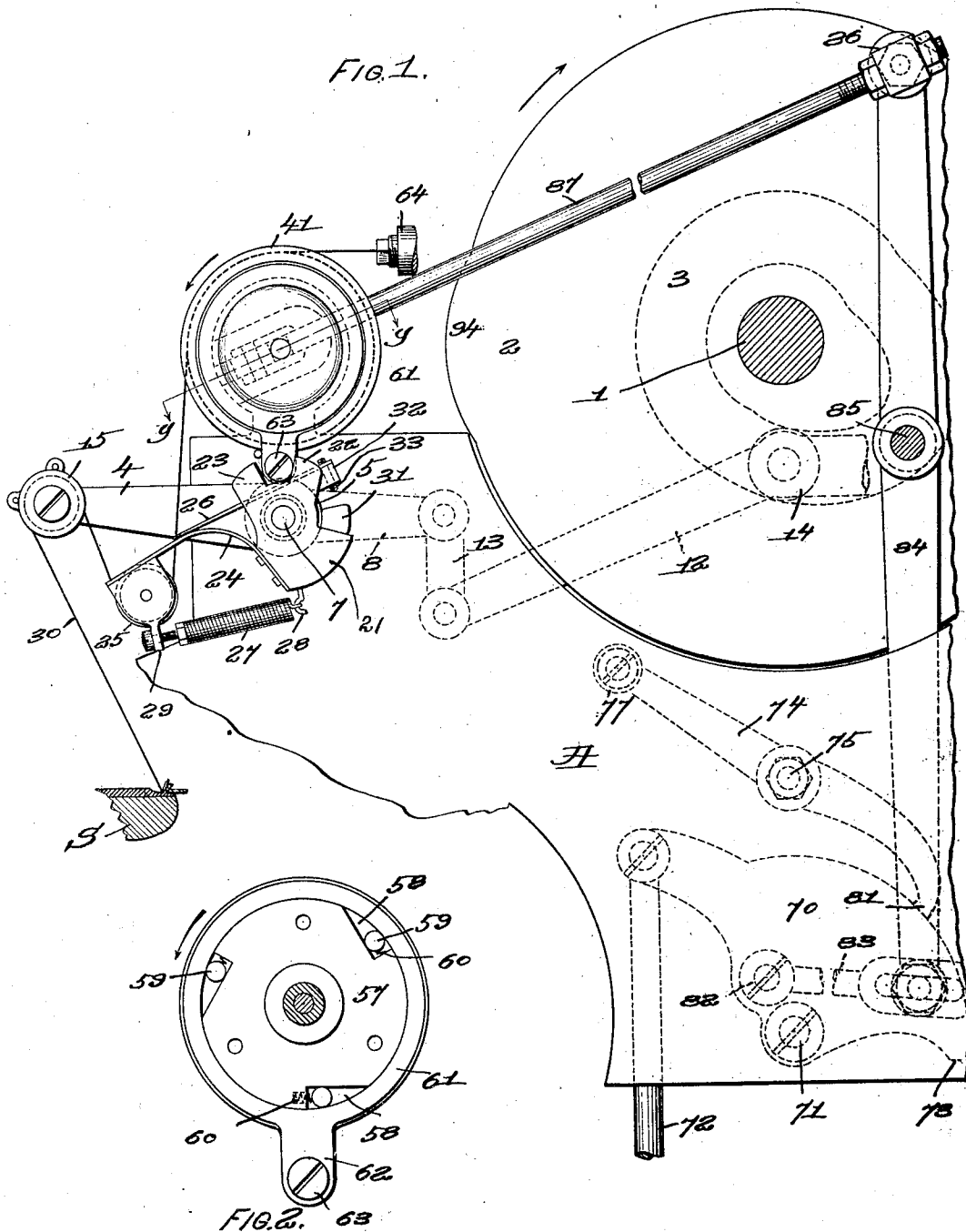


T. G. PLANT.
 THREAD CONTROLLING MECHANISM FOR SEWING MACHINES.
 APPLICATION FILED DEC. 26, 1907. RENEWED APR. 14, 1909.

946,783.

Patented Jan. 18, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

Amelia M. Ross
 Lloyd Gubitz.

