw 50 provided with a suitably knurled head and threaded through a portion of the block 44 to rock the clamp lever 48 about the fulcrum bolt 46 into clamping engagement with the knife. By releasing the clamp screw 50, the cutter may easily be replaced or removed for sharpening.

To enable the cutter to move into cutting position from a position at one side of the point of operation of the stitch forming devices in the line of feed, the cutter is mounted on the vertical shaft 40 (Figs. 3, 5, and 6 to 9) with its axis at the right of the shuttle and the point of operation of the needle and awl.

To actuate the cutter, the cutter shaft 40 is slidably and rotatably mounted in bearings of a bracket 52 so that the knife will be moved in a helical path, the shaft being rotated and reciprocated simultaneously by two different trains of connections. Surrounding the shaft 40 between the bearings of the bracket 52 is a pair of perforated lugs extending laterally from a vertically disposed rack 54 (see Figs. 5 and 6) sliding vertically in the bracket 52. Between the lugs of the rack there is mounted a collar 56 pinned to the shaft so that when the rack is raised or lowered the shaft will be moved correspondingly. The rack 54 meshes with a gear segment 58 on a horizontal shaft 60 which is oscillated first in one direction and then the other. To oscillate the shaft 60 there is mounted at its left end a gear segment 62 intermeshing with horizontal rack teeth formed in a power actuated horizontal bar 64. The bar 64 is mounted to slide within a horizontal passage within the bracket 52.

To rotate the cutter shaft 40, the rack bar 64 has in addition to the horizontal rack teeth, a set of vertical rack teeth along its right side meshing with the teeth on a gear segment 66 formed on one arm of a lever 68. The lever 68 is fulcrumed on a vertical stud 70 secured in the cutter bracket and the other arm of the lever is formed with a toothed segment 72 meshing with a similar segment 74. The hub of segment 74 rotates within the upper bearing for the shaft 40 and is provided with a squared central opening through which the squared upper end of the shaft 40 passes. When the rack bar 64 is reciprocated the connections thus described cause the cutter shaft 40 to be rotated simultaneously with the vertical reciprocation.

The shaft 40 is so arranged with relation to the point of operation of the stitch forming devices that its axis will intersect the work sub-

stantially in the line of feed, and at a point of sufficient distance to the right to insure that the cutting edge of the knife will engage the last-formed stitch in the work when operated. The helical path described by the knife edge forms an acute angle with the surface of the work so as to penetrate the work in a direction transverse to the seam line and to cut both the needle and locking threads in the desired manner.

To cause the cutter to penetrate a uniform distance below the upper surface of the work during each operation, regardless of the thickness of the work, the connections for reciprocating the cutter shaft 40 vertically are adjusted by means of connections controlled by the presser-foot as it engages the work. The segment 58 is mounted for relative movement on the shaft 60, and is caused to rotate sooner or later with relation to the start of the rotary movement of the shaft with thin or thick work, respectively.

On the shaft 60 near its right end is formed a series of screw threads 76 (see Fig. 3) engaging corresponding threads within the segment 58. When the shaft 60 begins its rotation to actuate the cutter, the rack 54 is held from downward movement by a yieldingly actuated pin 78 (see Fig. 5) engaging the side of the rack. The segment 58 therefore is held from rotation and moves lengthwise of the shaft. To cause the segment 58 to start rotating with the shaft at the proper point there is provided a square sided wedge shaped washer 80 loosely surrounding the shaft and a wedge shaped block 82 cooperating with the washer 80. The wedge shaped block 82 is connected with a feeler comprising a rod 86 sliding in a passage formed in the bracket 52.

The block and feeler rod are moved downwardly, before the cutter operates, to a position determined by the thickness of the work. With thinner work, the feeler rod 86 and wedge block 82 are moved when actuated to a lower position, and with thicker work to a higher position. Due to the wedging action between the block 82 and washer 80, the amount of relative lost motion between the shaft 60 and the gear segment 58 is regulated so as to change the reciprocating stroke of the cutter shaft 40 correspondingly.

