

Aug. 9, 1932.

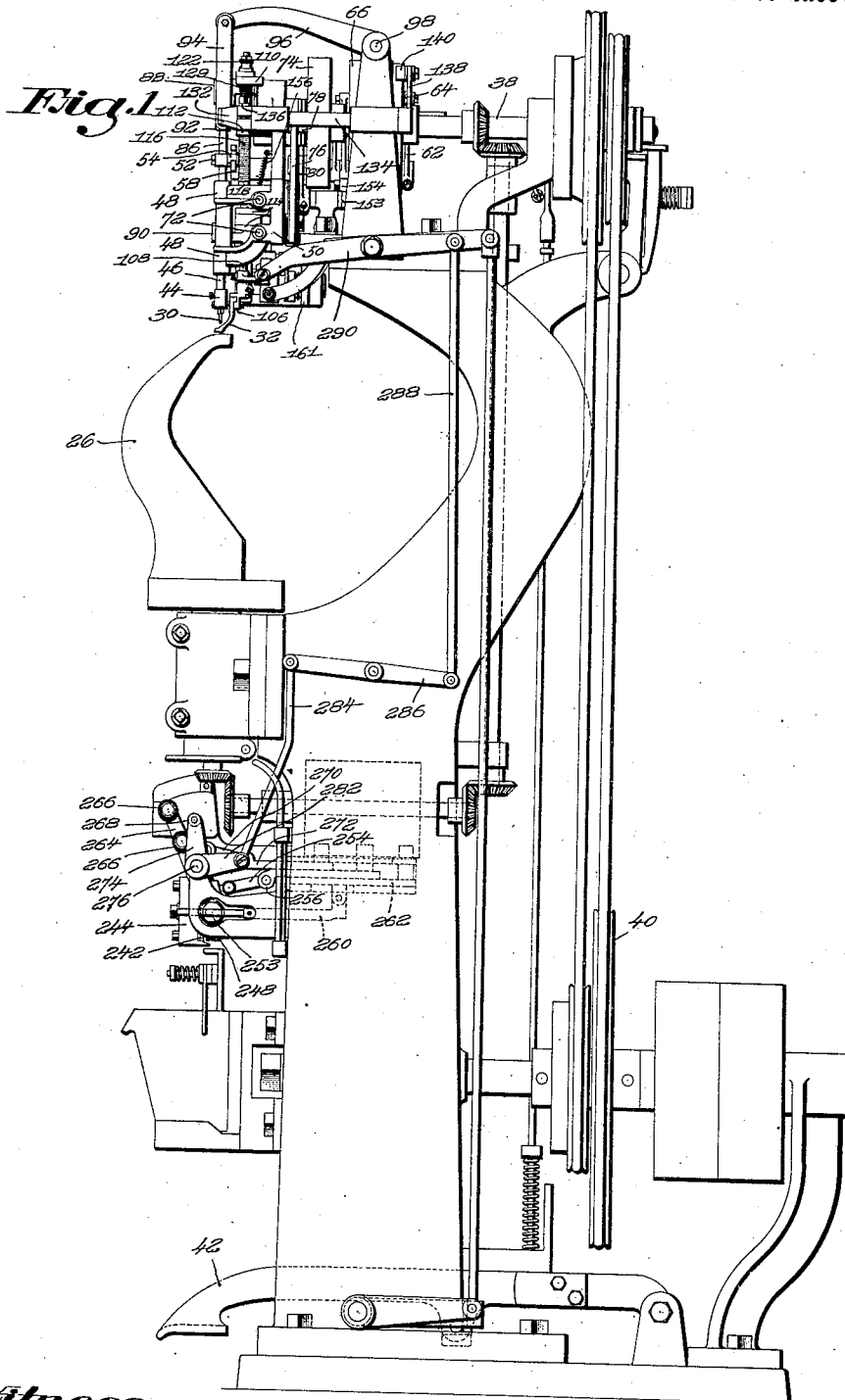
A. B. FOWLER

1,870,844

SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 1



Witness

Friedrich S. Greenleaf.

Inventor

A. B. Fowler, deceased,  
Mary F. Fowler, administratrix.  
By *Vern Everett Fishbaugh, Henry H. Hays*

Aug. 9, 1932.

A. B. FOWLER

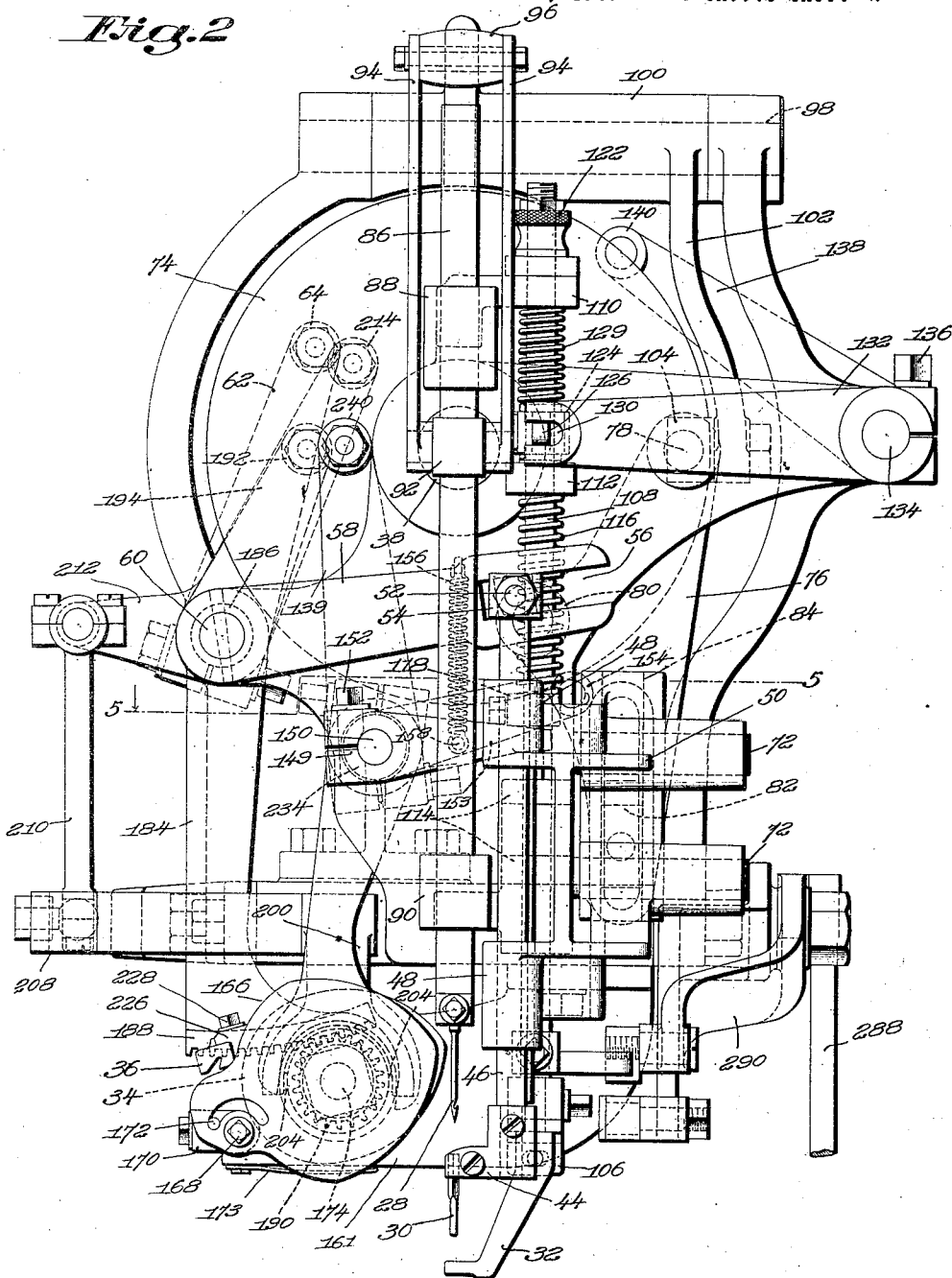
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SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 2

