CLAMP AND GUIDE FOR ELASTIC THREAD

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The present invention relates to novel and improved means for holding the elastic thread, as for instance in the form of series of elastic threads carried on a multi-needle sewing machine adapted for making a shirred fabric web by feeding such elastics under tension onto said web which is running through the machine and causing such elastics to become secured to said web by the stitching effected by the needles.

In one type machine of the character mentioned, the elastics are vibrated across the web at needle zone where-by the needle stitching straddles the elastics respectively. This invention is specially adaptable for such type of machine and is equally applicable in other machines for doing this kind of work.

The principal object of the present invention is to provide a novel and improved means for holding the elastic threads at needle zone, affording clamping action and convenience for mounting such elastics in the initial set up of the machine, or to reset any of the elastics if they should break, or if any of them need be replenished, and further such means shall act as a constant guide for such elastics as they are drawn towards the needles. Also, in machines where the elastics are to be oscillated, it is the means of this invention which is given suitable movement to accomplish the required vibration of the elastics at needle zone. Summed up, it is evident that the present invention serves to provide an initial clamp and constant guide for the elastic threads.

Another object of this invention is to provide a novel and improved initial clamp and constant guide device of the character set forth, which is low in cost, simple in construction, adapted for existing machines and which is efficient in carrying out the functions for which it is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

For the practice of this invention, there is of course a multi-needle sewing machine having a presser foot plate and a series of elastic threads being fed over the taut running fabric web. These elastics issue from supply spools, enter individual tension devices which lie in a line spaced and across the web. I provide a bar across the fabric, substantially near the surface of the web on which the elastics are laid. The elastics pass through and lie in channels or grooves in the surface of such bar respectively, and thence pass under the presser foot to be engaged by the stitching effected by the needles. It is imperative that the width of each of said channels or grooves shall be less than the diameter of the elastic thread through it. Thus the elastics when laid into such grooves become clamped therein. This provides for easy setting up of the machine initially so that the elastics are spanned between said bar and the respective tension devices aforesaid. The stated initial clamping action also affords ease in resetting an elastic if it becomes broken or if its supply need be replenished. Although such clamping action need be sufficient to initially hold the end region of an elastic it yet need be loose enough to permit the elastic to be drawn therethrough when the machine operates. Said channels or grooves, as is evident, serve as constant guides for the elastics. In the embodiment shown, the machine employed is of the type where the elastics need be vibrated at needle zone. Hence, in such instance, the bar mentioned which I provide, is adapted for longitudinal reciprocatory movement.

In the accompanying drawings forming part of this specification, similar characters of reference indicate corresponding parts in all the views.

Fig. 1 is a fragmentary perspective view of a multi-needle sewing machine of the class mentioned, embodying the teachings of this invention.

Fig. 2 is an enlarged fragment of the showing in Fig. 1.

Fig. 3 is a fragmentary perspective view of the bar serving as the initial clamp and constant guide, shown partly in section in order to show the structure of the channels or grooves therein.

Fig. 4 is similar to Fig. 3, but of a slightly modified form.

Fig. 5 is an enlarged section taken at lines 5—5 in Fig. 3.

Figure 6 is a top view of the clamp and guide bar with the elastic thread received therein.

In the drawings, the numeral 15 designates generally one type of multi-needle sewing machine for making a shirred fabric web. The numeral 16 indicates the needle bar of this machine and its presser foot plate is denoted by the numeral 17. The fabric web 18 passes in taut condition through the machine from off a roll 19. A series of elastic threads 20, fed from spools not shown, are spanned over and along the web 18, between the guide bar 21 and the individual tension devices 22 which are on the cross bar 23. Such tension devices may be of the type used in the machine shown in Patent No. 2,525,312 issued to Prazak et al., on October 10, 1950. The needle bar from which depends the series of needles 16', is adapted for its required vertical reciprocatory movement.

The presser foot plate 17 is adapted to be raised or lowered as need be. The guide bar 21 with which this invention is specifically concerned, is associated with mechanism not shown but well known in this art, to give said bar longitudinal reciprocatory movement in such timed relation to needle movement that the stitching effected by the needles shall straddle the elastics 20 respectively and thus secure them onto the fabric web 18. Said patent to Prazak et al., also shows an example of bar-reciprocating mechanism. The spanned elastics 20 are in constant tension between the last needle stitches holding them on the web and the tension devices 22. Such is the general scheme of this machine.

