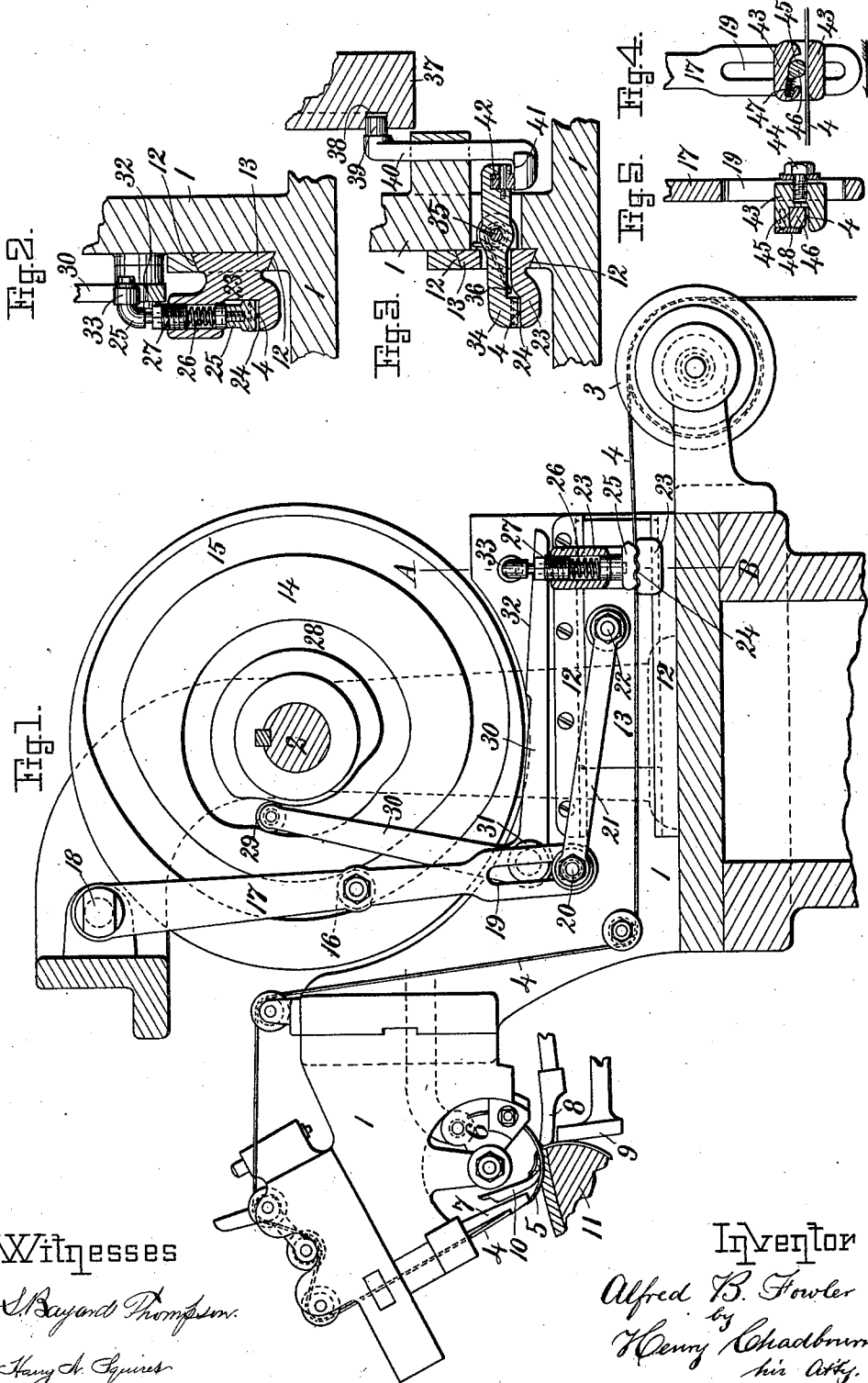


A. B. FOWLER.
SEWING MACHINE.
APPLICATION FILED JAN. 9, 1897.

1,029,283.

Patented June 11, 1912.



Witnesses

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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

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To all whom it may concern:

Be it known that I, ALFRED B. FOWLER, of Central Falls, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Sewing-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in sewing machines, and particularly to devices to prevent strain or tension upon the thread while it is being used by the stitch forming devices in forming stitches.

The object of my present invention is to simplify the construction of such devices, and to leave the tension device intact at all times.

