July 30, 1940. J. R. LONG 2,209,839

THREAD CONTROL DEVICE

Filed Feb. 19, 1940

FIG. 1.

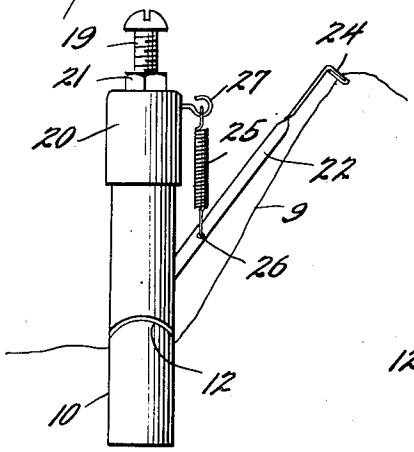


FIG. 2.

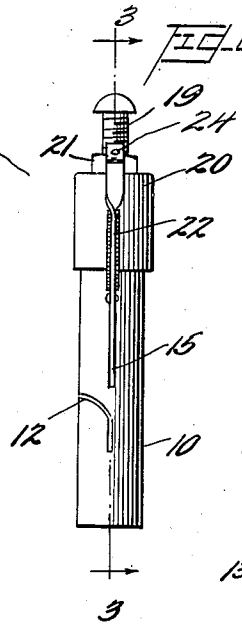


FIG. 3.

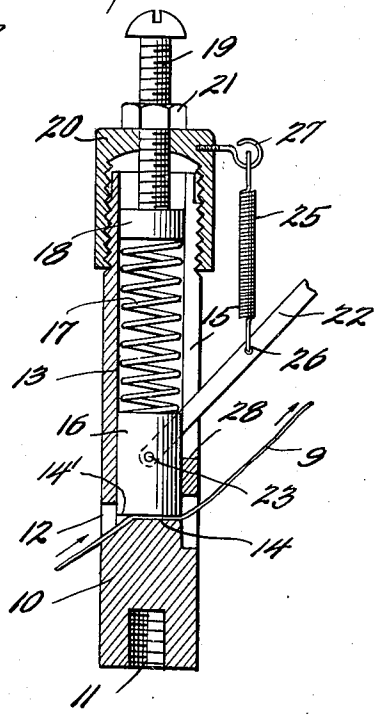


FIG. 4.

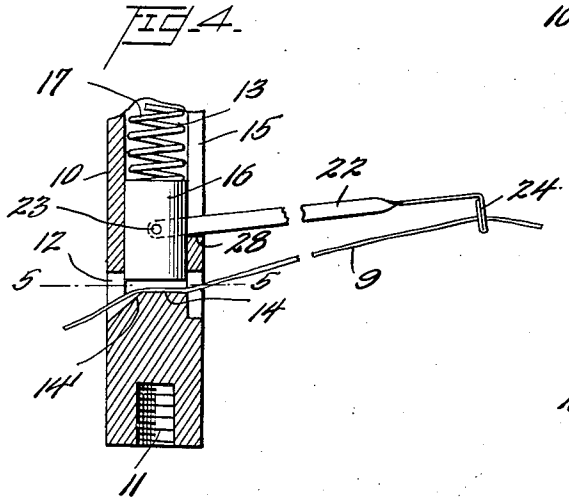
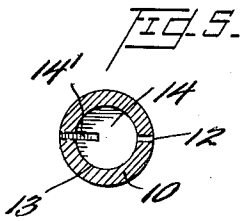


FIG. 5.



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THREAD CONTROL DEVICE

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4 Claims. (Cl. 66—146)

This invention relates to thread control devices, and particularly to a mechanism for governing the feed of thread or yarn to the needles of knitting machines, such as machines for knitting hosiery. Generally speaking, the present invention may be described as an improvement upon the thread controlling mechanism disclosed in United States Patent No. 2,091,407, to R. H. Lawson, and has for its general purpose the feeding of the threads to the needles of a knitting machine with equally regulated pull or tension.

