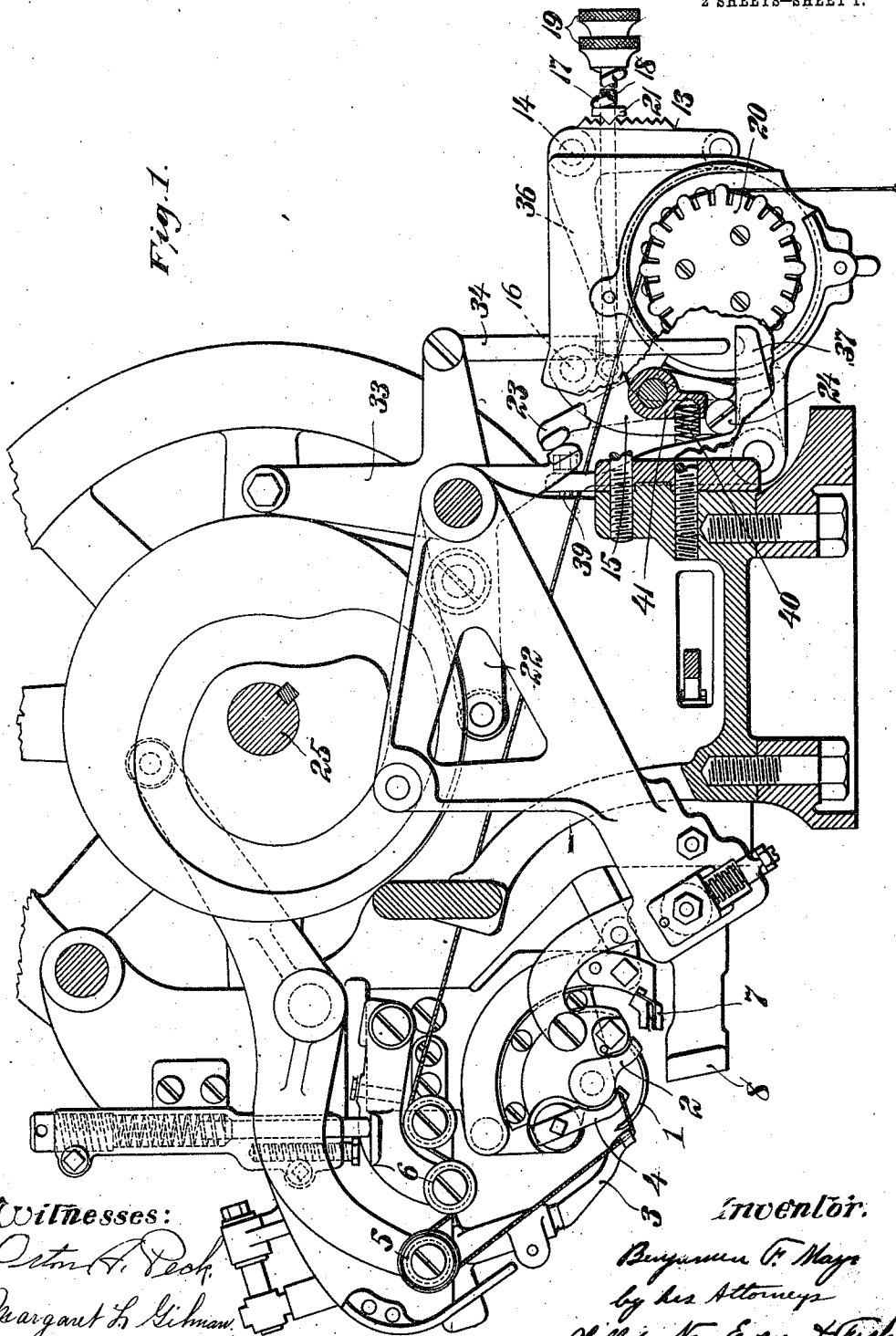


1,028,474.

Patented June 4, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Oscar A. Peck
Margaret L. Lihman

Inventor.

