

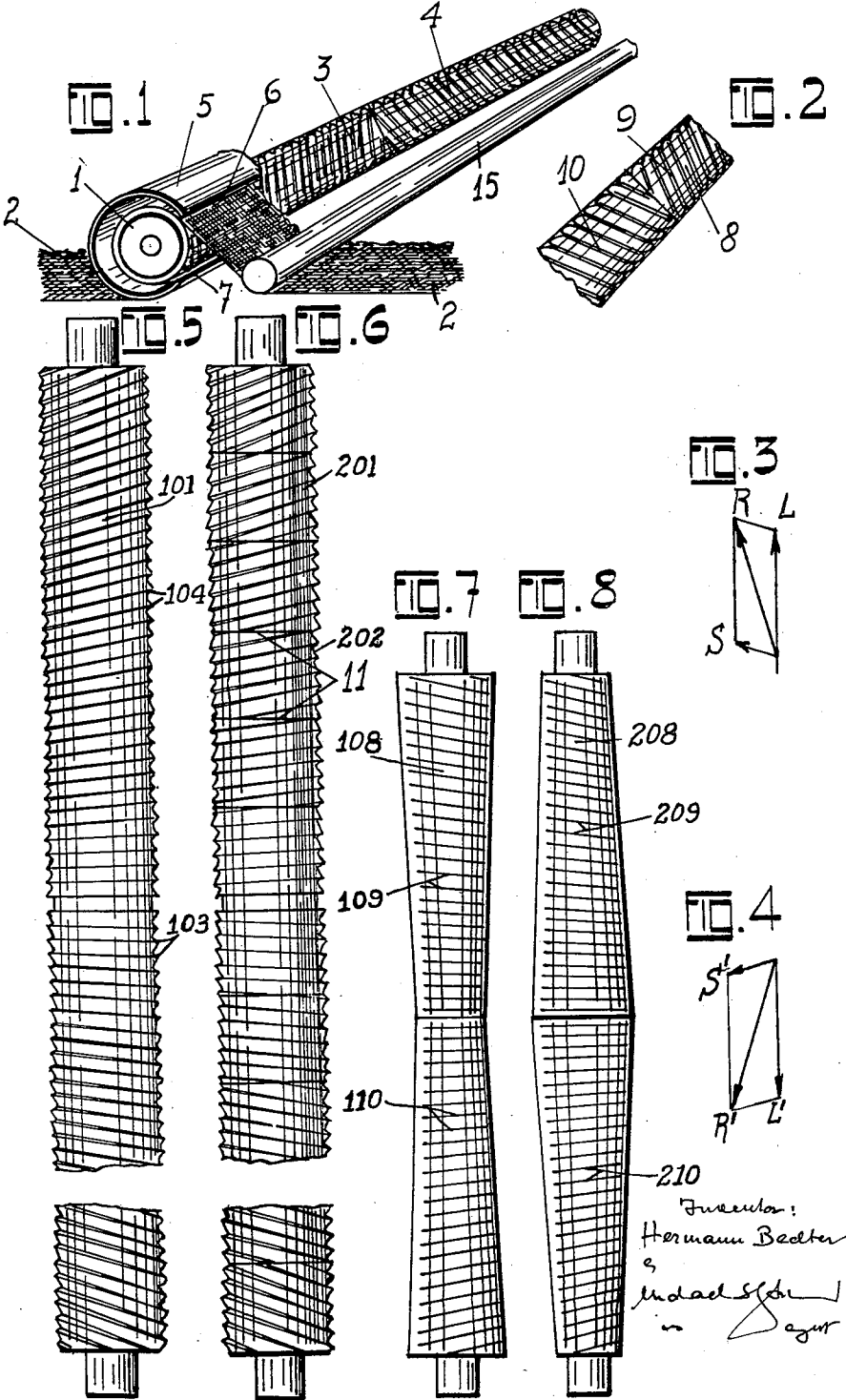
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MEANS FOR STRETCHING THE CLOTH
WEB IN WEFT DIRECTION IN LOOMS

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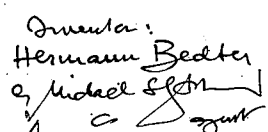
2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2



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MEANS FOR STRETCHING THE CLOTH WEB
IN WEFT DIRECTION IN LOOMS

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5 Claims. (Cl. 139—291)

1

This invention relates to stretcher roller mechanisms for looms.

A cloth web travelling through a loom has a tendency to contract in the direction of its weft, i. e. transversely to the direction of travel, between the position where the weft is picked in the warp and the cloth beam. It has been attempted to overcome this contraction by passing the cloth web over a smooth cylindrical stretcher roller directly after the weft has been picked, but the improvement obtained by this means has been very slight.

It is an object of this invention to provide an improved stretcher roller mechanism which will prevent any such contraction.