To adjust the position of the feeler rod 86 with relation to the thickness of the work, the lever 88, upon which the presser foot 32 is mounted, is provided with an upwardly extending arm to be engaged by the lower end of the feeler rod during its downward movement. The feeler rod is held in raised position during sewing by a yieldingly actuated pawl 90 pivotally mounted in the upper end of the block 82. The pawl is engaged by a dog 92 and, when the dog is moved from beneath the pawl, a spring 94 compressed between a shoulder at the upper end of the rod receiving passage in the bracket 52 and an enlargement at the lower end of the rod forces the rod downwardly against the presser-foot lever. The dog 92 is rotatably mounted on the hub of the gear segment 58, but is provided with a circular slot surrounding a circumferential rib 96 on the gear segment. To actuate the dog as soon as the shaft 60 begins to rotate, so that the feeler may be engaged with the presser-foot lever before the thread cutter has been moved any substantial distance, a slotted portion of the dog 92 extends beyond the rib 96 on the segment 58 and surrounds a stud 98 secured in the shaft 60. To limit the relative lost motion between the gear segment 58 and the shaft 60, the gear segment is

formed with axially extending portions also surrounding the threaded stud 98.

When the thread cutter has reached its lowermost thread cutting position, as shown in Figures 5, 6 and 9, it is immediately retracted from engagement with the work through substantially the same path as taken during its downward movement. To cause the thread cutter shaft 40 to be raised simultaneously with the beginning of its reverse rotation after cutting the threads, a one-way driving clutch connection is provided between the shaft 60 and the segment 58. Surrounding the shaft 60 at its right end, there is a bushing 100 secured to the shaft by means of a pin 102. Between the axially extending portion of the segment 58 and the bushing 100 there is wedged a roll 104 pressed towards locking engagement with the bushing 100 by a compression spring 106. When the shaft 60 begins its reverse rotation, after the threads are cut, the roll 104 causes the segment 58 to start its reverse rotation with the shaft immediately. When the reverse rotation to the shaft 60 is nearly completed, the roll 104 is moved from locking engagement with the bushing 100 so that the gear segment 58 may be held from rotation and moved along the shaft by threads 76 until the segment reaches its original starting position. To disengage the roll 104 there is mounted in the cutter bracket 52, a pin 108 having its inner end shaped in the form of a wedge to force the roll 104 against its spring 106 when the segment 58 has nearly reached its original starting position.

To raise the feeler rod from its lowermost position the upper portion of the block 82 is formed with a right angled finger extending over a pin 110 carried by an arm 112 of a forked lever 164 rotatably mounted on a horizontal shaft 114. After the thread cutter has engaged the work, the arm 112 is rocked upwardly by mechanism hereinafter described to disengage the feeler 86 from the presser-foot lever 88. When the feeler rod is raised, the pawl 90 immediately engages the dog 92 to hold the feeler rod from again contacting the presser-foot lever.

When the cutter knife 42 is in inactive position, its exposed edge may, if desired, be protected by a guard as more particularly illustrated in Figures 10, 11 and 12. The guard is arranged to be located in a position covering the edge of the knife and, when the cutter is actuated, the guard is automatically unlocked, so that the knife edge may be projected against the work.