Benjamin F. Mayo
by his Attorneys
Phillips Van Eeren & Bush

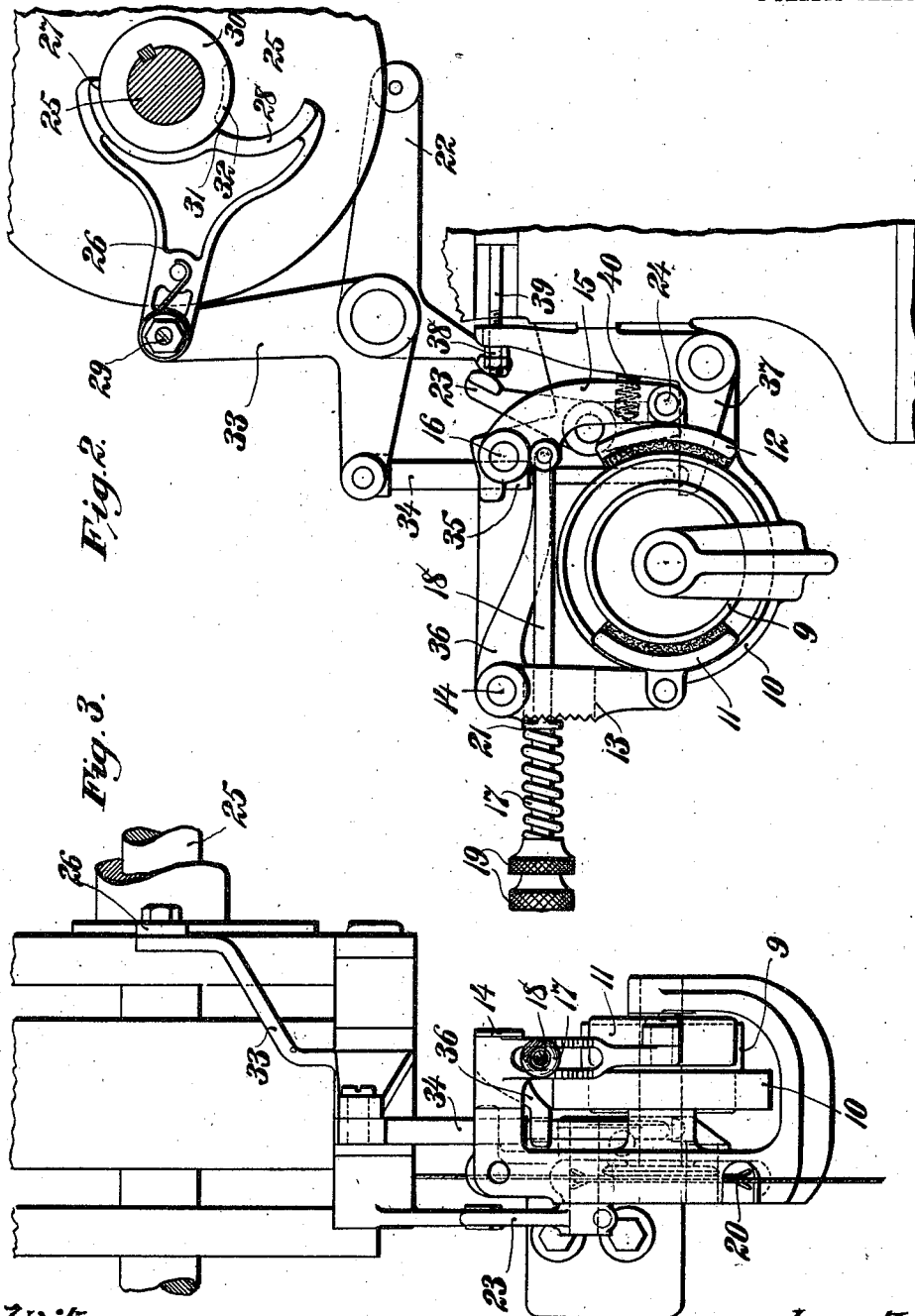
B. F. MAYO.
TENSION DEVICE.

