

J. T. HOGAN.  
TENSION DEVICE FOR SEWING MACHINES.  
APPLICATION FILED NOV. 19, 1903.

1,013,163.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.

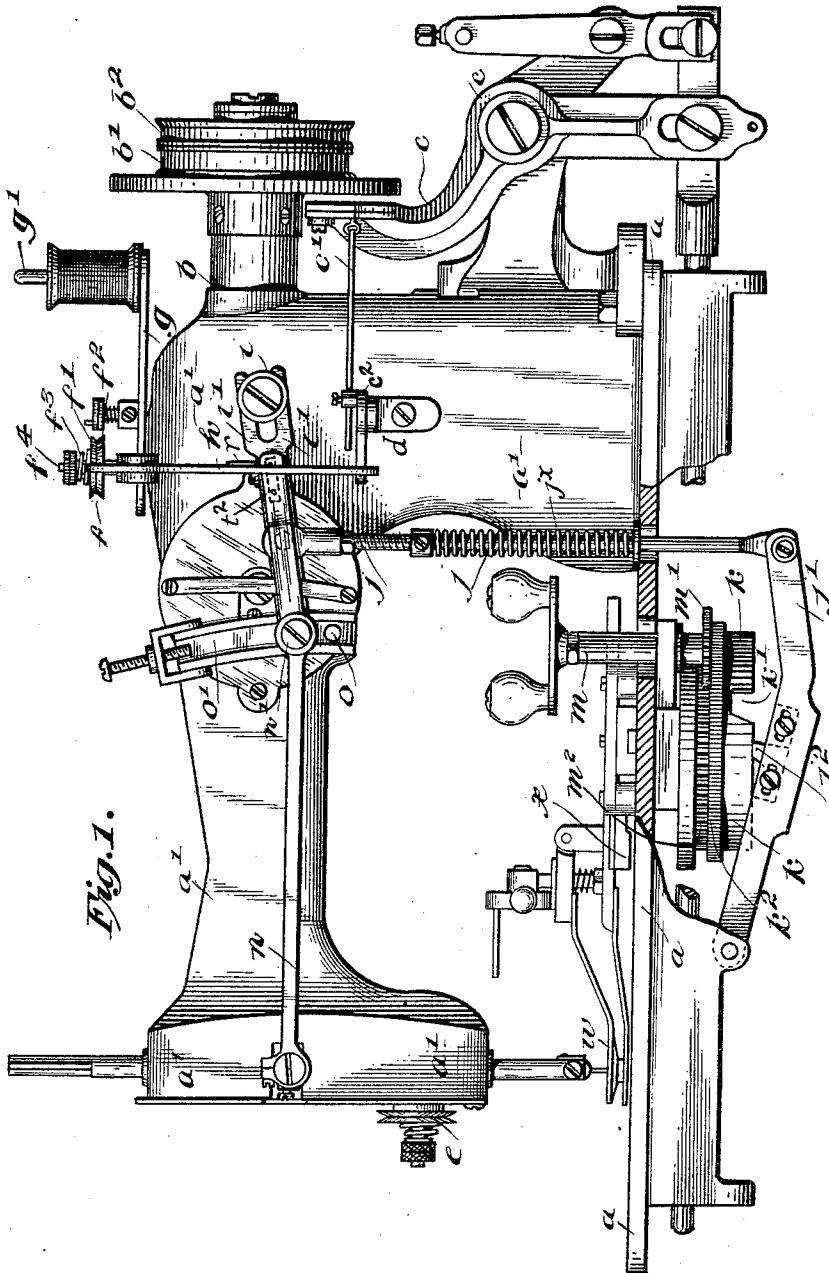


Fig. 1.