*Fig. 2*



*Witness*

*Frederick L. Grunbaf.*

*Inventor*

By *A. B. Fowler, deceased.*  
*Mary F. Fowler, administratrix.*

*by Van Evonne Rich Haldeth Esq. Atty*

Aug. 9, 1932.

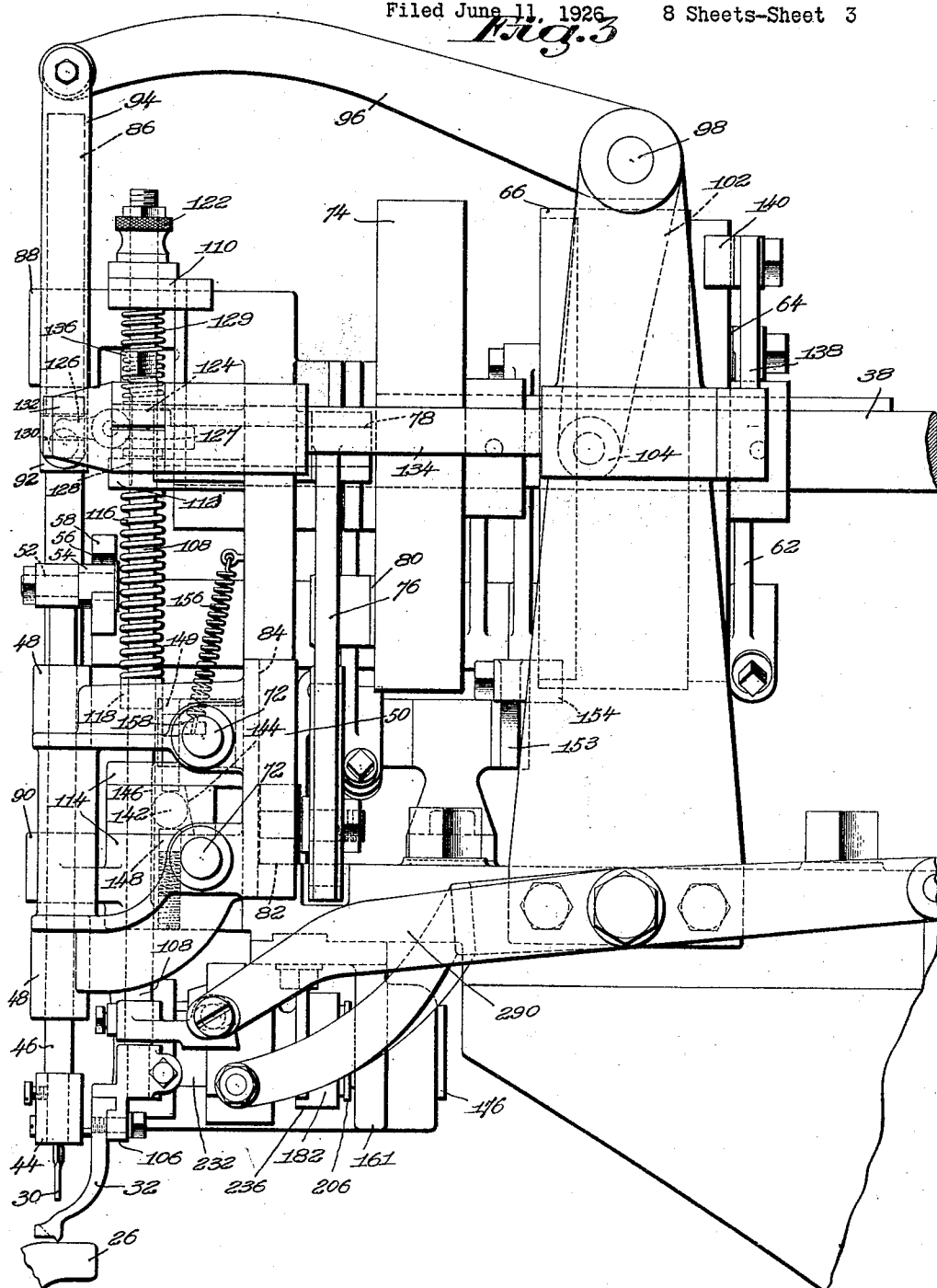
A. B. FOWLER

1,870,844

SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 3



Witness

Frederick S. Grunbaf.

Inventor

A. B. Fowler, deceased,  
by Mary F. Fowler, administratrix.

by Van Curren Fish Hillisley Mary Hays.

Aug. 9, 1932.