APPLICATION FILED NOV. 22, 1909.

Patented June 4, 1912.

2 SHEETS—SHEET 2.

1,028,474.



Witnesses:
Oscar A. Deak.
Margaret L. Gilman.

Inventor:
Benjamin F. Mayo
by his Attorneys
Phillips Van Couver & Visk

UNITED STATES PATENT OFFICE.

BENJAMIN F. MAYO, OF SALEM, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

TENSION DEVICE.

1,028,474.

Specification of Letters Patent.

Patented June 4, 1912.

Application filed November 22, 1909. Serial No. 529,342.

To all whom it may concern:

Be it known that I, BENJAMIN F. MAYO, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Tension Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improved tension device particularly adapted for use on wax-thread shoe-sewing machines which form a chain-stitch, although the invention is capable of use on other types of sewing machines.

In chain-stitch shoe-sewing machines it has been proposed to use a tension device or devices which are so actuated as to exert one tension on the thread at one point in the cycle of operations of the machine in forming a stitch and to exert another tension on the thread at another point in the cycle of operations. Thus in a chain-stitch shoe-sewing machine provided with a take-up operating while the needle is in the work, a tension device has been used which exerts a comparatively light tension on the thread during the loop drawing stroke of the needle and a comparatively heavy tension on the thread during the stitch setting stroke of the take-up. This tension device has embodied two brakes and two separate springs for actuating the brakes, one brake being in operation constantly and the other brake being thrown out of operation during the loop drawing stroke of the needle. This form of tension device has given more or less trouble by reason of the fact that in order to adjust the tension device so as to produce the best results on a given class of work, an adjustment of both springs has been necessary. As a consequence, an operator often adjusts one or both springs improperly so that either the heavy or the light tension is not of the required amount, and the required ratio between the two tensions is not preserved.

The principal object of the present invention is to provide a tension device which can be actuated to exert different degrees of tension on the thread at different times during

the stitch forming operation and which can be readily adjusted without liability of changing, to an objectionable extent, the required ratio between the tensions.

Other objects of the invention are to provide a tension device the parts of which are constructed and arranged to operate in an improved manner.

With the above objects in view a feature of the present invention contemplates the provision in a sewing machine of a tension device comprising a single spring, a brake mechanism which is actuated by the spring through suitable connections, and means for actuating said connections to vary the ratio between the effective pressure of the brake mechanism and the force of the spring. By varying the ratio between the effective pressure of the brake mechanism and the force of the spring, the tension on the thread is varied in the desired manner during the formation of each stitch while the tension on the thread at all times is due to the force exerted by a single spring. The tension on this spring can be adjusted and thus the amount of the tension exerted on the thread at all times during the formation of a stitch uniformly increased or diminished. The tension device can therefore be adjusted by a single adjusting device and the required amount of tension on the thread at any period in the cycle of operations secured without disturbing to an objectionable extent the proportions of the different tensions. In accordance with this feature of the invention the connections between the spring and the brake mechanism may be constructed, arranged and actuated in any suitable manner. In the preferred form of the invention hereinafter described, however, two sets of connections are provided between the spring and the brake mechanism and means are provided for throwing one set of connections out of operation during each cycle of operations of the machine.

In the preferred form of the invention illustrated in the drawings accompanying this application and hereinafter described the brake mechanism comprises two brakes, and a single spring is provided for actuating both brakes, so that the pressure of both brakes can be adjusted simultaneously by a

single adjusting means. This construction constitutes a feature of the present invention which broadly considered is not limited to a construction embodying a single spring since it is believed to be new in a tension device comprising two brakes to provide means for simultaneously adjusting the pressure of both brakes together with means for throwing one brake out of operation during each cycle of operations of the machine.