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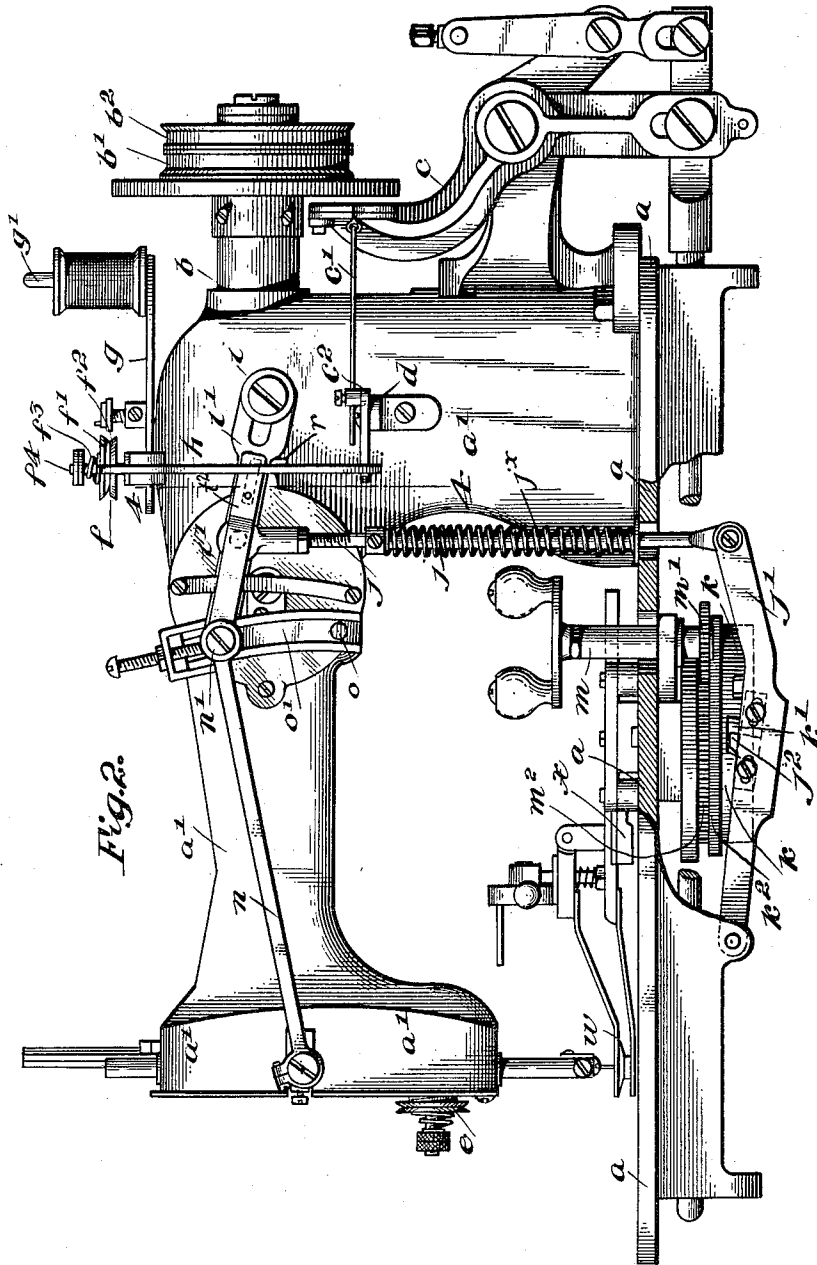


Fig. 2.