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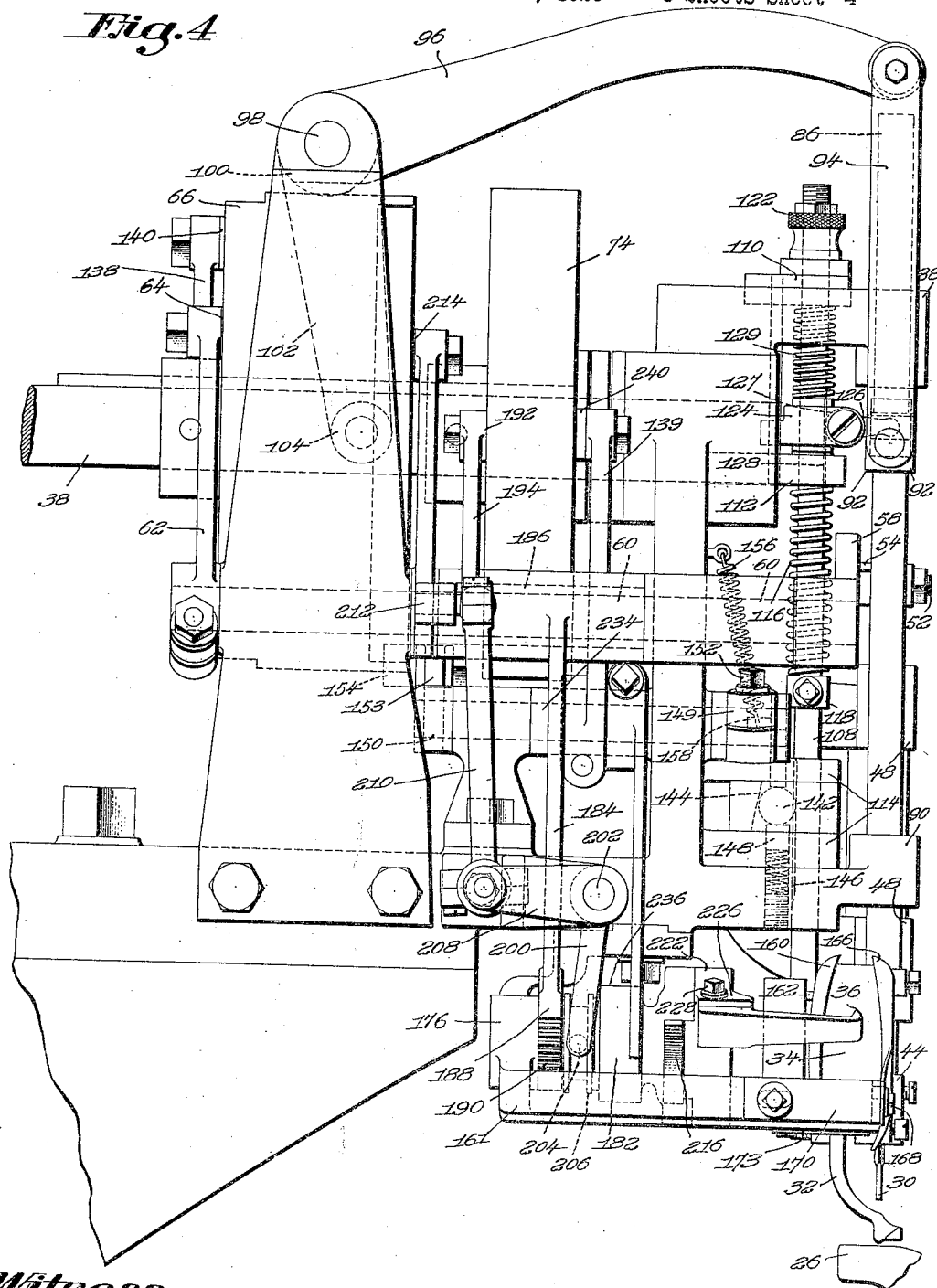
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SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 4

*Fig. 4*



*Witness*

*Fredrick S. Drenth*

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 by Mary F. Fowler, administratrix.  
*by VanLennep Chick Hilditch Henry Attys.*

Aug. 9, 1932.

A. B. FOWLER

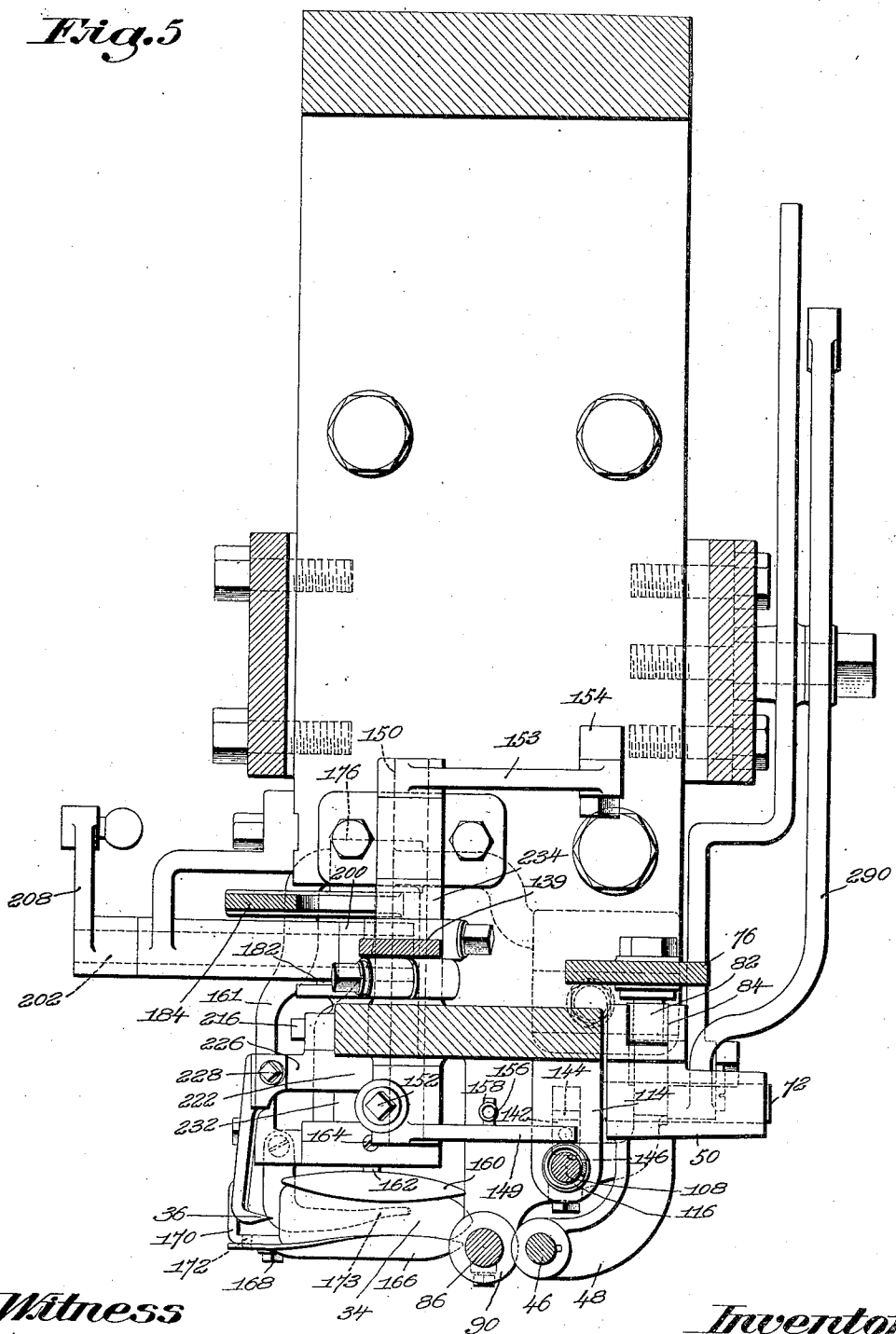
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SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 5