In the construction hereinafter described as embodying the preferred form of the present invention, adjusting means are provided between the spring and one of the brakes whereby the pressure exerted by the brake and consequently the tension produced on the thread can be adjusted without changing the tension of the spring. It is believed to be new in a tension device to provide means for adjusting the devices which are actuated by the spring to produce tension so as to change the tension on the thread without changing the tension of the spring and such a construction constitutes a feature of the present invention which is not limited to use in a tension device adapted to exert different tensions on the thread during the formation of a stitch.

In addition to the features of invention referred to the present invention also consists in certain devices, combinations and arrangements of parts, the advantages of which will be obvious to those skilled in the art from the following description.

The several features of the present invention will be clearly understood from an inspection of the accompanying drawings in which—

Figure 1 is a view in side elevation partly in section of a chain-stitch shoe-sewing machine, with a tension device embodying the invention in its preferred form applied thereto. Fig. 2 is a view in side elevation of the tension device looking in the opposite direction from Fig. 1 and Fig. 3 is a rear view of the mechanism illustrated in Fig. 2.

The sewing machine illustrated in the drawings, is a chain-stitch hooked-needle welt sewing machine of the same general type as that disclosed in the patent to French & Meyer, No. 412,704, although many of the parts and their actuating mechanism are somewhat differently constructed and arranged. The hooked-needle of the machine operates to draw loops of thread through the work and the take-up of the machine acts to exert a stitch setting strain on the seam while the needle is in the work, in substantially the same manner as in the machine of the patent above referred to. In the patented machine, a uniform tension is exerted upon the thread at all times, while in the machine illustrated in the drawings

of this application a comparatively light tension is exerted on the thread during the loop drawing stroke of the needle, and a comparatively heavy tension during the stitch setting stroke of the take-up.

Referring now to the drawings, 1 indicates the curved hook needle of the machine, 2 the needle guide, 3 the looper, 4 the thread arm, 5 the take-up, 6 the auxiliary take-up, 7 the welt guide and 8 the back rest. The specific construction and arrangement of these parts is immaterial so far as the present invention is concerned and consequently no further description of them will be given.

The tension device illustrated in the drawings includes a brake mechanism comprising two braking disks of drums 9 and 10 and two brake shoes 11 and 12 cooperating respectively therewith. The brake shoe 11 is pivotally mounted upon the lower end of a lever 13, pivoted at 14 on a bracket of the machine frame, and the brake shoe 12 is pivotally mounted upon the lower end of a lever 15 pivoted at 16 on the bracket. The brake shoes are oppositely disposed with relation to each other so as to engage opposite sides of the drums 9 and 10, and both levers are acted upon by a single spring 17 which tends to move the levers in a direction to press the brake shoes against their cooperating drums. To permit the spring 17 to act on both levers 13 and 15, a rod 18 is provided which is pivotally connected to the lever 15 and which extends transversely of the lever 13 through a slot in the lever. The spring 17 is supported on the rod 18 and is interposed between the lever 13 and adjusting stop nuts 19 on the outer end of the rod. During the operation of the machine the brake shoe 12 is moved away from the drum 10 during the formation of each stitch, as will be hereinafter described, while the brake shoe 11 remains continuously in engagement with the drum 9 until the completion of the sewing operation. The drums 9 and 10 are fast upon the shaft which carries the usual thread tension truck 20 so that the tension on the thread is determined by the pressure of the brake shoes 11 and 12 on the drums. At certain times during each cycle of operations of the machine, therefore, the tension on the thread is produced by the engagement of the brake shoe 11 with the drum 9, while at other times the tension on the thread is produced by the engagement of both brake shoes with their cooperating drums. The amount of each of these tensions can be adjusted by adjusting the tension of the spring 17 by means of the nuts 19, an adjustment of the tension of the spring increasing or decreasing the pressure exerted by each brake shoe on its drum. Both of the tensions which are produced upon the thread can thus be readily ad-

justed without any liability of changing to an injurious extent the relative proportions of the two tensions.