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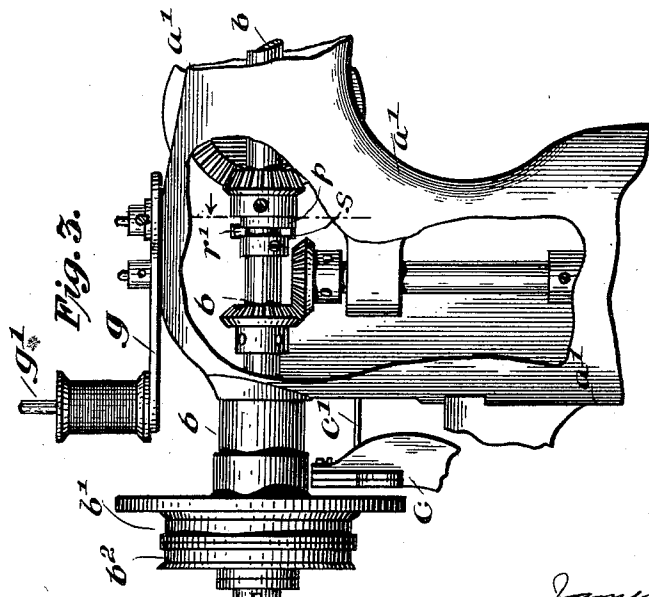
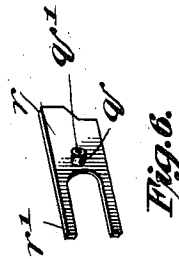
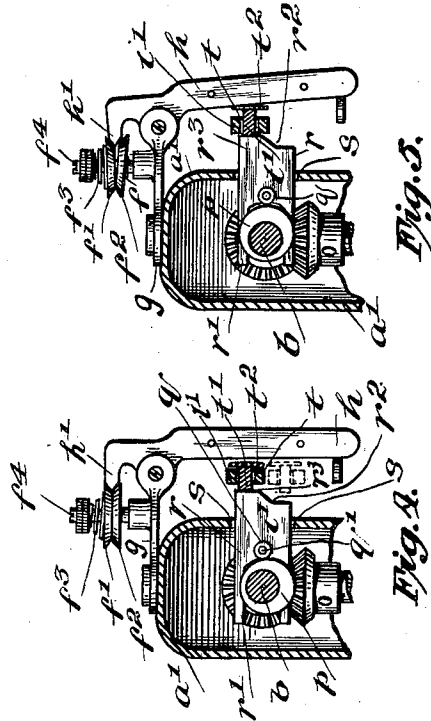
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3 SHEETS—SHEET 3.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS,  
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## TENSION DEVICE FOR SEWING-MACHINES.

1,013,163.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed November 19, 1903. Serial No. 181,778.

*To all whom it may concern:*

Be it known that I, JAMES T. HOGAN, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Tension Devices for Sewing-Machines, of which the following is a specification.

This invention relates to tension devices for sewing machines, such as used for making button-holes, and by which both side and barring stitches are made. In this class of machines attempts have been made to overcome the drawing or puckering of the goods at the ends of the button-hole when barring stitches are being formed.

It is the object of the present invention to provide a sewing machine of this class with tension devices to also overcome the objection to the tension on the barring stitches and to simplify and improve the means whereby the tension on the thread, when forming the barring stitches, is slackened.

Another object is to operate intermittently by instantly releasing tension and again instantly controlling it at each stitch or approximately when the needle has been shifted, this intermittent control being capable of being applied and released at any desired time during the formation of the loop, that is, the drawing up and tightening of the stitch.

My invention consists of certain features of construction and combinations of parts to be hereinafter described and then claimed.

In the accompanying drawings, Figure 1 is a side elevation of a sewing machine embodying my invention, and in which figure the mechanism is shown in position for producing the side stitches; Fig. 2 is a side elevation of the same parts, in which the mechanism is shown in position for producing the barring stitches, part of the tension on the needle thread having been removed; Fig. 3 is a broken side elevation of a portion of the arm of the machine, showing details of the operating mechanism; Fig. 4 is a section on the line 4-4, Fig. 2, more clearly showing the present improvement, one of the actuating parts being shown in dotted lines in one position and in full lines in another position; Fig. 5 is a similar view of the same parts in the position in which the tension on the needle thread is partly

relieved during the formation of the barring stitches; and Fig. 6 is a perspective view of the pusher forming a portion of the present invention.