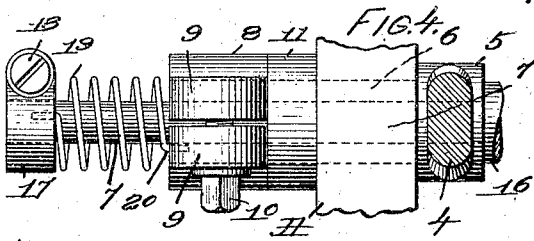
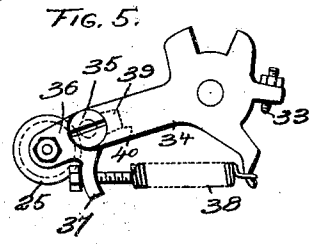
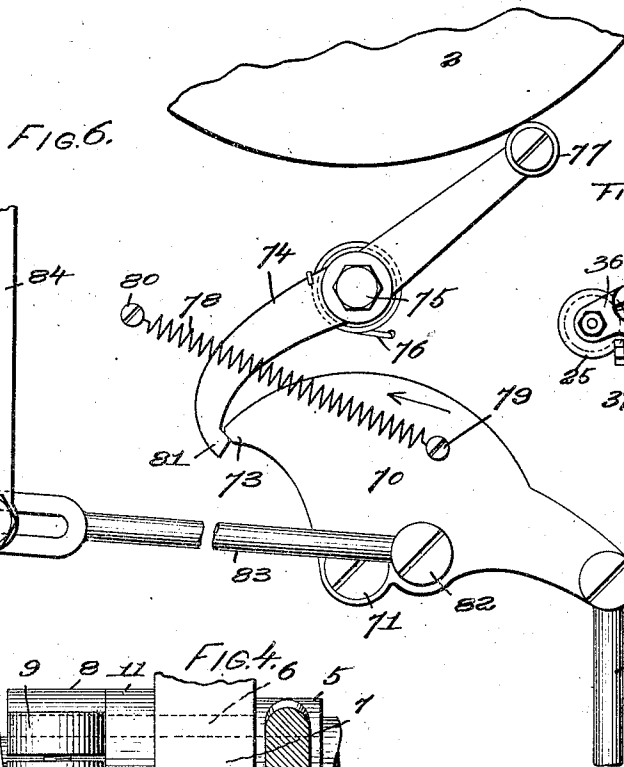
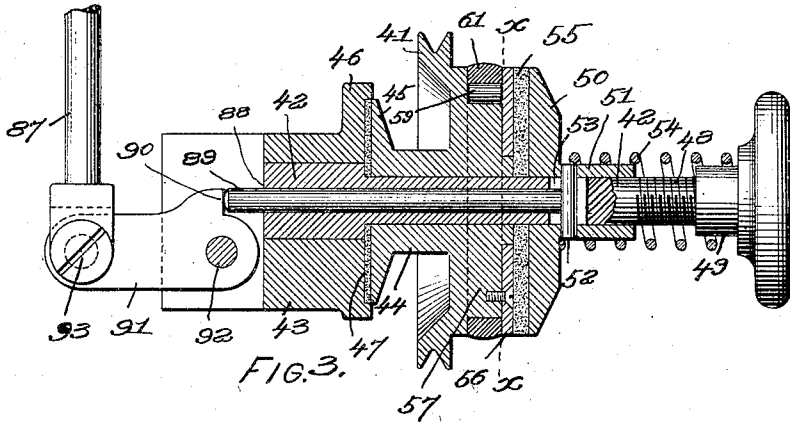
INVENTOR,
 Thomas G. Plant,
 BY Robt. P. Hains.
 ATTY.

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WITNESSES:
Amelia M. Ross
Signed Gubitz.

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UNITED STATES PATENT OFFICE.

THOMAS G. PLANT, OF BOSTON, MASSACHUSETTS.

THREAD-CONTROLLING MECHANISM FOR SEWING-MACHINES.

946,783.

Specification of Letters Patent.

Patented Jan. 18, 1910.

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To all whom it may concern:

Be it known that I, THOMAS G. PLANT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Thread-Controlling Mechanism for Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

The present invention relates to thread controllers for sewing machines of that type employed in sewing leather and has for its object the provision of means for so controlling the sewing thread that it will at all times be free from sudden shock or strain tending to rupture the thread particularly at the moment of setting the stitch, and wherein the tension may be released as desired.

