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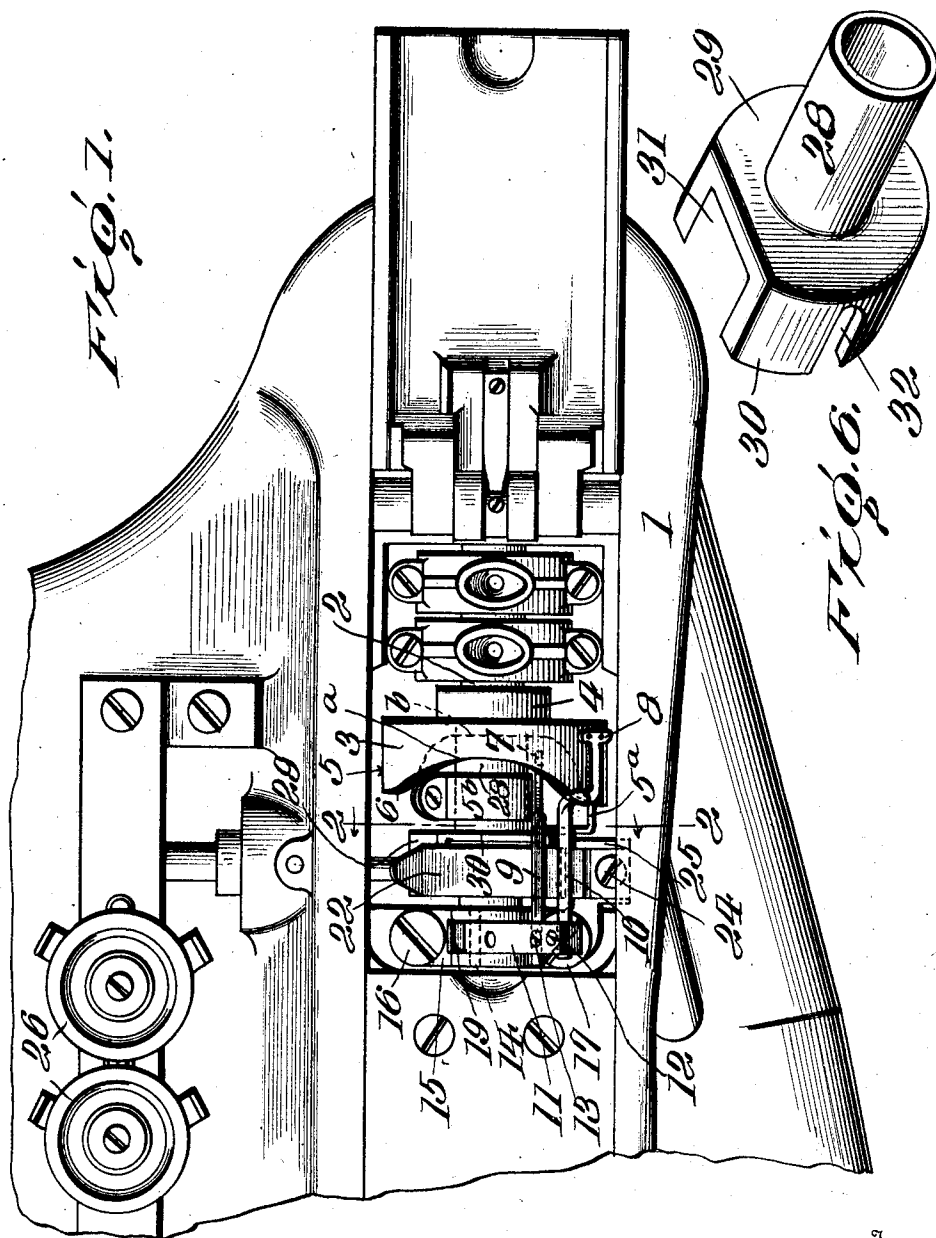
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THREAD CONTROLLING MECHANISM FOR SEWING MACHINES