In addition to the means above described for adjusting the amount of tension produced upon the thread, the tension device illustrated in the drawings is so constructed that the amount of the tension produced on the thread can be adjusted without changing the tension of the spring 17. To secure this result the rod 18 is so mounted that it can be swung about its pivot toward and from the pivot 14 of the lever 13 to move the point of application of the spring 17 nearer to or farther away from the fulcrum of the lever. To hold the rod in adjusted position a collar 21 is loosely mounted upon the rod between the spring 17 and the lever 13 and is provided with teeth arranged to engage a series of teeth on the lever. An adjustment of the rod 18 about its pivot varies the pressure exerted by the brake shoe 11 on the drum 9 and changes the proportions of the two tensions produced upon the thread as well as the amounts of such tensions.

The construction illustrated in the drawings for raising the brake shoe 12 out of engagement with the drum 10 during each cycle of operations of the machine consists of a cam actuated bell crank lever 22 and a lever 23, the upper end of which is engaged by the bell crank lever 22 and the lower end of which engages a pin 24 projecting laterally from the lower end of the lever 15. This pin also serves as the pivot for the brake shoe 12. During the operation of the machine the bell crank lever 22 is actuated to hold the brake shoe 12 out of engagement with the drum 10 during the retracting stroke of the needle and to allow the brake shoe to be in engagement with the drum during the stitch setting stroke of the take-up.

To prevent any substantial increase in the tension of the spring 17 when the lever 15 is actuated to move the brake shoe 12 out of engagement with the drum 10, the rod 18 is pivotally connected to the lever 15 at a comparatively short distance from the pivot of the lever, and to secure the required braking effect of the brake shoe 12, the drum 10 is preferably made larger than the drum 9.

The machine illustrated in the drawings is provided with means for relieving the tension on the thread to allow the removal of the work at the end of the sewing operation. The tension releasing mechanism is actuated by a reversal in the direction of rotation of the driving shaft 25 of the machine, and includes an arm 26 similar to that used in tension releasing mechanism heretofore devised, which arm is provided with two surfaces 27 and 28 at different dis-

tances from the pivot 29 of the lever. The surfaces 27 and 28 are arranged to bear against a collar 30 on the driving shaft 25 and between the surfaces is a projection 31 adapted to enter a recess 32 when the direction of rotation of the driving shaft is reversed. When the driving shaft is running in a forward direction the surface 27 is in engagement with the collar 30 as indicated in Fig. 2. Upon a reversal in a direction of rotation of the driving shaft at the end of the sewing operation the recess 32 engages the projection 31 and the arm 26 is swung to bring the surface 28 into engagement with the collar. This swinging movement of the arm 26 also moves the arm longitudinally by reason of the fact that the surface 28 is at a greater distance from the pivot 29 than the surface 27. The arm 26 is pivoted at 29 upon the upper end of a bell crank 33. To the horizontal arm of the bell crank 33 is pivotally connected the upper end of a vertical rod 34 which is provided with a shoulder 35 arranged to engage the upper surface of a horizontal arm 36 extending from the hub of the brake carrying lever 13. An oscillation of the bell crank 33 produced by a reversal in the direction of rotation of the driving shaft 25 moves the rod 34 downwardly and actuates the arm 36 and lever 13 so as to move the brake shoe 11 out of engagement with the drum 9. The cam on the driving shaft 25 which actuates the bell crank lever 22 is so arranged that at the time the arm 26 is swung by the backward rotation of the driving shaft the bell crank 22 is actuated to raise the brake shoe 12 out of engagement with the drum 10. A reversal in the direction of rotation of the driving shaft therefore throws both shoes out of operation and releases the tension on the thread. The machine illustrated in the drawings is also provided with means for retracting the welt guide when the thread is relieved of tension. This means consists of a bell crank 37, the horizontal arm of which projects beneath the lower end of the rod 34 and the vertical arm of which engages a nut 38 on the rear end of a rod 39, which rod is connected to the welt guide slide. The bell crank 37 is acted upon by a coiled spring 40 interposed between a portion 41 of the machine frame and the vertical arm of the bell crank, which spring acts in a direction to hold the horizontal arm of the bell crank in raised position.