The invention consists in the introduction of a thread clamping or grasping device, which clamps or grasps the thread in its path between the tension device and the needle or stitch forming devices, which thread grasping device is intermittently moved forward and backward in the line of the feeding of the thread, and by this means draws thread from the tension device, and supplies it to the stitch forming devices without tension, while thread is being used by the stitch forming devices in forming stitches.

It further consists in providing an automatic device, whereby the thread is released from the grasping device, and the tension applied in proper time so as to set the stitch, and to allow the grasping device to be returned to a position ready to again grasp and draw the thread from the tension device.

The invention is carried out substantially as illustrated on the accompanying drawing, on which some of the various constructions of my invention have been shown, and on which it has been shown as applied to a curved hooked needle sewing machine, such as are employed to sew turn shoes, or the welts upon shoes. My invention, however, is applicable to other kinds of wax-thread sewing machines than that shown on the drawing.

On the drawing: Figure 1 represents a sectional view of a hooked curved needle sewing machine, showing my invention and such other parts of the machine as are deemed necessary to clearly illustrate the construction and operation of my invention. Fig. 2 represents a detail vertical section

on the line A—B shown in Fig. 1. Fig. 3 represents a similar sectional view to that shown in Fig. 2, of a modified form of the thread grasping device. Figs. 4 and 5 represent respectively a detailed sectional front elevation, and a longitudinal section of another modified form of the thread grasping device.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

The machine is provided with a suitable frame 1, for the support of the various parts thereof; a driving shaft 2, mounted in bearings in the frame; a tension device 3, preferably exerting a constant tension on the thread 4, which is in contact with said device; a hooked curved needle 5, mounted on a needle block 6; a looper 7, to loop the thread into the hook or barb of the needle; a back gage 8, an auxiliary back gage 9; a channel guide 10; and mechanisms to operate said parts, but which have not been shown on the drawings, as they form no essential part of the invention, and may consist of any of the well known constructions now in use to operate said parts. The work to be sewed has been shown as a turn shoe 11, only a portion of a cross section of such a shoe having been shown in Fig. 1.

Referring to Figs. 1 and 2 which illustrate one construction of my invention, the frame is provided with suitable guides 12—12, within which is mounted the slide 13. Upon the driving shaft 2 is firmly mounted the cam 14, which is provided with the cam groove 15, acting upon a pin or roll 16 on the lever 17, which is fulcrumed at 18 to the frame 1, and is oscillated upon its fulcrum by the action of the cam groove 15. The free end of the lever 17 is provided with the slot 19 within which the pivotal connection 20, between the lever 17 and connecting link 21, is adjustable. The opposite end of the link 21 is pivotally connected at 22 to the slide 13. Thus it will be seen that the slide 13 is reciprocated within the guides 12 by the action of the cam groove 15 upon the lever 17, and that the amount of reciprocation can be varied by the adjustment of the pivotal connection 20 within the slot 19 in the lever 17. The thread clamping or grasping device is attached to or made in one piece with the

slide 13. This grasping device as shown in Figs. 1 and 2, consists of an ear 23 which projects from the side of the slide, and which is provided with the ledge 24, forming one of the clamping jaws of the clamping device, and against which the thread is clamped by the spring pressed plunger 25. This plunger is movable up and down within a perforation in the ear 23. A spiral spring 26 surrounds the plunger between a shoulder on the plunger and the under side of a screw threaded sleeve 27, adjustable up and down in a screw thread in the perforation in the ear 23. It will be seen that the pressure upon the thread which is between the ledge 24 and the under side of the plunger 25, can be increased or diminished by the adjustment of sleeve 27 within the perforation in the ear 23. This pressure is adjusted so as to be sufficient to clamp the thread, and to hold it with power enough to overcome the tension on the thread caused by the tension device 3, and to draw thread from said tension device when the slide 13 with its attached clamping device is moved in a direction away from the tension device. The amount of movement imparted to the slide and clamping device away from the tension device is preferably so adjusted as to be sufficient to draw a quantity of thread from the tension device, equal to or a little less than that used by the stitch forming devices in forming a stitch, and the cam groove 15 is preferably so formed and timed that the thread will be drawn at the time it is being used in forming the stitch, thus preventing the liability of having loose thread between the clamping device and the stitch forming devices, as well as preventing strain on the thread forward of the clamping device.