*Fig. 5*



*Witness*

*Fredrick S. Gumbaf*

*Inventor*

A. B. Fowler, deceased,  
By Mary T. Fowler, administratrix.

*By Van Emmon Fish, Hilduth, Henry, Attys*

Aug. 9, 1932.

A. B. FOWLER

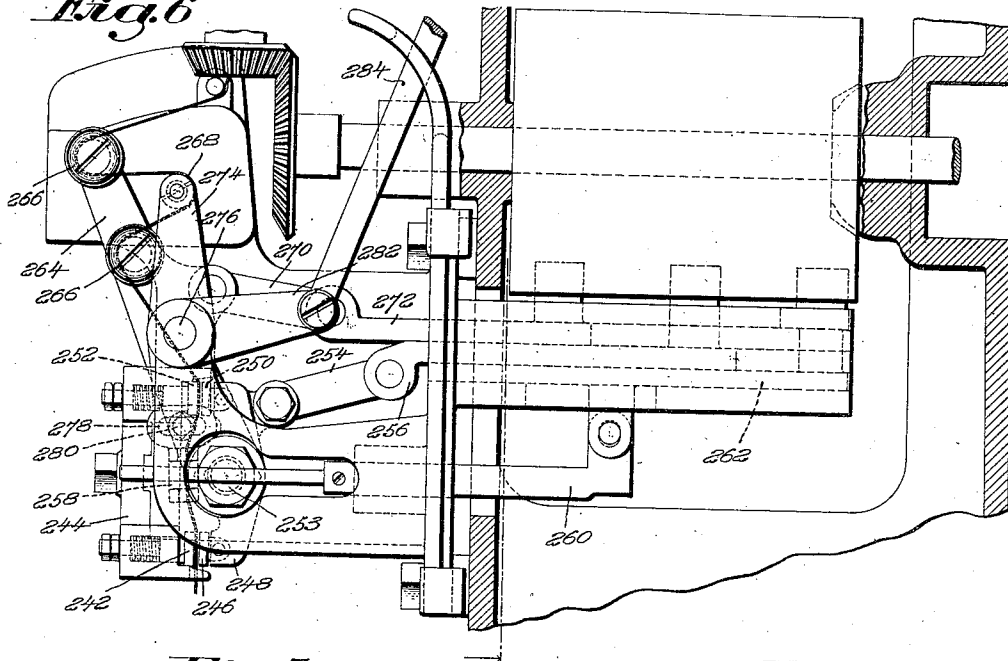
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SEWING MACHINE

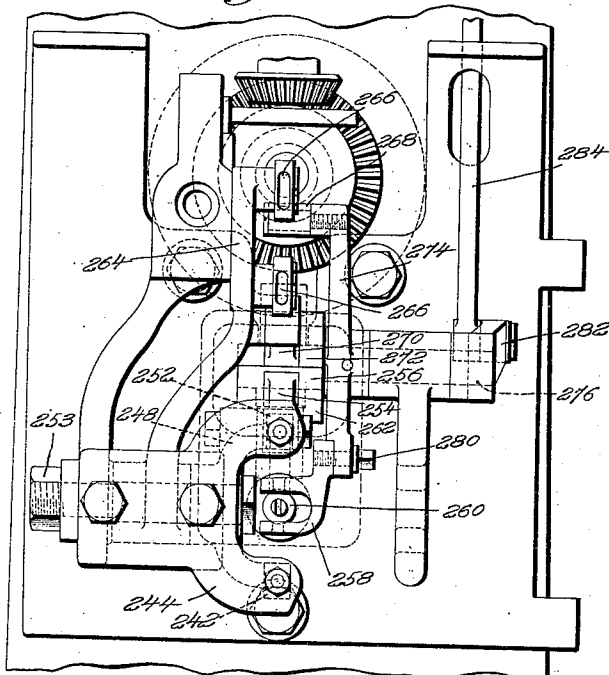
Filed June 11, 1926

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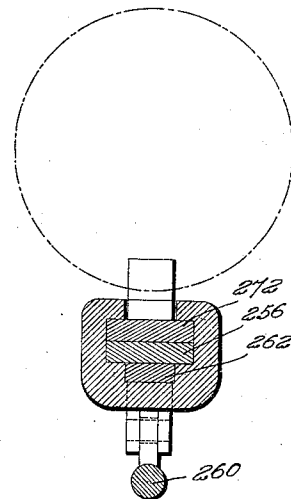
*Fig. 6*



*Fig. 7*



*Fig. 8*



Witness

*Frederick S. Greenleaf*

*Inventor*

A. B. Fowler, deceased,  
By Mary F. Fowler, administratrix.

*G. Van Eenem, Atty. in Law*

Aug. 9, 1932.