Filed July 23, 1927

2 Sheets-Sheet 1



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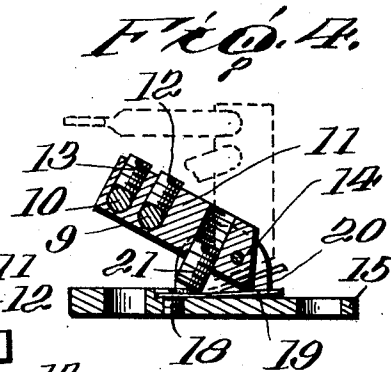
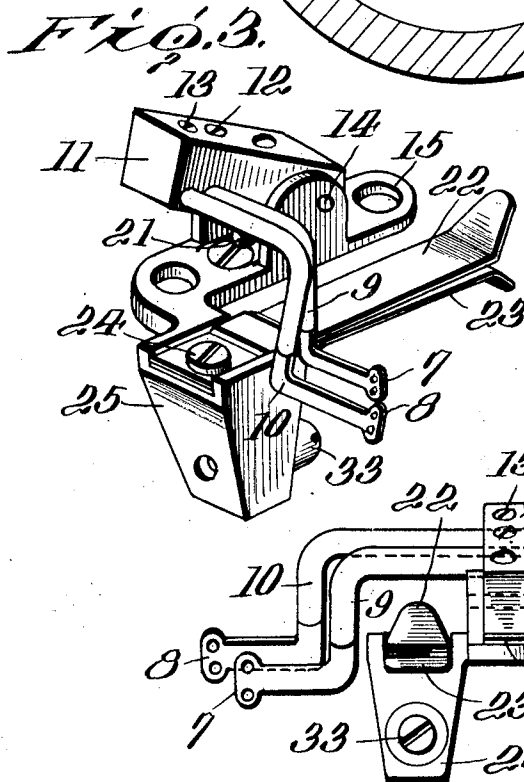
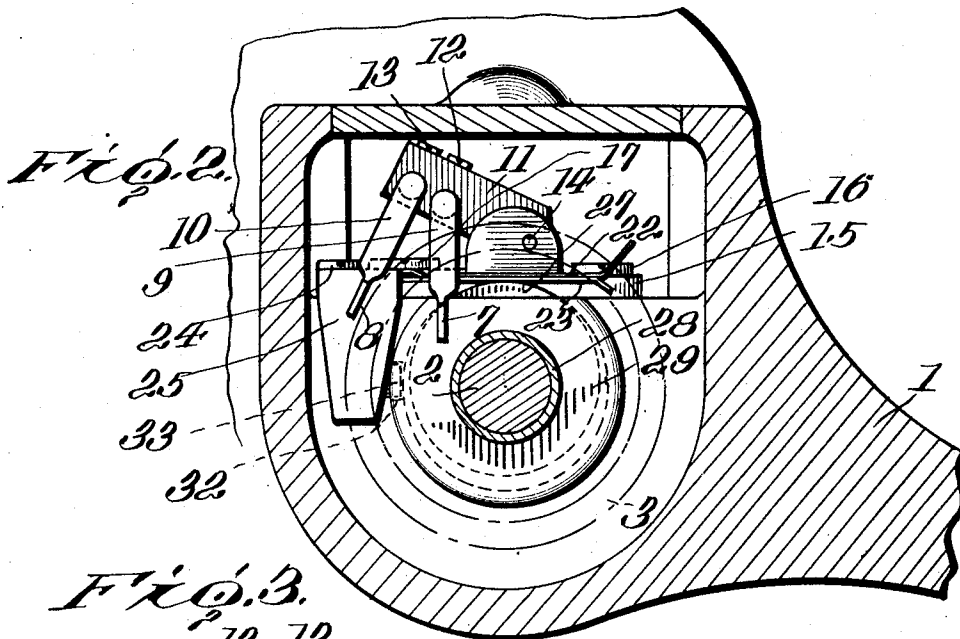
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THREAD CONTROLLING MECHANISM FOR SEWING MACHINES

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2 Sheets-Sheet 2



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THREAD-CONTROLLING MECHANISM FOR SEWING MACHINES

Application filed July 23, 1927. Serial No. 207,963.

The invention relates to new and useful improvements in thread controlling mechanisms for sewing machines, and more particularly to a thread controlling mechanism which includes a rotating controlling cam.