The tension releasing mechanism and welt retracting mechanism above described, are similar to mechanisms which have heretofore been devised and have been illustrated in the drawings of the present application merely for the purpose of showing a complete tension device embodying the features of the present invention.

The nature and scope of the present invention having been indicated and a preferred form of the invention having been specifically described, what I claim is:—

1. A sewing machine, having, in combination, stitch forming devices, a tension device including a brake mechanism, a spring, suitable connections actuated by the spring and acting continuously on the brake mechanism, and means for actuating said connections during the operation of the machine to vary the ratio between the effective pressure of the brake mechanism and the force of the spring.

2. A sewing machine, having, in combination, stitch forming devices, a tension device including a brake mechanism, a spring and two sets of connections between the spring and brake mechanism and means for throwing one set only of connections out of operation during each cycle of operations of the machine.

3. A sewing machine, having, in combination, stitch forming devices, a tension device including a brake, a brake carrying lever, a spring arranged to act on the lever, a rod for supporting the spring arranged transversely of the lever and movable to adjust the point at which the spring acts on the lever with relation to the fulcrum of the lever.

4. A sewing machine, having, in combination, stitch forming devices, a tension device including two oppositely disposed brakes, an actuating lever for each brake, a spring acting on both levers, and means for throwing one brake only out of operation during each cycle of operations of the machine.

5. A sewing machine, having, in combination, stitch forming devices, a tension device including two oppositely disposed brakes, an actuating lever for each brake, a rod connected to one lever and extending transversely of the other lever, a spring supported by said rod arranged to actuate both levers, and means for throwing one brake out of operation during each cycle of operations of the machine.

6. A sewing machine, having, in combination, stitch forming devices, a tension device including two brake disks of different sizes, a brake acting on the peripheral surface of each disk, and means for moving one brake out of engagement with its disk during each cycle of operations of the machine.

7. A sewing machine, having, in combination, stitch forming devices, a tension device including two brakes, a single adjusting means for adjusting the pressure of both brakes, and means for throwing one brake only out of operation during each cycle of operations of the machine.

8. A sewing machine, having, in combination, stitch forming devices, a tension device including two brakes, means for simultaneously adjusting the pressure of both brakes and means for throwing one brake only out of operation during each cycle of operations of the machine.

9. A sewing machine, having, in combination, stitch forming devices, a tension device including two brakes, means for simultaneously adjusting the pressure of both brakes, means for adjusting the pressure of one brake independently of the other, and means for throwing one brake out of operation during each cycle of operations of the machine.

10. A sewing machine, having, in combination, stitch forming devices, a tension device including two brakes, a spring for actuating both brakes and means for throwing one brake only out of operation during each cycle of operations of the machine.

11. A sewing machine, having, in combination, stitch forming devices, a tension device, including a brake mechanism, a spring and two sets of connections between the spring and brake mechanism, means for throwing one set of connections out of operation during each cycle of operations of the machine, and means for adjusting the pressure produced by one set of connections independently of that produced by the other set.

12. A chain stitch sewing machine, having, in combination, stitch forming devices, including a take-up acting while the needle is in the work, a tension device, means for actuating said device to produce a relatively light tension on the thread during the loop drawing stroke of the needle, and a relative heavy tension on the thread during the stitch-setting stroke of the take-up, a single adjusting means for adjusting the amount of both tensions and means for adjusting the amount of one tension independently of the other.

13. A chain stitch sewing machine, having, in combination stitch forming devices including a take-up acting while the needle is in the work, a tension device, means for actuating said device to exert a relatively light tension on the thread during the loop drawing stroke of the needle and a relatively heavy tension on the thread during the stitch setting stroke of the take-up, means for simultaneously adjusting the amount of both tensions and means for adjusting the amount of one tension independently of the other.

BENJAMIN F. MAYO.

Witnesses:

WARREN G. OGDEN,
FRED O. FISH.