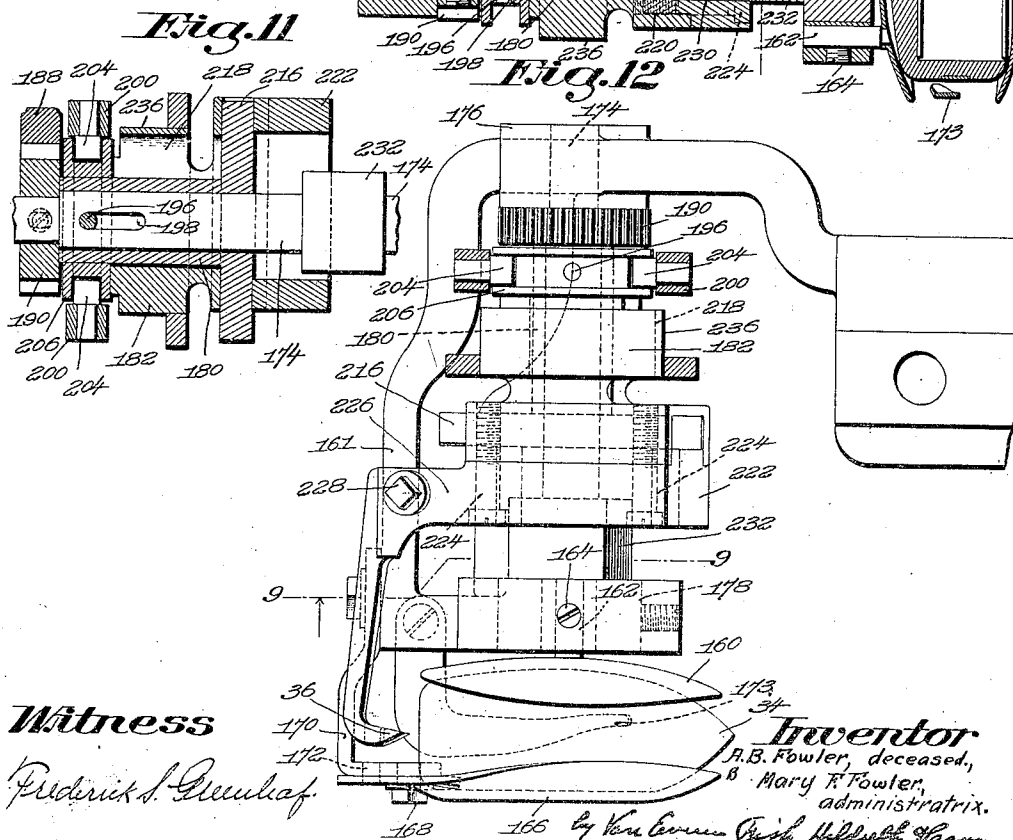
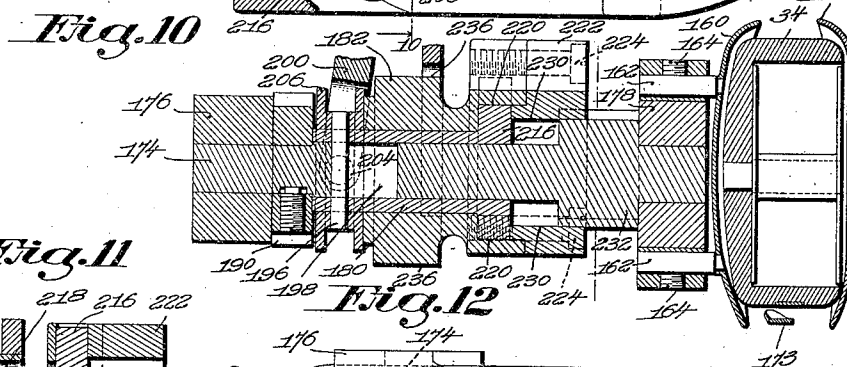
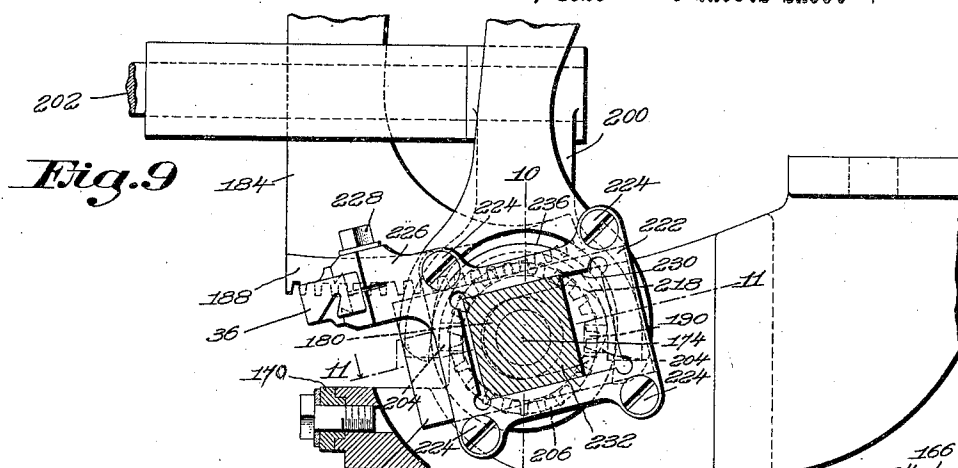
A. B. FOWLER

**1,870,844**

SEWING MACHINE

Filed June 11, 1926

8 Sheets-Sheet 7



*Witness*

Frederick S. Greenleaf.

Inventor

A.B. Fowler, deceased,  
B. Mary F. Fowler,  
administratrix.

by Van Eversen (with Hildreth & Co.)

Aug. 9, 1932.

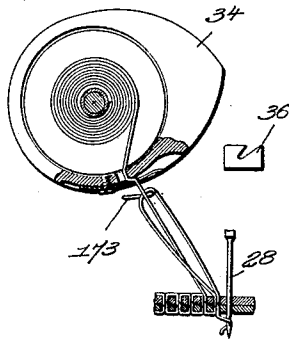
A. B. FOWLER  
SEWING MACHINE

1,870,844

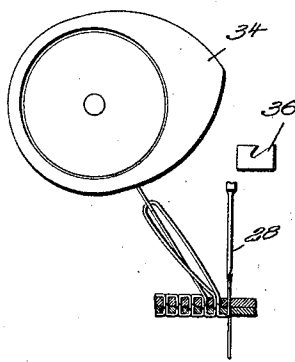
Filed June 11, 1926

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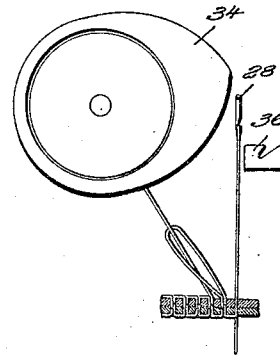
*Fig. 13*