The general objects of the invention and its characterizing features will be best made clear by the following description and drawings of one embodiment thereof selected for illustrative purposes and as applied to a wax thread sewing machine.

In the drawings:—Figure 1 is a side elevation of a machine for sewing shoes provided with one selected form of the present invention, only sufficient parts of such machine being illustrated as are desirable in showing the relation thereto of the invention. Fig. 2 is a detail sectional view on line $x-x$, Fig. 3. Fig. 3 is a sectional view in detail on the line $y-y$, Fig. 1. Fig. 4 is a detached detail, partly in section, of the take-up shaft and its adjuncts. Fig. 5 is a detached view of a modified form of auxiliary take-up arm. Fig. 6 is a detail view in side elevation of parts comprising the tension release.

Mounted, as usual, in a supporting frame, as A, is the main driving shaft 1 of a shoe sewing machine which may be driven by well known suitable means, unnecessary to illustrate, said shaft carrying an edge cam 2, and face cam 3. The main take-up arm 4 projects from the head 5 of a sleeve 6 having a suitable bearing in the frame A, Fig. 4, and surrounding the auxiliary take-up shaft 7. To the opposite end of the sleeve 6 is secured the arm 8 by means of the clamping jaws 9, 9, and set screw 10, a washer 11 being interposed between the frame A and arm 8. The arm 8 is connected to the actuating lever 12 by means of a link 13, said actuating lever extending to and being suitably pivoted at

the rear of the machine frame, and carrying a roller 14 which runs in the face cam 3. From this construction it is clear that rotation of the shaft 1 and face cam 3 will cause the free end of the main take-up arm 4 carrying the thread guiding roll 15 to be raised and lowered, the purpose of which, as well understood by those skilled in the art, is to provide sufficient thread for the usual needle to make the stitch, and then on its upward movement to tighten or set the stitch.

In sewing shoes it is desirable that the stitch be set with a strong pull, but as such machines operate rapidly, the sudden shock due to the upward movement of the take-up arm 4 is liable to break the thread; therefore, one of the purposes of the present invention is to entirely overcome this liability, as will now be explained.

The auxiliary shaft 7, Fig. 4, is preferably provided with a hub 16 having a bearing against the head 5 of the main take-up sleeve 6, and adjacent its opposite end it is provided with a collar 17 clamped thereto by a set screw 18, one end of a light spring 19 being secured to said collar and the opposite end at 20 to the main take-up sleeve.

Secured to or formed integral with the hub 16 of the auxiliary take-up shaft are the series of projections 21, 22, and 23, constituting what, for identification, may be termed the auxiliary take-up head. Supported from said auxiliary take-up head by a spring arm 24 is the thread guiding roller 25, about which the sewing thread passes. Projecting from the auxiliary take-up head is a leaf spring 26 which bears upon the spring arm 24 as indicated in Fig. 1. If desired an additional yielding connection between the roller 25 and the auxiliary take-up head may be secured by means such as the spring 27, having one end connected to a pin 28, on the auxiliary take-up head, and the other adjustably connected to the lug 29 projecting from the roller casing, as indicated in Fig. 1. From the construction thus described, it will be noted that the roller 25 of the auxiliary take-up is supported from the take-up head by a spring or yielding connection, and that the light spring 19, Fig. 4, normally maintains the auxiliary take-up in the position indicated in Fig. 1, the thread 30 being at such time under little, if any, tension.

Secured to the machine frame is a fixed stop 31 disposed between the projections 21