It is a general object of the present invention to provide a thread controlling device of the type referred to, of an extremely simple and convenient nature and economical manufacture. Another object is the provision of a thread control device having provision for quickly and conveniently adjusting the tension of the same. A further object is the provision of a device of the kind in question, having provision for releasing the tension on the thread when a knot or other obstruction is encountered, in order that the thread may be fed to the needles without excessive tension and without breakage.

Other and further objects, features and advantages of the present invention will be apparent to one skilled in the art from the following description taken in connection with the accompanying drawing in which:

Figure 1 is an elevational view of a thread control device according to the present invention;

Figure 2 is an elevational view similar to Figure 1 but taken at right angles thereto;

Figure 3 is a vertical section on line 3—3 of Figure 2;

Figure 4 is a detail view corresponding to the lower portion of Figure 3 but showing the mechanism in a different condition; and

Figure 5 is a horizontal section on line 5—5 of Figure 4.

In order to facilitate an understanding of the invention, reference is made to the embodiment thereof shown in the accompanying drawing and detailed descriptive language is employed. It will nevertheless be understood that no limitation of the invention is thereby intended and that various changes and alterations are contemplated such as would ordinarily occur to one skilled in the art to which the invention relates.

The thread control device of the present invention is intended to be installed on a knitting machine, a plurality of such devices being employed, corresponding to the number of needles with which the machine is equipped. The device of the present invention comprises a thread support 10, in the form of a tubular casing, the lower end of the member 10 being tapped as at 11 for the reception of means securing the device to the knitting machine in suitable relation to the thread supply and the needles.

The casing 10, as best seen in Figure 3, is hollow throughout the major portion of its length, to provide a longitudinal bore 13, and is provided adjacent the lower end of the bore 13 with a slot 12 which communicates with the hollow interior of the casing. The slot 12 extends inwardly and downwardly through approximately one-half the thickness of the casing, and thence vertically downward for an additional distance. The horizontal surface 14 formed by the material of the casing at the lower end of the bore 13 serves as a support for the thread 9 which enters and leaves the casing through the respective end portions of the slot 12. Preferably, the surface 14 is provided with a groove 14' which is inclined downwardly toward the entrance end of the slot 12, since the thread 9 is usually fed from below. The lower wall of the entering end of the slot 12 may be similarly inclined downwardly as illustrated in Figures 3 and 4, to promote smooth passage of the thread therethrough. The casing is provided with a vertical slot 15 in line with the vertical portion of the exit end of the slot 12, for a purpose hereinafter explained. The slot 12, together with the surface 14, constitutes the thread passage referred to in the appended claims.

A clamp member 16, slidably mounted in the bore 13 of the casing is adapted to cooperate with the thread supporting surface 14 in applying a clamping or gripping force to the thread 9 when the clamp member 16 is in the position seen in Figure 3. The clamp member 16 is constantly urged downwardly in the casing by a spring 17, which is under compression between the clamp member 16 and a washer 18, which is slidable in the bore 13. The position of the washer 18, and thus the pressure or tension of the spring 17, may be adjusted by means of an adjusting screw 19 which extends through a cap 20 and into engagement with the upper surface of the washer 18. The cap 20 has a threaded engagement with the casing 10 and serves as a closure therefor. The position of the adjusting screw 19 may be fixed, after suitable adjustment, by means of a lock nut 21.

The clamp member 16 is slotted to receive a take-up lever 22, which is pivoted thereto by means of a pin 23, and extends outwardly through the slot 15. The take-up lever 22 is

provided at its distal end with the usual thread eye 24, and is normally maintained in the position illustrated in Figure 1 by means of a light spring 25, the lower end of which engages an aperture 26 in the take-up lever and the upper end of which is connected to a hook member 27 secured in any suitable manner to the cap 20. When in lowered position the lever 22 is adapted to fulcrum on the shoulder 28 of the casing 10, at the lower end of the slot 15, and thus it will be apparent that when the lever 22 assumes the position illustrated in Figure 4, the clamp member 16 is raised, against the tension of the spring 17, so as to release the thread and permit its easy passage through the slot 12 and over the surface 14. The clamp member 16 may thus be raised sufficiently to permit smooth passage of obstructions such as the small knots customarily employed for joining threads or yarns.