An object of the invention is to provide a thread controlling mechanism of the above type having a rotating member provided with a peripheral laterally projecting cam shaped thread engaging element, and having thread guides one located within and the other without said peripheral thread engaging portion with means for supporting said thread guides whereby they may be raised to a position where they are accessible for threading, and wherein the thread guides are capable of adjustment in a direction longitudinally of the axis of rotation of the thread controlling cam, and also in a direction radially of said axis. In the drawings which show by way of illustration one embodiment of the invention:—

Figure 1 is a plan view of a portion of a sewing machine having the invention applied thereto;

Fig. 2 is a sectional view on the line 2—2 of Fig. 1, also showing in broken lines the radial position of the thread controlling cam;

Fig. 3 is a perspective view of the thread clamping devices and the thread guiding devices showing the supporting bracket therefor;

Fig. 4 is a sectional view through the support for the thread guiding devices and the bracket on which it is mounted showing in dotted lines the thread guides raised to accessible position for threading;

Fig. 5 is a side view of the parts shown in Fig. 3 and

Fig. 6 is a perspective view of the stationary sleeve which houses the shaft between the controlling cam and the operating cam for the thread clamp, and which also houses the operating cam.

The invention is directed broadly to a thread controlling mechanism for sewing machines of the type wherein the thread controlling element is mounted on a shaft preferably intermediate the ends thereof and rotates with the shaft. Said thread controlling

element is provided with a cylindrical peripheral projection which extends laterally so as to overhang the shaft. The free edge of this cylindrical projection is cam shaped and is the active element which engages the thread for taking up and giving up the thread during the stitch formation. Associated with this thread controlling cam are thread guides, one of which is located within the peripheral flange and the other of which is outside of the peripheral flange so that the thread running from one thread guide to the other is positioned for the thread controlling member to engage the same. These thread guides are mounted on a support which is pivoted on a bracket carried by the frame of the machine so that the support can be swung in a plane at right angles to the axis of rotation of the shaft. A spring is associated with the support which operates to yieldingly hold the support with the thread guides in operative position, and also yieldingly hold the support with the thread guides in position where they are readily accessible for threading. The thread guides are mounted in the support so that they are independently adjustable in a direction longitudinally of the axis of the shaft. The members forming the thread guides are so shaped that they may be rotated on the support for moving the thread guides axially toward and from the center of the shaft.

Between the thread guide support and the controlling cam are thread nippers which operate to clamp the thread. These are mounted on the same bracket as the support for the thread guides. Cooperating with the nippers is an operating cam mounted on the shaft which carries the thread controlling element. This operating cam is adjacent but spaced from the active edge of the thread controlling member. Mounted on the shaft and surrounding the same is a sleeve which extends from the thread controlling element to the nipper spring operating cam. This sleeve has a radially extending flange at the end thereof adjacent the operating cam, and at the outer end of this flange is a lateral projection which extends over a greater portion of the operating cam so as to house the same.

A portion of the housing adjacent the nipper springs is cut away so that the operating cam may engage the nipper springs. This sleeve serves to prevent the thread from being wound on either the thread controlling element or the operating cam in case the thread breaks.

Referring more in detail to the drawings, the invention is shown as applied to a sewing machine which includes a supporting frame 1. Mounted in suitable bearings in the supporting frame is an operating shaft 2. Mounted on the operating shaft 2 is the thread controlling element 3. Said thread controlling element is carried by a hub portion 4 which is fixed to the shaft and consists of a radially projecting disk shaped member, at the outer edge of which is a laterally projecting cylindrical member 5. There are preferably two cylindrical members, one located within the other, and these members are spaced and parallel. The free edges of said cylindrical members are cam shaped as indicated at 6. This is the active element for engaging the thread or threads for taking up and giving up the thread as necessary in the stitch formation.

Associated with this active element is a retaining finger 5^a which extends in between the spaced cylindrical portions of the thread controlling element. This retaining finger 5^a is mounted on a clamp collar 5^b attached to a sleeve surrounding the shaft, which sleeve is stationary.

This type of thread controlling mechanism per se forms no part of the present invention, but is shown, described and claimed in the application filed by James R. Moffatt, August 23, 1926, Serial No. 130,954.

Associated with this thread controlling element are two thread guides 7 and 8. The thread guide 7 is located within the cylindrical projecting elements which engage the thread, and the thread guide 8 is located outside of said elements. The thread running from the thread guide 7 to the thread guide 8 will be laid across the cam edge 6 on the controlling element. These guides 7 and 8 remain stationary during the operation of the thread controlling mechanism, and as the controlling cam rotates the cam edge will draw on the thread running between the thread guides at times and at the other times will give up the thread which it engages. Each thread guide is provided with a plurality of thread eyes depending upon the number of threads which are to be held in engagement with the thread controlling member. As shown in the drawings there are two thread eyes, and the thread controlling element will operate simultaneously upon two threads controlling the two threads in precisely the same way. These thread eyes forming the thread guides 7 and 8 are carried by members which as shown in the drawings

are in the form of rods. The thread guide 7 is carried by a rod 9, and the thread guide 8 is carried by a rod 10.