When the cutter guard is used, the knife clamping lever 48 is provided with a lug at its upper end, and the guard, in the form of a channel shaped arm 116, is pivotally mounted on a pin 118 secured in said lug. The cutter clamping lever is further modified by the provision of an opening 120 from which extends a compression spring 122 surrounding a right angled tongue bent up inside the guard arm 116. The free end of the arm is formed with an opening through which the cutter knife may pass and a finger 124 formed integrally with the arm acts as a stop to hold the arm against the action of the spring in a position covering the edge of the knife. The guard is held locked in this position by means of a latch 126 formed of spring metal secured to the cutter mounting block 44. The latch member is perforated to fit over the fulcrum bolt 46 for the cutter clamping lever, and is held in position by a pin 128 (Fig. 11) extending from the block and a nut 130 threaded to the end of

the fulcrum bolt. The latch member is provided with a right angle latch portion 131 at its lower end, beneath which the side flange of the guard arm 116 is held. When the cutter is projected against the work, the rounded lower end of the latch member engages the presser-foot to raise the latch portion from engagement with the guard arm 116 so that when the guard arm contacts with the work it may remain stationary during the continued advance of the cutter.

In operating upon certain types of work, it is desirable to provide an additional length of locking thread at the beginning of each new seam. For this purpose the latch member 126 is constructed with a thread measuring arm 132 which is located to engage the thread extending between the thread case and the work, as illustrated in Figures 10 and 11, just before the cutter severs the threads. The thread measuring arm deflects the thread over the work engaging portion of the presser-foot to pull off a sufficient length for proper starting of a new seam. The thread measuring arm is rounded at its lower end 133 so that it may be raised slightly to clear the presser-foot in measuring the thread.

The power driven mechanism for reciprocating the thread cutter actuating rack bar 64 comprises a link 134 (Figs. 2 and 3) pivotally connected at its forward end to the rearward end of the rack bar 64 and a cam actuated lever 136 connected to the rearward end of the link 134. The lever 136 is fulcrumed at its lower end on a bolt 138. Intermediate the ends of the lever is a follower 140 engaging a cam 142 rotatable on a shaft 143 at the rear of the sewing shaft 6. The cam 142 is connected with a one-revolution clutch having a driving part 144 and relatively movable driven parts 146 and 148 of the same construction and mode of operation as described more particularly in the present inventor's U. S. Patent No. 2,078,942 above referred to. The clutch is brought into operation by means including a dog 147 which engages a cam 149 on the sewing shaft whenever the driving and stopping mechanism is actuated to stop the machine during the final movements of the sewing shaft 6. During the operation of the machine, the dog is held away from the cam by treadle-operated connections including a rod 151 which is actuated by the treadle as described more fully in Patent No. 2,148,197 and in Patent No. 2,078,942.

The presser foot is locked in gripping engagement with the surface of the work by yielding means acting through an arrangement of locking wedge blocks similar to that described in the U. S. Patent to Ashworth No. 1,756,502 of April 29, 1930, the wedge blocks being mounted above the presser-foot in a wedge box 150 (see Figs. 3 and 6) secured in the machine frame. The presser-foot wedge block, indicated at 152, is connected to the presser foot 88 by a link 154 having ball and socket joints at the ends thereof.

The presser foot wedge block 152 is forced downwardly by engagement of one of its surfaces with a locking wedge block 156 formed at the lower end of a rod 158, the upper end of which carries a pin 160. Pivoted on opposite ends of the pin is a pair of links 162, the lower ends of which are pivotally connected to the ends of the forked lever 164 rotatably mounted on shaft 114. A tension spring 166 connected between an upstanding arm 168 of lever 164 and a lug on the machine frame acts to force the rod 158 downwardly to cause the presser foot to clamp the work.

To raise the presser-foot intermittently from the work during sewing, the rod portion 158 of the locking wedge block 152 is surrounded at its central part by a yoke 170 (see Figs. 6 and 9) between the lugs of which a gripping arm 172 is pivotally mounted. The yoke 170 is normally held in lowered position by a spring 174 surrounding the rod portion of the locking wedge block between the yoke 170 and a bearing 176 at the top of the wedge box 150. The gripping arm 170 is forked at its rearward end and surrounds a squared block 178 pivoted between the parallel arms of a lifting lever 180 also fulcrumed on the shaft 114. The lever 180 has a slotted arm in which is adjustably secured the pivot 182 for one end of a link 184, (Fig. 3), the other end of which is connected to a cam actuated lever 186 fulcrumed on a horizontal shaft 188. When the lever 186 is actuated, the cam-shaped forward end of gripping arm 172 acts directly against the locking wedge block rod 158 to raise it a predetermined distance during each cycle of operations of the machine. The lever 186 then lowers the gripping arm until the yoke 170 strikes a right angle plate 189 adjustably secured to the wedge box 150. Further downward movement of the lever 186 then causes the grip of arm 172 to be released so that the spring 166 may again move the presser-foot yieldingly against the work.