In operation, the tension of the spring 17 is adjusted to a suitable value so as to permit the passage of the thread 9 under the desired tension, the take-up lever 22 serving its conventional function of intermittently taking up the slack in the thread caused by the movements of the corresponding needle. It will be apparent that whenever the take-up lever 22 is in the raised position illustrated in Figure 1, the thread will be rather tightly gripped between the clamp member 16 and the surface 14, thus maintaining the thread between the control device and the needle under the proper tension. When additional tension is applied to the thread by reason of the movement of the corresponding needle, the take-up lever 22 is partially depressed, the requisite tension on the thread being maintained by virtue of the gripping action of the clamp member 16 under the pressure of the spring 17. However, the lower the position of the lever 22, the less force is exerted on the thread by the clamp member 16, since by virtue of the arrangement employed, the spring 25 acts against the spring 17, tending to rotate the lever 22 clockwise about its distal end, which is held down by the tension of the thread. Thus, the greater the tension of the thread, the less the gripping action of the device. When an obstruction is encountered, so that the tension on the thread increases sufficiently to cause the take-up lever to assume the position illustrated in Figure 4, the clamp member 16 is raised against the pressure of the spring 17 to such an extent that the obstruction may pass without hindrance between the member 16 and the surface 14. The tension returning to normal after the obstruction has passed the thread control device, the take-up lever 22 then resumes its normal operating position.

In practice, the thread control device of the present invention has been found to possess advantages in comparison with the best commercial devices heretofore employed for the like purpose. As compared with such prior devices, the mechanism of the present invention operates more smoothly and feeds the thread or yarn with greater uniformity, with corresponding improvement of the finished product.

A further advantage of the present invention lies in the fact that the tension spring 17 may be readily adjusted by means of the screw 19. In the devices heretofore employed, no adjustment was possible except by changing the point of connection between the corresponding spring and the movable member which it controlled. Thus in such prior devices there has been a limitation not only on the convenience of adjusting the tension, but upon the number of adjustments available, whereas in the present device, adjustment of the spring 17 may be effected readily and in any desired degree.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a thread control device for knitting machines, a thread support adapted to be mounted on said machine and having a thread passage therethrough, a movable clamp member associated with said support and adapted to cooperate with a surface of said passage to apply a clamping force to the thread in said passage, spring means acting on said clamp member for applying said force, a take-up lever pivoted to said clamp member and having a thread eye at the distal end thereof, means on said support acting as a fulcrum for said lever, and spring means acting on said lever to oppose the action of said first spring means as the tension of the thread increases, whereby said clamp member acts to grip said thread when the latter is under slight tension and is moved to release said thread as the tension thereof increases.

2. In a thread control device for knitting machines, a thread support adapted to be mounted on said machine and comprising a slotted tubular casing having a thread passage therethrough, a clamp member slidably mounted within said casing and adapted to cooperate with a surface of said passage to apply a clamping force to the thread in said passage, spring means confined in said casing and adapted to act on said clamp member for applying said force, a take-up lever extending through said slot in said casing and pivotally connected to said clamp member, said lever having a thread eye at the distal end thereof, said lever being adapted to fulcrum on an end wall of said slot, and spring means acting on said lever to oppose the action of said first spring means as the tension of the thread increases, whereby said clamp member acts to grip said thread when the latter is under slight tension and is moved to release said thread as the tension thereof increases.

3. In a device according to claim 1, means for adjusting the tension of said first spring means.

4. In a device according to claim 2, means for adjusting the tension of said first spring means, said adjusting means comprising a washer slidable within said casing and in engagement with said spring at the end opposite said clamp member, and means having threaded engagement with said casing and abutting engagement with said washer for adjusting the latter toward and away from said clamp member.

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