Referring to the drawings, the sewing machine head of ordinary construction is seen to comprise the base plate *a* and the arm *a'*, in which arm is journaled the operating shaft *b* provided with the fast and loose pulleys *b'* *b''* respectively. The removal of such tension as it is desirable to remove during the formation of the barring stitches will be seen hereinafter to be effected through a direct impulse from the operating shaft. The ordinary brake *c* is provided, which by means of a rod *c'* is connected with a bell crank lever *c''* pivoted upon a bracket *d* supported on the arm *a'*. A tension device *e* of any suitable construction is supported at the outer end of the arm so as to constantly act upon the thread passing through the needle. Another tension device *f* also operates upon the needle thread and the same preferably consists of two disks *f'* *f''* between which the thread passes, the upper disk *f'* being pressed toward the lower disk *f''* by means of a suitable spring *f'''*. The tension disks and spring are arranged upon a spindle *f''''* in well known manner. A plate *g*, which also supports the spindle *g'* for the spool, supports the tension device *f* and is arranged upon the arm *a'*, said plate having pivoted thereto, as shown more clearly in Figs. 4 and 5, a lever *h*. The upper end of this lever is somewhat pointed so that it may enter between the disks *f'* *f''* of the tension device *f* for the purpose of separating the same and relieving the tension on the needle thread when the barring stitches are being produced. Normally, the pointed end *h'* of the lever *h* has no effect on the disks, as these by their conicity act on said pointed end to force it into and to hold the lever in non-acting position. The tension device *e* operates continuously but the tension device *f* only operates periodically and between the sewing of the two side rows of stitches.

Fulcrumed to the arm *a'* at *i* is a lever *i'*, to which is pivoted a downwardly extending rod *j*, which rod extends through the base plate *a* and is pivotally connected with a lever *j'*, also pivotally connected to the base plate. This lever *j'* is provided with

a nose  $j^2$  which most of the time rides upon the rim of a cam  $k$ , which is provided with notches  $k'$  so that, when by the rotation of said cam a notch comes opposite said nose, the latter enters the notch and a spring  $j^*$  coiled about the rod  $j$  moves the lever  $j'$  and said rod  $j$  upwardly, causing the lever  $i'$  to partake of this motion. The cam  $k$  is preferably provided with a ratchet  $k^2$  which, as is well known in this class of machines, is actuated from a suitable ratchet mechanism connected with the main shaft of the machine, whereby the cam is intermittently and progressively rotated, causing the work carrier, which is usually supported on the base plate  $a$  to feed the work. A hand operated shaft  $m$  is provided with a pinion  $m'$  which meshes with a large gear  $m^2$  on the ratchet wheel  $k^2$ , so that the cam  $k$  may be turned by hand, when desired.

It will be understood that the invention is not limited to the cam mechanism just described, as other means may be found more desirable in practice.

When the lever  $i'$  is moved upwardly it also moves in the same direction a rod  $n$  which is pivotally connected thereto at  $n'$ , and which rod  $n$  oscillates, as well known, a frame carrying the needle bar for the purpose of positioning the needle for different stitches. It will be understood that the greater the distance the rod  $n$  is from the fulcrum  $o$  of an oscillatory guide-way  $o'$ , the amplitude of the vibratory or lateral movement of the needle bar will be greater, and consequently the barring stitches will be longer than the side stitches.

The parts described are well known and do not require more detailed description of their function and construction, and the above description and the drawings will suffice to render the present invention intelligible.

To effectuate the desired result simple means actuated from the operating shaft  $b$  are employed, these means being shown clearly in detail in Figs. 4, 5 and 6. On the operating shaft  $b$  is mounted an eccentric or cam  $p$ , on the edge of which rides an anti-friction roller  $q$ , which turns on a stud  $q'$  located at one side of a reciprocating slide  $r$ , which constitutes a pusher. This pusher is formed with a yoke  $r'$ , the throat of which receives the shaft  $b$ , said yoke holding the pusher in position upon the shaft, to be reciprocated through an opening  $s$  in the arm  $a'$  of the sewing machine. The said pusher projects a suitable distance beyond the arm  $a'$  and its outer end is provided with a cut-away or recess  $r^2$ . The end  $r^3$  above the cut-away  $r^2$  constitutes a striking portion for the pusher. The lever  $i'$  is provided with a hole  $t$  in which a plunger or pin  $t'$  is loosely mounted, said plunger being carried by means of a plate