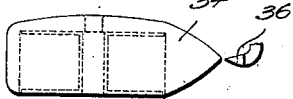
*Fig. 14*



*Fig. 15*



*Fig. 16*



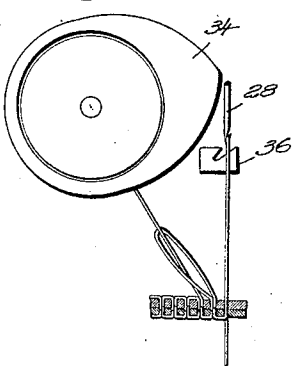
*Fig. 17*



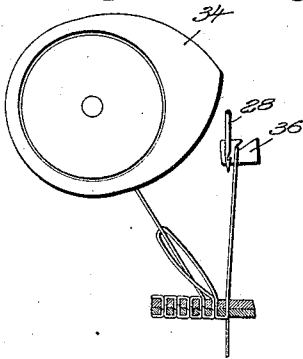
*Fig. 18*



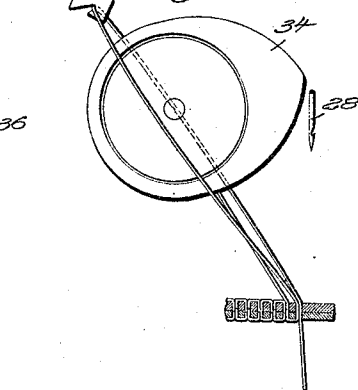
*Fig. 19*



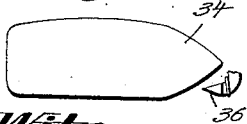
*Fig. 20*



*Fig. 21*



*Fig. 22*



*Fig. 23*



*Fig. 24*



Witness

*Frederick S. Gumbel*

*Inventor*

*A. B. Fowler, deceased,  
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by Van Eversen Fresh Willard & Henry Attys.*



# UNITED STATES PATENT OFFICE

ALFRED B. FOWLER, DECEASED, LATE OF BEVERLY, MASSACHUSETTS, BY MARY F. FOWLER, ADMINISTRATRIX, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

## SEWING MACHINE

Application filed June 11, 1926. Serial No. 115,202.

The present invention relates to machines for sewing soles to the uppers of boots and shoes and more particularly to that type known as lock stitch McKay shoe sewing machines.

The object of the invention is to provide a novel and improved lock stitch machine of the McKay type with particular reference to the improvement of the mechanisms for handling the thread.

With this object in view, the several features of the invention consist in the devices, combinations, and arrangement of parts hereinafter described and claimed which, together with the advantages to be obtained thereby, will be readily understood by those skilled in the art from the following description taken in connection with the accompanying drawings in which Fig. 1 is a side elevation of a lock stitch McKay shoe sewing machine embodying the invention. Fig. 2 is a front elevation of the head of the machine. Fig. 3 is a right side elevation of the head of the machine. Fig. 4 is a left side elevation of the head of the machine. Fig. 5 is a sectional plan view of the head of the machine taken on the line 5—5 of Fig. 2. Fig. 6 is a detail view in side elevation of the take-up and pull-off mechanisms. Fig. 7 is a front elevation of the same mechanisms. Fig. 8 is a cross sectional view of the slides for operating the pull-off and take-up mechanisms. Fig. 9 is a detail front view taken on line 9—9 of Fig. 12 of certain parts of the loop taking hook mechanism including the central shaft and its two superimposed sleeves for imparting to the hook its required motions. Fig. 10 is a sectional view taken on the line 10—10 of Fig. 9 showing the shaft sleeves and the bobbin case. Fig. 11 is a detail sectional view taken on the line 11—11 of Fig. 9. Fig. 12 is a plan view partly in section showing the bobbin case, the hook and its supporting and actuating mechanisms. Figs. 13 to 24 inclusive are sectional views illustrating somewhat diagrammatically the operation of the needle, bobbin case and loop taking hook in forming a stitch.

The lock stitch McKay shoe sewing machine herein disclosed includes a straight

hooked needle, a work supporting horn of usual construction to extend within the shoe and being provided with the usual whirl to supply thread to the needle, and an awl which is mounted on a feed slide and which is operated to perforate the work for the passage of the needle and to feed the work to align the perforations accurately with the needle. The thread handling devices include a bobbin case and a loop taking hook of novel design and a novel construction and arrangement of thread locks, pull-off and take-up for the needle thread.

Referring specifically to the drawings the horn is indicated at 26, the needle at 28, the awl at 30, a presser foot at 32 and the bobbin case and loop taking hook at 34 and 36 respectively.

The sewing shaft 38 of the machine is driven from the belt pulley 40 located at the base of the machine through a two speed clutch and driving mechanism similar to that disclosed by the patent to Richardson No. 885,328 and controlled by means of the foot treadle 42.

The awl 30 is adjustably held in a clamp 44 on the lower end of the awl bar 46 which is mounted to slide vertically in brackets 48 on the feed slide 50. A pin 52 journaled in the upper end of the awl bar supports a block 54 which is adapted to move in the slot 56 formed in the end of the lever 58 so that the awl bar is at all times operatively connected with the lever during the back and forth movement of the feed slide. The lever 58 is mounted on one end of the rock shaft 60 journaled in the machine frame. In order to turn the rock shaft 60 and thus cause the awl to move to and from the work the shaft is provided at its other end with a lever 62 which carries a cam roll 64 to engage a groove in the face of the cam 66.

The feed slide is mounted to reciprocate on horizontal bars 72 fixed to the machine frame and is actuated from the cam 74 on the sewing shaft by means of a lever 76 having a fulcrum at 78 on the machine frame and a cam roll 80 to engage a groove in the face of the cam. A sliding connection is

provided between the lever 76 and the feed slide comprising a block 82 pivotally mounted on the lower end of the lever and designed to move in a vertical slot 84 formed on the rear side of the feed slide.

With this arrangement of the parts it will be seen that the awl is given two positive lines of movement, one to and from the work imparted by the lever 58 and its actuating mechanism, and the other back and forth in the line of feed with the feed slide, this movement being so timed that the awl is moved forward while in engagement with the work and is retracted after the awl has been withdrawn preparatory for punching another hole.

The needle is carried on the lower end of the vertical needle bar 86 which is supported by brackets 88 and 90 on the machine frame. A collar 92 fastened to the bar forms a pivotal support for the parallel links 94 which connect the needle bar to its actuating lever 96 pivoted on shaft 98. The sleeve 100 which forms the hub of the needle lever 96 carries also the lever arm 102 with the cam roll 104 adapted to engage a cam groove in the periphery of the cam 66.

The presser foot 32 is adjustably mounted in a block 106 on the lower end of the presser foot bar 108 which is adapted to slide in brackets 110, 112 and 114 in the machine frame. The presser foot bar is forced down against the work by means of the spring 116 coiled about the bar between a collar 118 on the bar and the bracket 112, the downward movement being limited by the engagement of the nut 122 on the upper end of the presser foot bar with the bracket 110.