The presser-foot is raised from the work when the rod 158 is lifted by loosely connected connections between the locking wedge block 156 and the presser-foot wedge block 152. These connections comprise a lever 190 (see Fig. 6) pivoted at one end to the locking wedge block 156 and a link 192 connected with the presser-foot wedge block 152, arranged as in the application referred to in such a way that upward and downward movement of the rod 158 serves to raise and lower the presser-foot block 152, the looseness in connecting linkage allowing proper wedging action of the blocks when in lowered position for clamping the work.

The mechanism for raising the presser-foot at the end of the seam comprises an upstanding arm of a lever 194 having a horizontal arm underlying a set screw 196 carried by the arm 112 of forked lever 164. The lever 194 is connected to the forward end of a link 198, the rearward end of which is pivotally connected with a cam actuated lever 200 (Fig. 3). A cam 202 for actuating the lever 200 is rotated by the one-revolution clutch 144-148, hereinbefore referred to, and the relation between the cam 142 which actuates the thread cutter and the cam 202 is such that the presser-foot is raised only after the thread cutter has completed its operation.

To prevent the thread cutter from being actuated upon stopping the machine at certain times during sewing operations, as, for instance, while operating upon the forepart of a shoe, there is provided in the illustrated machine a series of connections for disconnecting the thread cutter from its actuating cam lever. The thread cutter actuating link 134 is formed at its rearward end with an L-shaped slot 204 (Fig. 3) through which passes a bolt 206 secured to the upper end of the cam actuated lever 136. The rearward end of the link 134 is also connected by means of a link 208 with an arm 210 secured to one end of a shaft 212. To the outer end of the shaft 212 is secured an arm 214 (see Fig. 1) located at the right side of the machine

and connected through a link 216 to a manual control handle 218 rotatably mounted on the main frame. The lower end of the handle is provided with a suitable grip by means of which the handle may be swung forwardly or rearwardly as desired. When the handle is swung rearwardly, the connections just described act to raise the end of link 134 until the horizontal portion of the slot 204 is level with the stud 206. When the link is in this position, rotation of the auxiliary clutch and cam 142, upon stopping the machine, will have no effect on the thread cutter, but the presser foot will be raised to release the work so that its position may be readjusted before starting the machine again. When the handle is moved forwardly to any position except its extreme rearward position, the end of link 134 is sufficiently lowered to engage the vertical portion of slot 204 with the stud 206, thereby again rendering the cutter actuatable when the machine is stopped.

The control handle 218 is so connected and arranged that it may be used, not only to render the thread cutter inoperative, but also, if desired, the handle may be used to regulate simultaneously the feeding movements imparted by the presser-foot and work support as a unit and by the needle as a unit.

The presser-foot and work support are mounted on a laterally sliding carriage 220 for reciprocating movement in the line of feed. The carriage is provided with horizontal gudgeons 222 extending in opposite directions from the carriage and received in circular guideways in the machine frame. A link 224 pivotally connected at one end to the rear of the carriage and at its other end to the machine frame prevents rotation of the carriage about the gudgeons.

To move the carriage in the line of feed, the gudgeon 222 at the left of the carriage is connected to one arm of a lever 226 mounted on a vertical shaft 228 in the machine frame. The arm is provided with vertically separated forked portions, between the ends of which are slidably positioned a pair of blocks the lowermost one of which is shown in Fig. 4, at 230 pivotally mounted upon a vertical pin 232 in the gudgeon 222. The other arm of the lever 226 is connected by means of a link 234 to a lever 236 supported on a horizontal shaft 238 carried by the machine frame.