and 32 secured to or formed as part of the auxiliary take-up head, said projection 32 being provided with an adjusting screw stop 33, which coming in contact with the stop 31 limits the substantially free rising movement of the auxiliary take-up roller 25. It is to be here noted that while the stops 21, 31 and 33 thus limit the rotative movement of the auxiliary take-up head, the auxiliary take-up roller is still free to yield to the tension of the thread and against the cushioning effect of its spring connection with said take-up head. In other words, the action of the auxiliary take-up is at all times yielding, regardless of the contact of stops 31 and 33, and this yielding action varies inversely as the auxiliary take-up responds to the increasing tension on the sewing thread. Various other forms of the auxiliary take-up may be employed, as, for instance, that illustrated in Fig. 5 wherein the auxiliary take-up head has a rigid arm 34 extended therefrom to which is jointed at 35 a roller support 36, having an arm 37 to which one end of a spring 38 may be connected, the other end of said spring 38 being secured to the take-up head. A stop 39 on the arm 34 is adapted to be engaged by a lug 40 extended rearwardly from the roller support to limit the downward pull of the roller 25 by the spring 38. In any case, however, the action of the auxiliary take-up is yielding both prior to the engagement of the stops 31 and 33 which limit the turning movement of the auxiliary take-up head, and thereafter; the yielding action of the auxiliary take-up after the engagement of said stops gradually increasing as the tension upon the thread increases, yet never presenting a positive stop.

During the sewing operation, one of the functions of the so-called take-up in this character of machines is to draw the stitch tight or set it, and also to pull from the thread supply an amount of thread substantially equal to that used in making the previous stitch to be used in making the next succeeding stitch. It is desirable at the moment of stitch setting, therefore, that the full strain or tension necessary to accomplish that end be attained without shock or positive resistance, as has heretofore been the case in machines of this class, and when the stitch has been properly set, to quickly draw thread for the next stitch by a continued movement of the take-up devices. Where, however, the supply has to be drawn by the unassisted action of the said take-up devices, the sudden additional strain necessary to start the thread from the supply is calculated to break the thread. The present invention, therefore, contemplates means for assisting the take-up devices in this action and to start the thread in its forward movement, so that the take-up devices act upon

the already forwardly moving thread in pulling from the supply sufficient for the next stitch, thus avoiding the sudden jerk or shock incident to sudden movement of a body from a state of rest.

Referring to Fig. 3, the tension wheel 41 is mounted to turn upon a stud 42 projecting from a bracket 43 erected upon the machine frame, said tension wheel 41 having a barrel 44 terminating in a friction disk 45, and being movable longitudinally of the stud 42 toward and from a fixed disk 46, suitable friction material 47 being interposed between said disks 45 and 46. At its outer end portion the stud 42 is screw threaded, as at 48, and is engaged by an adjusting hand wheel 49. Fixed upon the stud 42, so as to be non-rotative but movable longitudinal thereon, is the friction disk or member 50, the sleeve portion 51 of which is provided with a pin 52, which passes through an elongated slot 53 formed in the stud 42. A coiled spring 54 is interposed between the adjusting hand wheel 49 and the disk or member 50, the normal tendency of which is to force the disk or member 50 toward the tension wheel 41 and against a friction pad 55 interposed between a plate 56 secured to an extended portion 57 of said tension wheel and said friction disk 50. The extended portion 57 of the tension wheel 41 forms one member of a clutch, which may be of any desired character to discharge the function to be described, said clutch, Fig. 2, in the form selected for illustrative purposes being of a well known character. As shown by Fig. 2, the extended portion 57 of the tension wheel 41 has a series of tapering recesses 58 in each of which is seated a ball or roller 59 normally pressed toward the smaller end of the recess by a spring 60. Surrounding the extended portion 57 and said balls or rollers is a collar 61 forming the other member of the clutch and having an extended arm or lug 62 provided with a stud 63 adapted to be engaged between two projections 22 and 23 of the auxiliary take-up head. Obviously, rotative movement imparted to the collar 61 in the direction of the arrow, Fig. 2, will cause the balls or rollers 59 to bite or bind in the tapered recesses 58 and impart corresponding rotative movement to the portion 57 of the tension wheel 41, and, consequently, to the tension wheel itself about which the thread 30 passes from the conduit 64. The thread 30 from the source of supply passes through the conduit 64, then one or more times about the tension wheel 41, under the auxiliary take-up roller 25, over the main take-up roller 15 to the work S, and, as the main take-up rises to set or tighten the stitch, it will first take up any slack in the thread, gradually tightening the thread until, in the continued upward movement of the main take-up due to