In order to prevent the thread from being drawn backward by the return movement of the slide 13, and to allow the tension to be applied to the thread in the stitch just formed in order to properly set the stitch, I provide a suitable releasing mechanism which acts upon the clamping device and removes the clamps from the thread as soon as the desired amount has been drawn from the tension device. This releasing device has been illustrated in Figs. 1 and 2 as consisting of the following: The cam 14 is provided with the second cam groove 28, which acts upon the pin or roll 29 on the bell crank lever 30, to intermittently oscillate said lever upon its fulcrum 31 on the frame 1. The free end of the lever 30 is provided with the straight edge 32, which is parallel to the line of reciprocations of the slide 13, when the free end of the lever is raised by the action of the cam groove 28. The upper end of the plunger 25 is provided with the roll 33, which is engaged by the straight edge 32 of the bell

crank lever, as the free end of said lever is being raised, and by so doing the plunger 25 is drawn upward against the influence of the spring 26, thus releasing the thread from the clamping device. As the edge 32 on the lever 30 is parallel with the reciprocations of the slide 13, and the plunger 25 is raised so as to free the clamping device from the thread when the free end of the lever is raised, it will be seen that the slide 13 can be reciprocated, and the roll 33 be moved on the edge 32 keeping the plunger drawn upward from contact with the thread so long as the free end of the lever 30 is raised. The cam groove 28 is so shaped and timed, in relation to the reciprocations of the slide 13 that the free end of the lever 30 will be lowered and the plunger 25 clamp the thread just previous to the movement of the slide away from the tension device, and will remain lowered until the slide has finished this movement, so as to draw the necessary amount of thread from the tension device, but the free end of said lever will be raised and thereby release the thread, as soon as the slide has completed its movement away from the tension device, thus allowing the tension to be applied to the thread in order to properly set the stitch. The lever 30 will remain in this latter position until the slide has made its return movement, and preferably until just prior to the time for drawing thread for the formation of the next stitch.

The surfaces of the ear 23 and of the plunger 25 between which the thread is clamped, are preferably made corrugated, or uneven, as shown in Fig. 1, but such a construction is not essential to the working of my invention, and may be dispensed with if so desired.

In Fig. 3 another construction of my invention has been shown, which construction consists of the following: The lever 34 is pivotally attached at 35 to the reciprocating slide 13, in such a manner that one end thereof in connection with the ledge 24 form the clamping jaws by means of which the thread 4 is clamped. The rat trap spring 36, or any other suitable spring, acts upon the lever 34 to normally raise the clamping end of the lever, and thereby release the thread from the clamping device. The cam 37 mounted upon the driving shaft is provided with the cam groove 38, which acts upon the pin or roll 39 on the vertical sliding rod or bar, 40, to intermittently raise and lower said bar. The lower end of the bar 40 is provided with the straight surface 41, which is always parallel to the line of reciprocations of the slide 13, and said surface is arranged to come into contact with the anti-friction roll 42, on the end of the lever 34, when said bar is raised by the action of the cam groove 38, thus allowing the lever

to be moved sidewise upon said surface, by the reciprocations of the slide. This raising of the bar 40 will cause the lever 34 to be turned upon its fulcrum 35 so as to
 5 firmly clamp the thread between the end of said lever, and the ledge 24. The straight surface 41 being of sufficient length and parallel to the line of reciprocations of the slide 13 at all times, will retain the lever 34
 10 in such a position as to hold the thread firmly clamped during the reciprocations of the slide, provided however, that the bar is raised to its highest position. The slide 13 is reciprocated intermittently by substantially the same mechanism as shown in Fig.
 15 1, or it may be reciprocated by any other suitable mechanism. The cam groove 38 is preferably so formed and timed in relation to the reciprocations of the slide 13 that the bar 40 will be raised, and cause the clamping
 20 of the thread only during the time that the slide is moving away from the tension device, so as to draw thread from the tension device, but said bar will be lowered, and allow the spring 36 to operate the lever
 25 34, and release the thread during the return movement of the slide, and will also remain released until it is again desired to draw thread for the formation of another stitch.
 30 In Figs. 4 and 5 I have illustrated a construction of my invention, whereby an automatically operating clutch is used, which clutch will grasp the thread when said device is moved in one direction, but will automatically release the thread when it is
 35 moved in the opposite direction; or said thread will be automatically released by pulling the thread in the line of the forward movement. This automatic clutch has been shown as having been applied to the
 40 lever 17 shown in Fig. 1, but it might be applied to the slide 13 if so desired. The clutch is constructed substantially as follows: Upon the lever 17 is mounted the
 45 block 43, which is made adjustable thereon by means of the slot 19 in said lever, and the bolt 44 substantially as shown. The block 43 is provided with a cavity 45 containing the roll 46. This cavity is made
 50 tapering as shown in Fig. 4, and is preferably provided with a suitable spring 47, which acts upon the roll 46, tending to keep said roll at the narrow part of the cavity. The block is provided with the plate 48,
 55 which acts to keep the roll within the cavity, but leaves sufficient opening to said cavity to allow the introduction of the thread 4. The operation of this device is such, that when the lever 17 is moved in the direction
 60 of the arrow in Fig. 4 the thread will be clamped and firmly held between the roll and the wall of the cavity, but when said lever is moved in the opposite direction the thread will be free to move through said
 65 cavity. By means of this construction the