The lever 236 is formed with an elongated hub carrying a pair of arms 240 positioned at each side of an open frame 242 and pivotally connected thereto. The frame carries a cam roll 244 cooperating with a cam on the sewing cam shaft 6 and is pivotally connected by means of a pin 246 with the lower end of a link 248, the upper end of which is rotatably mounted upon a stud 250 secured in the upper end of one arm of a yoke 252. When the sewing cam shaft is rotated, the frame 242 is oscillated about the shaft 238 and stud 250 as centers, the lever 240 and link 248 acting as guides for the movement of the frame. The link 248 and that portion of the frame 242 between pin 246 and the pivotal connection of lever 240 comprises a pair of toggle members for driving the feed slide, the relative position of stud 250 determining the amount of feeding movement imparted to the carriage.

The needle and awl are mounted on toothed segments for oscillating movement about a carrier stud 254 journaled at one end in a plain bearing in the machine frame, and at the other end in a threaded bearing 256 supported by the feed

carriage, the end of the stud being correspondingly threaded to engage said bearing as described in further detail in the inventor's Patent No. 2,031,479 above referred to.

To impart separate feeding movements to the carrier stud 254, the stud is oscillated by means of a gear segment 258 formed on the stud and engaged by a corresponding segment 260 (see Fig. 4) secured to a shaft 262 on which is mounted an arm 264. The arm 264 is connected by means of a link 266 with an open frame 268 similar to the frame 242 of the feed carriage reciprocating mechanism. The link 266 is provided with a roll 270 positioned in a guideway formed in a plate 272 mounted on shafts 238 and 274. The frame 268 is supported for oscillating movement by a link 276 pivotally connected at one end to the frame 268 and at the other end by stud 278 to the outer end of the other arm of the adjustable yoke member 252. The frame is oscillated from a cam on the main sewing shaft 6 while being guided by the link 276 and by the roll 270 in the guideway in plate 272. The amount of feeding movement imparted to the needle and awl by the carrier stud 254 is determined by the position of the adjustable yoke member 252, which member likewise determines the feeding movement imparted to the feed carriage, as above described.

The connections between the control handle 218 and the feed mechanism comprise a plate 280 (see Fig. 1), pivotally mounted on a stub shaft 282 secured in a bracket 284 carried by the machine frame. The shaft 282 is arranged with its axis in alignment with the pivotal center of the handle. When the handle is moved towards the rear, it engages a lip 286 at the lower end of the plate 280 and when it is moved forwardly a laterally extending pin 288 on the handle engages the inner end of a bolt 290 adjustably clamped within a slot in the plate 280. The plate 280 is also formed with an arcuate slot 292 in which is adjustably clamped a bolt 294, the inner end of which passes loosely through the forward end of a link 296. The rearward end of the link 296 is connected with the lower end of an arm 298 mounted at the right end of a horizontal shaft 300. The shaft 300 extends loosely through suitable bearings in the lower part of the sewing head and at its left end is pinned to one side of the yoke member 252 to the extremities of which the cam actuated frames 242 and 268 are connected. The other side of the yoke member is rotatably mounted on a stub shaft 302 in alignment with the shaft 300. When the shaft 300 is oscillated, the positions of the arms of the yoke 252 are changed so as to change simultaneously the distances through which the feed carriage 220 and the needle and awl stud 254 are moved.