the action of cam 3, the thread tension will start the auxiliary take-up against the light force of the spring 19, the lug or projection 23 of the auxiliary take-up head coming in contact with the pin 63 of the clutch member 61. This clutch member, however, is yieldingly held from movement by the working tension upon the tension wheel 41. Continued upward movement of the main take-up in setting the stitch will, therefore, cause the auxiliary take-up to yield, owing to its spring supporting arm, thus relieving any sudden shock or strain upon the thread, and the auxiliary take-up will continue to thus yield or cushion the strain on the thread until, as the stitch is set, the continued upward movement of the take-up to draw thread from the supply will cause the auxiliary take-up, while still yielding, to move the clutch member 61 and turn the tension wheel 41 to start the thread forward to respond to the demands of the take-up in drawing thread for the next stitch. This movement of the auxiliary take-up in starting the thread tension wheel 41 is limited by the stops 31 and 33, and, for purposes of identification, such movement of the tension wheel may be herein referred to as an initial thread movement. Thus it is to be noted that the auxiliary take-up at all times is yieldingly movable, either by virtue of the light spring 19, the spring supporting arm of the auxiliary take-up roller, or the yielding nature of the tension wheel 41, and that at no time does the auxiliary take-up present a positive resistance to the pull exerted upon it by the thread.

It is desirable at times to release the thread tension and permit the thread to rend freely from the source of supply, as in removing the shoe from the machine, and to maintain the thread free from tension until after the needle has received its first loop and as it makes its retracting stroke. One form of mechanical devices embodying this feature of the invention is shown by Figs. 1 and 6, wherein 70 is an actuator pivoted at 71 to the machine frame, and connected to a suitable treadle by a rod 72. This actuator, Fig. 6, has a nose or projection 73 adapted to be engaged by a trip-catch 74, pivoted to the machine frame at 75, and acted upon by a spring 76 normally tending to hold the trip-catch 74 in engaging or locking relation with the nose of the actuator 70 when once the latter has been moved into position, as indicated in Fig. 6, the other end portion of the trip-catch 74 being provided with a roll 77 adapted to ride upon the cam 2 secured to the main shaft 1, Figs. 1 and 6. A spring 78 having one end secured at 79 to the actuator and the other end secured to the main frame, as at 80, normally acts to turn the actuator in the direction of the arrow, Fig. 6, and lower

the nose 73 of the actuator, as indicated by dotted lines in Fig. 1, the end 81 of the trip-catch 74 at such times riding on the curved upper edge portion of the actuator, as indicated.

Jointed to the actuator at 82 is a rod 83, which connects the actuator with a lever 84 pivoted to the frame at 85 and jointed at 86 with a tension controlling rod 87, Fig. 1. Movable longitudinally in the bore 88 of the stud shaft 42, Fig. 3, is a tension release rod 89, the inner or right hand end viewing Fig. 3, bearing directly against the pin 52 secured to the sleeve of disk 50. At its opposite end the tension rod 89 is adapted to be engaged by the toe 90 of a release dog 91, pivoted to the bracket 43 at 92, and having its free end connected by a suitable pin 93 with the tension controlling rod 87.

Obviously, changes may be made in the particulars described as one form of the invention's mechanical embodiment, the characteristics of which are that upon depressing the treadle rod 72, the actuator 70 will have its nose 73 raised to be engaged by the end 81 of the trip-catch 74, and the lever 84 will be moved to cause the dog 91 to push upon the pin 52 and free the tension wheel 41 from control of the friction disks. With the parts in this position the thread may be drawn freely from the thread supply without substantial resistance by the tension wheel, and the parts will be retained in this position by the trip-catch until the riser 94 of the cam 2 passes under the roller 77 of the trip-catch, whereupon the end 81 of the trip-catch will free the actuator 70 and permit the parts to resume their original position as shown in Figs. 1 and 3 with the tension wheel 41 in control of the tension disks.

From the construction described it will be noted that the invention contemplates the manual release of the thread tension, as, for instance, upon stopping the machine, and a lock or catch to hold the parts in position with the tension thus released, so that upon starting a new piece of work the needle may receive its first loop of thread and make its retracting stroke through the leather with the thread released from tension, and that thereafter the thread tension may be automatically restored by a moving part of the machine.

What I claim is:—

1. In a shoe sewing machine, the combination of a main take-up, an auxiliary take-up head, an auxiliary thread guide, a stop to limit the movement of said auxiliary take-up head, and a spring to permit the auxiliary thread-guide to yield after the limit of the head movement as defined by the stop has been reached.