Mechanism for lifting the presser foot is provided consisting of a collar 124 loosely mounted on the presser foot bar and containing a bearing for the cam lever 126 having the eccentric cam surface 127 adapted to come into contact with a recessed surface 128 on the presser foot bar. The collar 124 is normally held in its lowest position resting against the bracket 112 by means of a spring 129 coiled about the presser foot bar and inserted between the collar 124 and bracket 110. The cam lever 126 at its outer end engages the slot 130 in the presser foot lifting lever 132 which is adjustably clamped to the rock shaft 134 by means of a split hub and the set screw 136. Another lever 138 attached to the rock shaft carries a cam roll 140 adapted to ride on the periphery of cam 66. As the lifting lever 132 is raised under the influence of the cam 66 the cam lever 126 is turned about its pivot causing the cam surface acting in conjunction with the collar 124 to grip the presser foot bar which is lifted a uniform distance against the pressure of the springs 116 and 129 to disengage the work.

At the end of the feeding operation, the shaft 134 is again rocked by the cam 66 allowing the presser foot to be forced down into clamping engagement with the work. A locking device is provided to hold the presser foot bar in clamping position which comprises a roll 142 inserted between the inclined surface 144 and a slightly recessed surface 146 of the presser foot bar and held in yielding contact with these surfaces by means of the spring plunger 148. In order to release the locking mechanism preparatory to lifting the presser foot a lever 149 clamped to the rock shaft 150 by a split hub and set screw 152 is adapted to bear on the upper side of the roll and force it downward against the pressure of the spring plunger 148. The shaft 150 is rocked for this purpose by means of a lever 153 mounted on the shaft and having at its outer end a cam roll 154 to engage the periphery of the cam 66. A spring 156 stretched between a pin 158 on the lever 149 and a point on the machine frame tends to press the roll 154 against its cam and keeps the lever 149 normally out of engagement with the locking roll 142.

The bobbin case 34 is loosely mounted in a holder which comprises an inner guard 160 rigidly secured to the bracket 161 of the machine frame by means of two rearwardly projecting studs 162 and screws 164, and an outer guard 166 pivotally mounted at 168 on a bracket 170 so that it can be swung back to allow the removal of the bobbin case. In order to limit the pivotal movement of the guard and to insure that it is clamped in the proper position, a pin 172 is mounted on the bracket 170 to project through a circular slot in the guard which is shaped so that the pin will rest against one end of the slot when the guard is in the proper closed position. A leaf spring 173 secured to the bracket 161 extends beneath the bobbin case between the guard plates and assists in supporting the case and also serves as a means for retaining the loop of needle thread which has been passed over the bobbin case out of the path of the descending needle.

The bobbin case 34, with its guard plates 160 and 166, is located in advance of the needle in the direction of feed and slightly to the rear, as clearly shown in Figs. 2, 4 and 5. The loop taking hook 36 is mounted so as to rotate bodily through a portion of a revolution about the bobbin case and its point or beak is arranged to enter the needle loop from the side remote from the bobbin case and take the loop directly from the needle. To enable the hook to enter the side of the needle loop remote from the bobbin case and to take the loop directly from the needle and carry it over the bobbin case, the hook is given a bodily axial movement and also a bodily movement transverse to its axis in addition to its movement of rotation.

The mechanism for imparting to the loop taking hook 36 the required motions comprises a central shaft 174 having bearings at 176 and 178 in the machine frame and two sleeves 180 and 182 superimposed on one another and constrained to turn with the shaft, the inner sleeve 180 being provided for giving the hook 36 a movement forward and back along the shaft, and the outer sleeve 182 for giving the hook a lateral movement toward and away from the axis of the shaft. The central shaft 174 is turned through an angle sufficient to cause the hook to carry the new loop over the bobbin case by means of a lever 184 mounted on a sleeve 186 on the rock shaft 60 on the lower end of which is formed the gear segment 188 to mesh with the gear 190 on the shaft 174. The lever 184 is actuated from the cam 74 through the engagement of the cam roll 192 on a lever arm 194 projecting from the sleeve 186 with a groove in the face of the cam.

The inner sleeve 180 is keyed to turn with the shaft while at the same time being allowed a limited movement along its axis by means of a pin 196 fixed in the sleeve and passing through a slot 198 in the shaft. For moving the sleeve along the shaft a lever 200 is provided pivoted on the rock shaft 202 and carrying two rolls 204 on its forked lower end to engage the grooved flange 206 on the sleeve. The rock shaft has also fastened to it a lever arm 208 which is pivotally connected by a link 210 with one end of a bell crank lever 212 loosely mounted on the rock shaft 60. The other arm of the bell crank carries a roll 214 to engage with a groove in the surface of the cam 66 which acts through the connections just described to control the movement of the sleeve.

The outer sleeve 182 is mounted between the grooved flange 206 and an oblong guide block 216 to move axially with the inner sleeve 180 and has an elliptical bore as indicated at 218 to permit a transverse movement with respect to the axis. The sleeve 182 is further constrained to turn with the central shaft, and the transverse movement is given a definite direction with relation to the angular position of the shaft, by the engagement of slideways or grooves 220 formed on the sleeve 182 with the guide block 216. A bracket 222 is fastened by means of four screws 224 to the slideways 220 on the outer sleeve and carries the loop taking hook 36 which is rigidly clamped to the projecting arm 226 of the bracket by means of a set screw 228. The inner surface 230 of the bracket 222 is rectangular in shape and is adapted to engage a square portion 232 on the central shaft 174 which forms an additional guiding surface for the transverse movement of the bracket and the outer sleeve 182.

The mechanism for giving the outer sleeve and the loop taking hook a motion transverse

to the axis of the sleeve comprises a lever rigidly clamped to a sleeve 234 on the rock shaft 150 and slotted at its lower end to embrace a bearing surface 236 on the sleeve 182. Another lever arm 139 clamped to the sleeve 234 carries a cam roll 240 to engage a groove in the face of the cam 74.

The successive positions taken by the hook 36 during the cycle of operations are illustrated step by step in Figs. 13 to 24 inclusive. As shown in Fig. 13, the shaft 174 has been rotated clockwise to carry the hook to the limit of its movement in this direction. Then as the needle withdraws from the work the hook is moved forward axially with respect to the shaft 174 and transversely away from the axis so that the point of the hook is in a position to enter the new loop formed by the needle. (See Figs. 15 and 18.) From this point the hook is moved transversely to enter the loop from the side remote from the hook and is then retracted axially and rotated to take the loop over the bobbin case.