The rods 9 and 10 are mounted on a common support 11, and are held therein by set screws 12 and 13 respectively. This provides an independent clamping means for each rod and when the clamping means is released the rod may be adjusted endwise in the support therefor or be rotated in the support therefor. Each rod as clearly shown in the drawings extends for a short distance out from the support, and is then bent at right angles. At the end of the right angular portion the rod again extends in a direction outwardly away from the support therefor. By turning the rod 9 when loosened in a counter-clockwise direction the thread guide 7 will be moved radially away from the thread controlling cam, and when turned in the opposite direction it will be brought closer to the thread controlling means. The same type of adjustment may be made in connection with the rod 10 and thus it is that the thread guides 7 and 8 may be properly set radially so as to cooperate with the rotating take-up cam and not engage the same. By adjusting the rods endwise the thread guides will be positioned nearer to or farther away from the path of travel of the maximum high point in the cam shaped edge of the thread controlling member. By this adjustment the amount of thread taken up and given up can be varied.

The support 11 is pivoted at 14 to a bracket 15. The bracket 15 is secured by screws 16 and 17 to the frame 1 of the machine. The support extends between upwardly extending ears carried by the bracket, and the member forming the pivot 14 is mounted in these ears. Secured to the bracket 15 by means of a screw 18 is a leaf spring 19. This leaf spring 19 extends beyond the pivot point 14 for the support. The rear end of the support is shaped so as to form a nose portion 20 against which this leaf spring bears. A stop screw 21 is attached to the support 11 and bears against the bracket. The spring bearing against the nose portion of the support normally tends to force the support so as to bring the stop screw 21 against the bracket as shown in Figure 4. This occurs when the support is turned to bring the guides into operative position. When, however, the support is turned to the broken line position in Fig. 4, the spring if it bears against the support at all will bear against the inclined end thereof and hold it in raised position. When placed in this position the thread guides are moved to a point where they are accessible for threading. In order to accomplish this shifting of the support 11 the machine is stopped and the thread controlling cam turned to a position where the thread guide 7 can be moved through the cut away portion in the cylinders which form the cam shaped

edge for controlling the thread. After the thread guides have been threaded then they are swung to operative position with one thread guide within and the other without the active thread engaging edge of the controlling element. By adjusting the stop screw 21 the support for the thread guides may be moved and the position of the thread guides shifted in a direction at an angle to a radius extending outwardly from the center of the shaft. It is further noted that each thread guide is independently mounted and is provided with an offset portion carrying the thread guide and when the thread guide is adjusted about its point of support it will be shifted in another direction at an angle to a radius extending outwardly from the center of the shaft. By these two combined adjustments the thread guides may be set circumferentially of the axis of rotation of the shaft without varying the distance between the respective thread guides and the center of the shaft. By this setting of the thread guides the time when the thread controlling cam engages the thread may be varied without varying the character of the take-up action. At the same time the support may be adjusted without varying the set position of the thread guides on the support and the set position of the thread guides on the support may be shifted without varying the position of the support. By these adjustments the character of the take-up action may be varied. For example, if the thread guides are brought closer together the amount of thread drawn off is increased, assuming that the castoff takes place at the same time interval.

Adjacent the operative side of the thread controlling member are nipper springs 22 and 23. These nipper springs are secured by means of a screw 24 to a laterally projecting depending portion 25 formed integral with the bracket 15. The threads are led through suitable tensions 26, 26 and thence between the nipper springs 22 and 23 and from the nipper springs to the thread guides. The lower nipper spring 23 is raised against the upper nipper spring for clamping the threads by means of a controlling cam 27. This controlling cam is carried by the operating shaft 2. At the proper time interval this operating cam 27 will close the nipper springs and grip the thread which will prevent the thread from being drawn from the supply and at this time the thread controlling element will take up thread between the nippers and the stitching point.