thread is always free to be drawn forward in the line of the feeding of the thread to the stitch forming device, through the clamping device. By means of this action of the clamping device upon the thread, and by
 70 properly shaping the cam which acts upon the lever 17, I am able to draw thread from the tension device at the proper time, and still have the thread free to be drawn forward through the clamping device at all
 75 times when so desired.

By means of firmly clamping the thread and drawing it from the tension device, in the line of the feeding of the thread to the stitch forming devices, and as it is used by
 80 said stitch forming devices, I am enabled to remove all strain from the thread forward of the clamping device from the stitch forming devices, and from the between substance, thus preventing liability of springing the
 85 needle, chafing or breaking the thread, or cutting or injuring the between substance.

I am aware that several devices to pull off thread from the tension device by drawing thread over suitable thread rolls out of its
 90 course, from the tension device to the stitch forming devices, have heretofore been made, used and patented, but such devices have not operated entirely satisfactory, as the same amount of strain was applied to the
 95 thread on both sides of the pull off, and that which was applied to the thread between the pull off and the stitch forming devices operated as a detriment, as it was liable to chafe and break the thread in the needle to
 100 spring the needle, and to cut or otherwise injure the between substance. My present invention is designed to obviate any strain to the thread between the stitch forming devices and the clamping device, during the
 105 time the thread is pulling off from the tension device, and the stitch is being formed; but to deliver the thread for the formation of the stitch in quantities as required, and when required.
 110

My invention is not limited to the illustrated and described embodiments thereof as it may be embodied in other forms without departure therefrom.

Having thus described my invention, I
 115 claim as new and desire to secure by Letters Patent.

1. A chain stitch shoe sewing machine, having, in combination, a curved hook needle, a looper, a tension device, an inter-
 120 mittently acting thread clamp which engages the thread between the tension and the work, and means for moving the thread clamp while closed in the direction of the lead of the thread to pull off thread from
 125 the tension, substantially as described.

2. A chain stitch shoe sewing machine, having, in combination, a curved hook needle which acts to set the stitch, a looper, a constantly acting tension device, a mov-
 130

able thread clamp which engages the thread between the tension and the work, and means for operating the thread clamp in timed relation to the movements of the needle to clamp the thread just before the needle begins its retracting stroke, to move while clamped in the direction of the lead of the thread to pull off thread from the supply and to unclamp the thread during the last part of the retracting stroke of the needle so that the needle may set the stitch against the tension, substantially as described.

3. A chain stitch shoe sewing machine, having, in combination, a curved hook needle, a looper, a tension, an intermittently acting thread clamp which engages the thread between the tension and the work, means for moving the thread clamp while closed in the direction of the lead of the thread to give up thread to the retracting needle, substantially as described.

4. A shoe sewing machine, having in combination, a curved hooked needle, a looper, a tension device, an intermittently acting thread clamp which engages the thread between the tension and the work, and means for moving the closed thread clamp while the needle is making its retracting stroke in the direction of the lead of the thread to pull off thread from the tension and deliver it to the needle, substantially as described.

5. A shoe sewing machine, having in combination, a curved hooked needle, a looper, a tension device, an intermittently acting thread clamp which engages the thread be-

tween the tension and the work, and means for moving the thread clamp while closed in the direction of the lead of the thread to pull off thread from the tension and deliver it to the stitch forming mechanism during the thread consuming movements thereof, substantially as described.

6. A shoe sewing machine having in combination a curved hooked needle, a looper, a constantly-acting tension device, and means operating during the retracting stroke of the needle to engage the thread between the needle and the tension device and to pull off thread from the latter and give it up freely at the same time to the retracting needle, substantially as described.

7. A chain stitch shoe sewing machine, having, in combination, a curved hook needle, a looper, a tension device, a movable thread clamp which engages the thread between the tension and the work, and means for operating the thread clamp to pull off thread from the tension during the retracting stroke of the needle and to unclamp the thread during the last part of the retracting stroke of the needle, substantially as described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, on this fifth day of January A. D. 1897.

ALFRED B. FOWLER.

Witnesses:

HENRY CHADBOURN,
S. BAYARD THOMPSON.