2. In a shoe sewing machine, the combination of a main take-up, an auxiliary take-up head, a support therefor, a stop to limit

the movement of said head about its support, an auxiliary take-up thread guide, and a spring controlled arm carrying said guide to permit the auxiliary take-up to yield after the limit of its movement as defined by said stop has been reached.

3. In a shoe sewing machine, the combination of a main take-up, an auxiliary take-up comprising a head, an auxiliary take-up guide, a spring controlled arm carrying said guide, a stop on the machine frame and a co-operating stop on the auxiliary take-up head, one of said stops being adjustable, to limit the movement of said head, the spring controlled arm yielding after the limit of head movement has been reached.

4. In a shoe sewing machine, the combination of a main take-up, an auxiliary take-up guide, an auxiliary take-up head, a spring arm 24 secured to said head and carrying said take-up guide, fixed and adjustable stops, one of which is on the machine frame and the other on the auxiliary take-up head, said stop limiting the movement of the said head and spring arm 24 permitting yielding movement of the said guide after the limit of head movement has been reached.

5. In a machine of the character described, the combination of thread tension means, a main take-up, an auxiliary take-up, and means actuated by the auxiliary take-up to give initial forward movement of the thread from the source of supply after the stitch has been set.

6. In a machine of the character described, the combination of thread tension means, a main take-up, means for actuating said take-up to set the stitch and draw thread for the next stitch, and means to impart initial forward movement to the thread from the source of supply at and prior to the pull-off action of the take-up to enable the main take-up to draw upon the moving thread for the next stitch.

7. In a machine of the character described, the combination of thread tension means, a main take-up, means for actuating said main take-up, and means to impart initial forward movement to the thread tension means after the stitch is set to enable the main take-up by its continued movement to draw thread for the next stitch.

8. In a shoe sewing machine, a thread tension wheel, a main take-up and its actuating means, an auxiliary take-up having yielding movement to cushion the pull exerted on the thread by the main take-up, a clutch associated with the thread tension wheel, and connections between the clutch and the auxiliary take-up to give initial movement to the thread tension wheel.

9. In a shoe sewing machine, the combination of thread tension means, a main take-up, an auxiliary take-up associated therewith, means actuated by the auxiliary take-

up to give initial forward movement to the thread from the source of supply, and a stop to limit the action of the auxiliary take-up in giving the thread movement.

10. A shoe sewing machine comprising, in combination, a main take-up and its actuating means, a thread tension device, an auxiliary take-up guide, a spring controlled arm supporting said guide, and means under control of the auxiliary take-up guide operative to impart movement to the thread tension device and give initial movement to the thread after the stitch setting tension has been reached.

11. In a shoe sewing machine, the combination of tension means to produce tension upon the thread during the operation of the machine, means controlled by the operator to relieve the action of the tension means upon the thread, a catch to maintain the tension means functionally ineffectual and provide free thread for the first stitch formation, and automatic means operative after the first stitch has been formed to trip the catch and restore the tension means to its action upon the thread.

12. In a shoe sewing machine, the combination of tension means to produce tension upon the thread during the operation of the machine, treadle actuated means to relieve the action of the tension means upon the thread, a catch to maintain the tension means thus frictionally inoperative while the machine is at rest, and means operative subsequent to starting the machine to trip the catch and restore the action of the tension means upon the thread.

13. In a shoe sewing machine, a main take-up, an auxiliary take-up comprising an auxiliary take-up head movable about its axis, a spring 19 normally acting to hold the auxiliary head in one position of its rotative movement, a spring arm 24 secured at one end to said auxiliary take-up head and carrying an auxiliary take-up guide 25, and a spring 26 secured to the said head and bearing on the spring arm 24.

14. In a shoe sewing machine, a main take-up, means for operating it, an auxiliary take-up comprising a head movable about its axis, a spring 19 connecting the main and auxiliary take-ups, a spring arm 24 secured to the auxiliary take-up head and carrying a take-up guide, a stop to limit rotative movement of the auxiliary take-up head, and a spring additional to the arm 24 to yieldingly control the movement of said arm 24 about the auxiliary take-up head.

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

THOMAS G. PLANT.

Witnesses:

IRVING U. TOWNSEND,
WARREN G. OGDEN.