To initially set up the elastics, or to reset a broken elastic or one that needs to be replenished from a new spool, has been a big problem with this machine. Various mounting devices have been attempted on the reciprocating guide bar 21 or on an auxiliary station near it. But they are of cumbersome and expensive construction and not very convenient for “threading” of the elastic threads 20. I have therefore devised simple means for such mounting of the elastic threads by having the guide bar 21 serve not only as the constant guide and carriage for the elastics, but also to serve as the initial clamping means therefor. To do this, the elastics 20 set in and slide through constraining channels or grooves in the top surface of said bar 21, which grooves are indicated at 21’ and are shown of slightly modified form at 21”. The grooves or channels 21’ are really notches across the entire top surface of said guide bar. The grooves or channels 21” are across the entire top surface of said guide bar. It is mandatory however that the width of such grooves be narrower than the
thickness of the elastics 20 respectively and of such dimension to sufficiently clamp an elastic thread to hold it and yet permit its movement when drawn therethrough when the machine operates. This permits easy mounting of an elastic thread end portion to set up the machine or rethread a broken or new elastic 20, by merely stretching such end portion of the elastic dealt with, laying it into its groove or channel and let go, whereupon it will be clamped on the guide bar 21. The free end of such elastic is of course laid under the presser foot plate 17.

The elastics are run through the machine after their tension is adjusted to a predetermined amount, in which condition their reduced size will permit them to run practically free through the guiding channels. However, the width of such channels shall be sufficient to hold an elastic end when stressed to a degree which is less than the “running” tension.

The predetermined amount of the “running” tension depends upon the amount of stretch the finished product is to have. If for instance the stretched length is to be substantially double the unstretched length, then in setting up the machine, each elastic thread 20 is initially set as follows. The thread’s tension device 22 is loosened and the thread is manually pulled therethrough to lie in untensed condition on the fabric web 20, a distance which is substantially half the span between said tension device and the plane of the needles. Then said tension device is tightened and the free end of said thread which is midway of the span distance, is pulled to stretch a bit beyond the bar 21 and set into the notch 21′ in its line wherein it becomes clamped. After all the threads are dealt with as mentioned and of course all are held clamped in the respective notches in the bar 21, their free ends are then set under the presser foot 17 and the machine is ready to do its work.

This invention is capable of numerous forms and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiments herein shall be deemed illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claims rather than to the specific description herein to indicate the scope of this invention.

I claim:

1. In a sewing machine for laying on and securing a tension-stressed running elastic thread onto a running web, a portion of which thread is stressed in tension a predetermined amount between the last stitch of the needle securing same to the web and a section of the machine spaced from the needle of said machine and having a member across tensed portion of the thread adjacent the needle, said member being reciprocable in a direction across the web and positioned adjacent the needle; said member providing guide means for holding the thread to run therethrough while being vibrated by movement of said member, the improvement being that the guide means is afforded by an open channel transverse of said member in the direction of movement of the web; the width of such channel being a diameter of the thread therethrough when said thread is stressed in tension less than said predetermined amount, whereby a loose end of such thread is engageable in said channel when the thread end is placed therein in a stressed condition and let free; said channel width being such that the thread can run free therethrough without appreciable restraint when the thread is stressed said predetermined amount.

2. The apparatus as defined in claim 1, wherein said member is between the thread and the web and wherein the channel is so located on said member that the thread is laid into such channel through the lengthwise opening of such channel, by movement in a direction towards the web.

3. The apparatus as defined in claim 1, wherein the channel is a notch in said member.

4. In a multi-needle sewing machine for laying on and securing a plurality of tension-stressed running elastic threads onto a taut running web, a portion of each of which threads is stressed in tension a predetermined amount between the last stitch of the needle securing same to the web and a section of the machine spaced from the needles of the machine and having a longitudinally reciprocable bar across said tensed portions of the threads adjacent the needles; said bar providing guide means for holding the threads to run therethrough while being vibrated by movement of said bar, the improvement being that said guide means is afforded by a series of spaced open channels transversely of said bar; the width of each channel being a diameter of the thread therethrough when said thread is stressed in tension less than said predetermined amount, whereby a loose end of such thread is engageable in said channel when said thread end is placed therein in a stressed condition and let free; said channel width being such that the thread can run free therethrough without appreciable restraint when the thread is stressed said predetermined amount.

5. The apparatus as defined in claim 4, wherein the bar is between the threads and the web and wherein the channels are so located on the bar that the threads are laid into such channels through the lengthwise openings of said channels, by movement in a direction towards the web.

6. The apparatus as defined in claim 4, wherein each channel is a notch in the bar.

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