When the control handle is moved to its rearward position to disable the thread cutter, the plate 280 is moved in a direction to shorten the feeding movements of the feed carriage and the needle and awl stud. The handle is customarily thus moved as the sewing progresses from the shank of the shoe to the forepart. When the control handle is moved to the other extreme position as, for instance, when the sewing progresses from the forepart to the shank, the plate 280 will be moved to lengthen the feeding movements. By thus disabling the thread cutter, the machine may be stopped in the middle of a seam, if necessary or desirable for any reason, without cutting the thread, and the thread cut properly upon again stopping the machine at the completion of the seam, without any attention or care on the

part of the operator other than ordinarily used in regulating the feed mechanism or the other devices which act on the shoe. The movements of the plate 280 will occur only at the ends of the control handle movement so that the cutter may be rendered operative if desired by moving the control handle to a central position without effecting a change in the feeding movements. To retain the plate 280 in position after adjusting the length of feed at one end of the handle movement, in the lower end of the bracket 284 there is loosely mounted a bolt 304 passing through an arcuate slot in the plate 280. The bolt 304 is surrounded by a spring, not illustrated, compressed between the bracket 284 and a thumb nut 306 on the rods to provide friction of the stud in the slot of the plate 280 and prevent its movement while the machine is operated. If desired, the thumb nut 306 may be tightened to prevent any movement of the plate 280, thus holding the feed adjustment fixed during operation of the machine.

The nature and scope of the invention having been indicated, and a construction embodying the several features of the invention having been specifically described, what is claimed is:

1. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of the seam comprising a knife-edged member and means for causing said member, when actuated, to move through a path extending at an angle to the surface of the shoe sole and having a component in the direction of the seam line from inactive to active cutting position, and to enter the space between the presser foot and work support.

2. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam comprising a knife edged member and means for causing said member, when actuated, to move through a path having a component in the direction of the seam line from inactive to active cutting position, and to penetrate the shoe sole between the presser foot and work support in a direction transverse to the seam line.

3. An outsole shoe sewing machine having, in combination, stitched forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the shoe remains in position between the work support and the presser foot comprising a knife-edged member and means for causing said member, when actuated, to move in a helical path about an axis forming an angle with the shoe sole.

4. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife edged member and a knife supporting shaft, mechanism for actuating the shaft to cause the knife member to move in a curved path having a component in the direction of the seam line from an inactive position at one side the point of operation of the stitch forming de-

vices to a cutting position between the work support and presser foot.

5. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife edged member, a knife supporting shaft disposed with its axis approximately perpendicular to the surface of the work and intersecting the seam line, and mechanism for reciprocating and rotating the shaft to cause the knife member to move in a direction lengthwise of the shaft from an inactive position at one side the point of operation of the stitch forming devices to a cutting position between the presser foot and work support.

6. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, a knife supporting shaft and mechanism controlled by the position of the presser foot for rotating and reciprocating the shaft towards and from the shoe to cause the knife to act in a predetermined relation to the shoe sole.

7. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, a knife supporting shaft, and mechanism controlled by the thickness of the work for rotating and reciprocating the shaft towards and from the shoe to cause the knife to act in a predetermined relation to the shoe sole.

8. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, a knife supporting shaft, mechanism for rotating and reciprocating the shaft towards and from the shoe, and means for controlling said mechanism to cause the knife to penetrate a predetermined distance into the shoe sole regardless of the sole thickness.

9. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member and a knife supporting shaft, mechanism for rotating the shaft, connections between the shaft and said mechanism for reciprocating the shaft during rotation, and a feeler cooperating with the presser foot for adjusting the extent of reciprocation imparted to the shaft.

10. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between

them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member and a knife supporting shaft, mechanism for rotating the shaft, connections between the shaft and said mechanism for reciprocating the shaft during rotation, and means controlled by the thickness of the work for adjusting the extent of reciprocation imparted to the shaft.

11. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, knife supporting means, mechanism for moving the knife supporting means to cause the knife member to move transversely to the seam line, connections between the knife supporting means and said mechanism for causing the knife to penetrate the shoe sole during transverse movement of the knife, a feeler brought into engagement with the presser foot for adjusting the connections to cause the knife member to penetrate a predetermined distance beneath the surface of the sole, and means for holding the feeler out of engagement with the presser foot during sewing.

12. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, knife supporting means, mechanism for actuating the knife supporting means towards the shoe sole, a feeler brought into engagement with the presser foot for adjusting the operation of said mechanism, and a latch for holding the feeler out of engagement with the presser foot during sewing.

13. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, a knife supporting shaft, mechanism including connections having lost motion for actuating the knife supporting shaft towards the shoe sole, and simultaneously for rotating the shaft to cause the knife member to penetrate the surface of the shoe sole along a path forming an acute angle with the work surface, and a feeler controlled by the thickness of the work to adjust the amount of lost motion in said connections.

14. An outsole shoe sewing machine having, in combination, stitching forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam while the sole edge remains in position between the work support and presser foot comprising a knife-edged member, a knife supporting shaft disposed with its axis at an angle to the shoe sole, mechanism for rotating the shaft, connections having lost motion between the shaft and said mechanism for reciprocating the shaft during rotary motion, a feeler controlled by the

thickness of the sole to adjust the amount of lost motion in said connections, and means for preventing lost motion in said connections from taking place when the knife member is in engagement with the sole.

15. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam comprising a knife-edged member arranged, when actuated, to move against the shoe sole, a guard mounted to move with the knife-edged member for covering the edge of the knife member during operation of the stitch forming devices, and means for causing the guard to uncover the edge of the knife member when said member moves toward the shoe sole.

16. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam comprising a knife-edged member arranged, when actuated, to move against the shoe sole, a yielding guard mounted to move with the knife-edged member, and means for locking the guard in a position covering the edge of said member.

17. An outsole shoe sewing machine having, in combination, stitch forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam comprising a knife-edged member arranged, when actuated, to move against the shoe sole, a yielding guard mounted to move with the knife-edged member, a latch for locking the guard in a position covering the edge of said member, and means cooperating with the latch for unlocking the guard when the knife member moves towards the shoe sole.

18. An outsole shoe sewing machine having, in combination, stitching forming devices, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, and means for severing the thread at the end of a seam comprising a knife-edged member arranged, when actuated, to move against the shoe sole, a yielding guard mounted to move with the knife-edge member, a latch for locking the guard in a position covering the edge of said member, and a projection on the latch for engaging the presser foot when the knife member engages the shoe sole to unlock the guard.

19. An outsole shoe sewing machine having, in combination, stitching forming devices including a locking thread case and a loop taker, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, a thread cutter actuated to sever the locking thread at the end of a seam while the work is clamped, mechanism for actuating the thread cutter and thereafter for releasing the work from the presser foot and work support, and a member on the cutter for deflecting the locking thread between the thread case and the work while the work is clamped to provide an extra length of locking thread in starting a new seam.

20. An outsole shoe sewing machine having, in combination, stitch forming devices including a locking thread case and a loop taker, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, a thread cutter actuated to sever the locking thread

at the end of a seam while the work is clamped, mechanism for actuating the thread cutter, and a member on the cutter for deflecting the locking thread between the thread case and the work while the work is clamped to provide an extra length of locking thread in starting a new seam.

21. An outsole shoe sewing machine having, in combination, stitch forming devices including a locking thread case and a loop taker, a work support and a presser foot for clamping between them the projecting edge of the sole of a shoe, a thread cutter actuated to sever the locking thread at the end of a seam while the work is clamped, mechanism for actuating the thread cutter and thereafter for releasing the work from the presser foot and work support, and a yielding member on the cutter for forcing the locking thread against the presser foot while the work is clamped to provide an extra length of locking thread in starting a new seam.