In the machine herein illustrated the stitch is set against a thread lock by the loop taking hook 36 above described. A take-up is employed to pull the needle loop down part way to the work, and to further facilitate the handling of the thread a pull-off and an additional thread lock are provided for measuring off the necessary thread for each succeeding stitch. The amount of thread pulled from the supply by the pull-off is adjusted automatically in accordance with the thickness of the work so that the lock is set always the same distance into the material, and in order that the amount of thread drawn around the work from the preceding loop by the needle may be a minimum and constant regardless of variations in the thickness of the work means are also provided for varying the action of the take-up.

The thread lock against which the stitch is set comprises two members consisting respectively of a spring pressed plunger 242 mounted on the bracket 244 on the machine frame and a clamping plate 246 mounted on the lower end of the lever 248. This thread lock may be termed "the rear thread lock." The other or "front thread lock" is similarly arranged with a clamping plate 250 mounted in the upper end of the lever 248 and the spring plunger 252 mounted on the bracket 244. The lever 248 is pivotally mounted midway between the clamping plates 246 and 250 upon a pivot 253 in the bracket 244 and is connected through link 254 to the cam actuated slide 256. With this construction, as the lever 248 is rocked one of the thread clamps is opened and the other closed. The pull-off device is located between the two thread clamps and comprises a fork 258 across which the thread extends as it passes from the supply through the two thread clamps and a pull-off plunger rigidly con-

nected through arm 260 to the cam actuated slide 262 and notched at its tip to receive and bend the thread between the two arms of the fork 258.

- 5 The take-up mechanism comprises the take-up lever 264 mounted at its lower end on the pivot 253 and carrying the two take-up rolls 266 which cooperate with the stationary roll 268 to take up the slack thread.  
10 The take-up lever is connected by link 270 to the cam actuated slide 272.

- In order to provide for the automatic adjustment of the pull-off and take-up mechanisms in accordance with the thickness of the work a lever 274 is mounted on the rock shaft 276 to support the stationary roll 268 before mentioned and also carries at its lower end the fork 258 adjustably fastened to the lever by means of slot 278 and set screw 280. The  
15 position of the lever 274 is controlled from the presser foot bar through connections which include a lever arm 282 on the rock shaft 276, link 284, a lever 286, vertical connecting rod 288 and a lever 290.

- 20 The feeding mechanism herein disclosed forms the subject-matter of a divisional application filed October 15, 1931, Serial No. 569,026.

- The invention having been thus described,  
30 what is claimed is:

1. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle operating during its retraction to draw thread from the  
35 preceding needle loop, a loop taker, a thread lock against which the stitch is set, a pull-off variable to regulate the supply of thread in accordance with the thickness of the work, a take-up, and means for varying the throw  
40 of the take-up so that the same length of loop is left above the work to be pulled through by the needle regardless of the thickness of the work.

2. A lockstitch sewing machine having, in  
45 combination, stitch forming and setting devices including a hook needle operating during its retraction to draw thread from the preceding needle loop, a loop taker acting to set the stitch, a thread lock against which  
50 the stitch is set, a take-up acting to pull the needle loop from the shuttle partially back through the work, a pull-off, and means operating to vary the action of the take-up and the pull-off in accordance with the thick-  
55 ness of the work to cause the same length of loop to be left above the work by the take-up.

3. A lockstitch sewing machine having, in combination, stitch forming and setting devices including a hook needle operating during  
60 its retraction to draw thread from the preceding needle loop, a loop taker acting to set the stitch, a thread lock against which the stitch is set, a take-up acting to pull the needle loop partly back through the work, a  
65 pull-off, and mechanism controlled by the

presser foot to vary the action of the take-up and the pull-off in accordance with the thickness of the work to cause the same length of loop to be left above the work by the take-up.

4. A lockstitch sewing machine having, in  
70 combination, stitch forming devices including a hook needle, a work support, a bobbin case mounted to permit the passage of the needle loop around it, and an oscillating loop-taking hook having additional movements  
75 along and transverse to its axis.

5. A lockstitch sewing machine having, in combination, stitch forming devices including a hook needle, a work support, a bobbin  
80 case mounted to permit the passage of the needle loop around it and an oscillating hook arranged to take the loop from the needle over the bobbin case and having additional movements along and transverse to its axis.

6. A lockstitch sewing machine having, in  
85 combination, stitch forming devices including a straight hook needle, a work supporting horn, a bobbin case mounted to permit the passage of the needle loop around it, and a loop-taking hook oscillating about an axis  
90 transverse to the line of feed and having additional movements along and transversely of its axis.

7. A lockstitch sewing machine having, in combination, stitch forming devices including  
95 a hook needle, a work support, a bobbin case mounted to permit the passage of the needle loop around it, a loop-taking hook, and mechanism for imparting motion to the hook comprising a rock shaft, an inner sleeve  
100 keyed to slide on the shaft, an outer sleeve superimposed on the inner sleeve constrained to turn and slide with the inner sleeve and having a motion transversely of the shaft.

8. A lockstitch sewing machine having, in  
105 combination, stitch forming devices including a hook needle, a work support, a bobbin case mounted to permit the passage of the needle loop around it, a loop taking hook, a rock shaft for oscillating the hook, an inner sleeve keyed to slide on the shaft for moving  
110 the hook axially, an outer sleeve superimposed on the inner sleeve to turn and slide with it and having an elliptical bore to permit a motion of the hook transversely to the axis.

9. A lockstitch sewing machine having, in combination, stitch forming devices including  
115 a hook needle, a work support, a discoidal bobbin case mounted in advance of the needle in the direction of feed with its axis transverse to the direction of feed, a loop taking hook, and means for actuating the hook to enter the needle loop from the side remote from the bobbin case and carry the loop over  
120 the bobbin case.

10. A lockstitch sewing machine having, in combination, stitch forming devices including  
125 a straight hook needle, a bobbin case, a loop taking hook mounted to oscillate about an axis transverse to the line of feed and  
130

perpendicular to the needle, and means for actuating the hook to enter the needle loop from the side remote from the bobbin case and carry the loop over the bobbin case.

- 5 11. A lockstitch sewing machine having, in combination, stitch forming devices including a straight hook needle, a bobbin case mounted in advance of the needle in the direction of feed, a loop taking hook mounted  
10 to oscillate about an axis transverse to the line of feed, and means for imparting to the hook oscillating and axial movements and movements transversely of its axis to cause the hook to enter the needle loop from the side  
15 remote from the bobbin case and carry the loop over the bobbin case.

In testimony whereof I have signed my name to this specification.

MARY F. FOWLER,

20 *Administratrix of the Estate of Alfred B. Fowler, Deceased.*

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