spring  $t^2$ , free at that end to which the plunger is attached, but fixed at its other end on the pivot pin which connects the lever  $i'$  and rod  $n$ . It will be observed that the lever  $h$ , which is to act on the tension device  $f$ , is located at the outer side of the lever  $i'$ , while the pusher  $r$  is located at the other side of the lever  $i'$ , and these parts co-operate in the manner now to be described. During the ordinary running of the sewing machine to form the side stitches, the lever  $i'$  is in the position shown in Fig. 1 and in the position shown in dotted lines in Fig. 4, in consequence of which the pusher  $r$  will be projected outwardly by the action of the eccentric  $p$ , without acting on the movable plunger  $t'$ , which at this time lies opposite the cut-away or recess  $r^2$  of the pusher. When however the parts are moved into the position shown in Fig. 2, the lever  $i'$  will be raised, as shown in Figs. 4 and 5, and the striking portion  $r^3$  of the pusher will come in contact with the plunger  $t'$ , causing the same to move outwardly and press upon the lever  $h$ , thus forcing its pointed end  $h'$  between the tension disks  $f'$   $f^2$  and relieving the needle thread of tension at this point.

It will be evident that instead of the flat spring  $t^2$ , on which the plunger  $t'$  is mounted, there may be substituted other spring means for normally projecting the plunger  $t'$  inwardly in the path of the striking portion  $r^3$  of the pusher.

It will be seen that during the normal running of the machine the pusher is simply moved forwardly without doing any work, but that as soon as the lateral vibrations of the needle have been increased, the plunger  $t'$  will be brought in position between the striking portion  $r^3$  of the pusher and the lever  $h$ , and the next outward movement of the pusher will push the plunger outwardly and the pointed end  $h'$  of the impelled lever  $h$  inwardly to separate the tension disks.

The machine is shown as provided with a work carrier  $w$  and feeding mechanism therefore including a reciprocatory plate  $x$ . The precise details of these parts are not shown herein, as they constitute no part of the present invention.

Any suitable form of work clamp and feed mechanism therefor, such as is in common use, may be employed.

Having thus described my invention and without limiting myself to details, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a buttonhole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier, a tension device, means operating upon the tension device to automatically vary the tension at a predetermined moment during the operation of sewing, said means actu-

ated directly from the main shaft and independently of the mechanism for feeding the work carrier, and means controlling the operation of the said tension varying means.

5 2. In a button-hole sewing machine, the combination of stitch forming mechanism, a tension device, mechanism for feeding a work carrier, means located wholly adjacent the operating shaft and operatively  
10 actuated from the operating shaft to automatically vary the tension during the operation of sewing, and means controlling the operation of the said tension varying means, substantially as and for the purposes set  
15 forth.

3. In a button-hole sewing machine, the combination of mechanism for imparting movements of vibration to produce side  
20 stitches and vibrating movements of an increased amplitude to produce barring stitches, controlling means for the said mechanism for determining the extent of said vibration, a tension device, means operated directly from the main operating shaft  
25 of the machine to vary the tension on the thread during the formation of the barring stitches, and means connected with the barring stitch mechanism for controlling the operation of the said tension varying means.

30 4. In a button-hole sewing machine, the combination of mechanism for imparting movements of vibration to produce side stitches and vibrating movements of an increased amplitude to produce barring  
35 stitches, controlling means for the said mechanism for determining the extent of said vibration, work feed mechanism, means operated directly from the operating shaft of the machine and independent of the said  
40 work feed mechanism to vary the tension on the thread during the formation of the barring stitches, and means connected with the barring stitch mechanism for controlling the operation of the said tension varying  
45 means.

5 5. In a buttonhole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier, a tension device, means acting upon the tension device to remove tension, means operating thereon at a predetermined moment  
50 during the operation of sewing, said means actuated directly from the main shaft and independently of the mechanism for feeding the work carrier, and means independent  
55 of the main shaft actuated means for controlling the operation of the said tension varying means.

60 6. In a button-hole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier, a tension device, a lever provided with a part to engage and to remove tension of the tension device, means operated directly from  
65 the operating shaft to actuate said lever in-

dependently of the means for feeding the work carrier, and means controlling the operation of said lever actuating means, substantially as and for the purposes set forth.

70 7. In a button-hole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier, a tension device, means acting on the tension device to remove tension, a pusher guided  
75 in the machine arm and suitably actuated from the operating shaft to actuate said tension removing means, and means controlling the operation thereof, substantially as and for the purposes set forth.