Located on the shaft between the supporting disk of the thread controlling element and the operating cam 27 which causes the nipper springs to clamp the thread is a sleeve 28. This sleeve is shown in detail in Fig. 6. The sleeve 28 has a radially extending flange 29 which carries at its outer edge a laterally projecting member 30. The flange 29 and the

member 30 form a housing for the operating cam 27. The housing is cut away at 31 directly beneath the nipper springs so that the operating cam engages the nipper springs through said cut away portion. The member 30 is provided with a slot 32 which extends in a direction longitudinally of the axis of the sleeve. The depending portion 25 of the bracket 15 is provided with a lug 33 which is adapted to engage the slot 32, and this lug which is held stationary by the bracket will hold the sleeve 28 and the parts carried thereby stationary. This sleeve provides a housing which extends from the thread controlling element to and over the rotating cam which operates the thread clamp. Thus it is that the rotating parts are housed so that if a thread should break it cannot be caught and wound onto the rotating parts. This stationary sleeve for housing the cam for the nipper springs per se forms no part of my invention.

The improved thread controlling mechanism may be used with various types of sewing machines, but is particularly adapted for use in controlling the looper thread of a chain stitch sewing machine. The thread engaging cam edge of the thread controlling element will of course be shaped to adapt the thread controlling mechanism to the particular type of machine in which said mechanism is used. The present thread controlling element is provided with two oppositely disposed thread engaging portions which take up and give up thread so that the looper thread is practically controlled throughout the entire movement of the looper. Between these active taking up and giving up projections there are of course two cut away portions, one of which is indicated in full lines at *a*, and the other of which is indicated in broken lines at *b* in Fig. 1 of the drawings. It is noted that the cut away portion *b* is of greater extent than the cut away portion *a*. The thread guide 7 can only be lifted when the take up element is stopped so that the thread guide may be raised through the cut away portion *b*.

It is obvious that minor changes in the details of construction and arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A thread controlling mechanism including in combination a rotatable shaft, a thread controlling member mounted on said shaft and having a laterally projecting thread engaging surface overhanging the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, means for pivotally mounting said support whereby said support may be moved away from the

shaft for placing said thread guides in an accessible position for threading, and means for independently mounting said thread guides on said support whereby said thread guides may be adjusted radially of the shaft and longitudinally of the shaft.

2. A thread controlling mechanism including in combination a rotatable shaft, a thread controlling member mounted on said shaft and having a laterally projecting thread engaging surface overhanging the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, means for pivotally mounting said support whereby said support may be moved away from the shaft for placing said thread guides in an accessible position for threading means for independently mounting said thread guides on said support, a spring for normally holding said support with the guides in operative position, and an adjustable stop for limiting the movement of the support by said spring.

3. A thread controlling mechanism including in combination a rotatable shaft, a thread controlling member mounted on said shaft and having a laterally projecting thread engaging surface overhanging the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, means for pivotally mounting said support whereby said support may be moved away from the shaft for placing said thread guides in an accessible position for threading, each of said thread guides having a supporting member bent between the support and the thread guiding eyes so that a rotation of the members in the support therefor will shift the position of the thread guides radially of the shaft.

4. A thread controlling mechanism including in combination a rotatable shaft, a thread controlling member mounted on said shaft and having a laterally projecting thread engaging surface overhanging the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, means for pivotally mounting said support whereby said support may be moved away from the shaft for placing said thread guides in an accessible position for threading, each of said thread guides having a supporting member bent between the support and the thread guiding eyes so that a rotation of the members in the support therefor will shift the position of the thread guides radially of the shaft, and means for securing said members to the support whereby said members may be shifted angularly of the support and also shifted endwise in the support.

5. A thread controlling mechanism for sewing machines including in combination a rotatable shaft, a thread controlling mem-

ber mounted on said shaft and having a laterally projecting thread engaging surface overhanging the axis of the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, and means whereby said thread guides may be adjusted and set in various shifted positions circumferentially of the axis of the rotating shaft without varying materially the radial distance of the respective thread guides from the center of the shaft.

6. A thread controlling mechanism for sewing machines including in combination a rotatable shaft, a thread controlling member mounted on said shaft and having a laterally projecting thread engaging surface overhanging the axis of the shaft, thread guides located one within and the other without said overhanging portion, a support for said thread guides, means for adjusting said support for moving the thread guides in a direction at an angle to a radius extending centrally from the shaft, and means for adjusting each thread guide on said support in a direction at a different angle to said radius, whereby said thread guides may be adjusted and set in various shifted positions circumferentially of the axis of the rotating shaft without varying materially the radial distance of the respective thread guides from the center of the shaft.

In testimony whereof, I affix my signature.
CHARLES F. RUBEL.