22. A sewing machine having, in combination, stitch forming devices, a main sewing shaft for actuating said devices, a work support, a presser foot for clamping the work against the work support, driving and stopping mechanisms, a treadle for controlling the driving and stopping mechanisms, a thread cutter arranged to sever the thread while the work is clamped between the presser foot and work support, power driven mechanism for actuating the cutter and for disengaging the presser foot from the work, means actuated by the sewing shaft in stopping the machine to throw the power driven mechanism into operation, and manually controlled connections between the power driven mechanism and the cutter arranged to render the cutter inoperative while the power driven mechanism operates.

23. A sewing machine having, in combination, stitch forming devices, a main sewing shaft for actuating said devices, a work support, a presser foot for clamping the work against the work support, driving and stopping mechanisms, a treadle for controlling the driving and stopping mechanisms, a thread cutter, power driven mechanism for actuating the cutter, means actuated by the sewing shaft in stopping the machine to throw the power driven mechanism into operation, and manually controlled connections between the power driven mechanism and the cutter arranged to render the cutter inoperative while the power driven mechanism operates.

24. A sewing machine having, in combination, stitch forming devices, a main sewing shaft for actuating said devices, a work support, a presser foot for clamping the work against the work support, driving and stopping mechanisms, a treadle for controlling the driving and stopping mechanisms, a thread cutter arranged to sever the thread while the work is clamped between the presser foot and work support, levers connected to actuate the cutter and to disengage the presser foot from the work, a power driven member for operating the levers, means actuated by the driving and stopping mechanisms in stopping the machine to throw the power driven member into operation, and manually controlled connections

between the cutter and one of the levers arranged to render the cutter inoperative without preventing the disengagement of the presser foot from the work.

25. A sewing machine having, in combination, stitch forming and work feeding devices, a cutter actuated when the stitch forming devices are stopped to sever the thread, means for regulating the operations of certain of the stitch forming and work feeding devices and for disabling the cutter, a control handle, and connections for actuating the regulating and cutter disabling means from said handle.

26. A sewing machine having, in combination, stitch forming and work feeding devices, a stop mechanism, a thread cutter, cutter actuating mechanism, a feed changing mechanism, and means for simultaneously operating the feed changing mechanism and rendering the cutter actuating mechanism operative and inoperative upon stopping the machine.

27. A sewing machine having, in combination, stitch forming and work feeding devices, a stop mechanism, a thread cutter, cutter actuating mechanism, a feed changing mechanism, and connections between the feed changing and cutter actuating mechanisms acting under one adjustment of the feed changing mechanism to render the cutter actuating mechanism inoperative upon stopping the machine, and under another adjustment to render the cutter actuating mechanism operative upon stopping the machine.

28. A sewing machine having, in combination, stitch forming and work feeding devices, a cutter actuated when the stitch forming devices are stopped to sever the thread, means for regulating the operations of certain of the stitch forming and work feeding devices and for disabling the cutter, a control handle arranged to be shifted manually through a limited range of movement, connections operated by the handle for actuating the regulating means at the ends only of said handle movement, and other connections for actuating the cutter disabling means to render the cutter operative throughout the central portion of the handle movement.

29. A sewing machine having, in combination, stitch forming and work feeding devices, a cutter actuated when the stitch forming devices are stopped to sever the thread, means for changing the length of feeding movement imparted to the work by the feeding devices and for disabling the cutter, a control handle arranged to be shifted manually through a limited range of movement, connections between the control handle and said means arranged to disable the cutter at one end only of handle movement, other connections actuated by the handle arranged to change the feeding movement of the work feeding devices at both ends of the handle movement, and means for retaining the position of the feed changing connections after adjustment at one end of the handle movement until the other end of the handle movement is reached.

OTTO R. HAAS.

CERTIFICATE OF CORRECTION.

Patent No. 2,201,969.

May 21, 1940.

OTTO R. HAAS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 6, first column, line 16, for the word "rods" read --rod--; page 6, first column, line 53, claim 3, for "stitched" read --stitch--; page 7, second column, lines 44 and 57, claims 18 and 19 respectively, for "stitching" read --stitch--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of August, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.