80 8. In a button-hole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier, a tension device, means acting on the tension device and supported wholly on the machine arm to remove tension, a pusher acting on the tension removing means, an eccentric on the operating shaft for actuating  
85 said pusher, and means controlling the operativeness of said pusher when so actuated, substantially as and for the purposes set forth.

9. In a button-hole sewing machine, the combination of stitch forming mechanism, including means for forming side stitches  
95 and barring stitches, a tension device normally exerting tension upon the thread, means acting on the tension device to remove tension, means located to one side of the operating shaft to directly act on the  
100 said tension removing means when barring stitches are being formed and means carried by the operating shaft for acting upon the last said means, substantially as and for the purposes set forth.

105 10. In a button-hole sewing machine, the combination of stitch forming mechanism, including means for forming side stitches and barring stitches, a tension device normally exerting tension upon the thread, means acting on the tension device to remove tension, said means being supported directly on the arm of the machine, means located sidewise of, and actuated directly  
110 by the operating shaft for acting on the same for removing tension when barring stitches are being formed, and controlling means therefor, substantially as and for the purposes set forth.

115 11. In a button-hole sewing machine, the combination of stitch forming mechanism, a tension device, means acting on the tension device to remove tension, a pusher, eccentric means acting on the pusher, and means for interposition between the pusher  
125 and the means for removing tension, for acting on said latter means through impact of the pusher, and means for bringing about such interposition, substantially as and for the purposes set forth.

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12. In a button-hole sewing machine, the combination of stitch forming mechanism, a tension device, means acting on the tension device to remove tension, an eccentric operated by the operating shaft, a pusher supported by the operating shaft and guided through the arm of the machine, said pusher being operated by said eccentric, and a laterally shiftable longitudinally movable plunger for interposition between the pusher and the means for removing tension, and actuated by the pusher for acting on said latter means, substantially as and for the purposes set forth.

13. In a button-hole sewing machine, the combination of stitch forming mechanism, a tension device, means acting on the tension device to remove tension, a pusher guided through the arm of the machine and provided with a yoke straddling the operating shaft, a stud at one side of the pusher having an anti-friction roller mounted thereon, an eccentric on the operating shaft, bearing on said roller, and means for interposition between the pusher and the means for removing tension, and actuated by the pusher for acting on said latter means, substantially as and for the purposes set forth.

14. In a button-hole sewing machine, the combination of mechanism for imparting movements of vibration to produce side stitches and vibrating movements of an increased amplitude to produce barring stitches, controlling means for the said mechanism for determining the extent of said vibration, a tension device, a pusher actuated by the operating shaft, a lever provided with a part to act on the tension device, and a loosely mounted lever-actuating plunger for interposition between the pusher and the said lever, said plunger being actuated by the pusher, substantially as set forth.

15. In a button-hole sewing machine, the combination of mechanism for imparting movements of vibration to produce side stitches and vibrating movements of an increased amplitude to produce barring

stitches, controlling means for the said mechanism for determining the extent of said vibration, a tension device, a pusher actuated by the operating shaft, a lever provided with a part to act on the tension device, a loosely mounted lever-actuating plunger for interposition between the pusher and the said lever, said plunger being actuated by the pusher, and a spring pressing on said lever-actuating part, substantially as set forth.

16. In a buttonhole sewing machine, the combination of stitch forming mechanism, mechanism for feeding a work carrier during the formation of side and barring stitches, a tension device to maintain a uniform tension on the needle thread during the formation of the side stitches, means operating the tension device to automatically vary the tension for the barring stitches, said means actuated directly from the main shaft and independently of the mechanism for feeding the work carrier, and means controlling the operation of the said tension varying means.

17. A button-hole sewing machine including a needle bar, a work clamp, means for producing relative jogging movements between the work clamp and needle bar to produce side stitches, means for increasing the amplitude of the jogging movements to produce barring stitches of greater length than the said side stitches, a main shaft, a thread tension device, and an element actuated by the main shaft to reduce the tension upon the thread of the said tension device, after the second said means has completed its operation to increase the amplitude of the jogging movements to produce barring stitches.

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

JAMES T. HOGAN.

Witnesses:

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THOS. T. YAVEGAN.