According to the present invention, in a stretcher roller mechanism for looms, the stretcher roller is formed on its surface with right- and left-hand threads or helical grooves extending from the centre to opposite ends thereof, such that a moving web passing partially around the roller is tensioned transversely of its direction of movement. In one form of the invention, the movement of the cloth web rotates the roller and the two threads or grooves are so formed that they converge in the direction of rotation. According to a modified form, however, the roller is fixed and the threads or grooves diverge in the direction of movement of the cloth web.

Preferably, means are associated with the stretcher roller for tensioning the cloth web in its direction of travel as it passes around the roller.

In order that the invention may be more readily understood, reference will be made to the accompanying drawings, which illustrate various constructional examples thereof and wherein:

Fig. 1 is a perspective view of one embodiment with a rotating stretcher roller,

Fig. 2 is a view of a portion of a stretcher roller,

Figs. 3 and 4 show component diagrams, which result from the cooperation of the cloth web with the stretcher roller,

Figs. 5 to 8 illustrate further constructional forms of the stretcher roller,

Fig. 9 is a side elevation of a tensioning means for the stretcher roller,

Fig. 10 is a plan view thereof,

Fig. 11 is a side elevation of a modified form of stretcher roller tensioning means,

Fig. 12 is a plan view of yet another form of tensioning means,

Fig. 13 is an elevation of Fig. 12, and

Fig. 14 is a plan view of a modified form of the stretcher roller mechanism shown in Figs. 12 and 13.

2

Referring now to the construction illustrated by way of example in Fig. 1, a rotatably mounted stretcher roller 1 is driven by the passage of the cloth web 2 thereover and thus rotates at the same peripheral speed as that at which the cloth travels. The stretcher roller 1 is formed on its surface with right- and left-hand threads or helical grooves 3 and 4, respectively, extending from the centre to opposite ends thereof and arranged so that they converge in the direction of rotation of the roller, i. e. in the direction of travel of the cloth web 2. In order not to damage the cloth, which passes over the stretcher roller 1 under tension, the vertices of the thread profile are rounded off. The nature of this rounding off depends upon the material being made, since there are some materials which require stretcher rollers having sharp-edged threads or grooves.

As the cloth web 1 rotates the stretcher roller 2 by passing around it, an "unwinding" action takes place, so that each thread on its own side of the centre of the roller exerts a force on the cloth web 2 in the direction S, i. e. towards the outer edge of the fabric, as will be apparent from the diagram shown in Fig. 3. This component S provides, in conjunction with the tensile stress produced in the direction of travel L, a resultant R by which the separate parts of the cloth web 2 are forced outwards obliquely from the centre line of the latter. In this way, the cloth web 2 is tensioned transversely of its direction of travel, i. e. in the direction of the weft.

As illustrated by way of example in Fig. 2, there is provided a stretcher element 8 on which there is formed a right-hand thread 9 and a left-hand thread 10, both of which also start from the centre of the element. However, these threads run in opposite directions as compared with the arrangement previously described, i. e. they diverge or travel outwardly from each other at the centre in the direction of travel of the material. The component diagram relating to this example is shown in Fig. 4 and produces the following effect: If the element 8 stands still and the cloth web slides over it each thread or groove exerts a force on the web in the direction S'. The resistance produced by this sliding of the web over the element is indicated as a component L'. The combination of these two components S' and L' yields a resultant R' which produces a tensioning effect in the direction of the two ends of the element. As such resultants R' act towards both sides from the centre of the element, the cloth web is tensioned transversely of its direction of travel, i. e. in the direction of the weft.

In order that the stretcher element 8 may

have this effect on the material, the latter must be under tension on the roller or element, i. e., it must exert a certain compression thereon. This is brought about by tensioning the cloth web in the direction of its length, for example, by arranging the roller in a slotted cylinder 5 which partially surrounds it as shown in Fig. 1 and as will be more fully described hereinafter with reference to Figs. 9 and 10.

It has been shown that a stretcher roller with right- and left-hand threads or grooves produce a stretching of the fabric in the direction of the weft. In order that this stretching may take effect uniformly over the entire width of the cloth web, it has been found advantageous to give these threads or grooves a progressive pitch. In this way, the cloth on the centre portion of the stretcher roller is stretched a certain amount, while the cloth towards the two ends of the roller is stretched to a greater degree in proportion to the progressive pitch of the threads.

An example of this form of the invention is illustrated in Fig. 5, in which the stretcher roller 101 is formed with helical grooves 103, 104 which constantly increase in pitch from the centre of the roller towards its ends. The stretching thus takes place in accordance with the formula

$$\text{tg} = \frac{dy}{dx}$$

where y represents the pitch height of the helix and x the roller periphery.

The mechanical production of such rollers with constantly increasing pitch height of the helical grooves necessitates special mechanical devices, but, as shown in Fig. 6, the same result may be achieved by dividing the roller 201 into sectors 11 extending from the centre towards both ends and providing each sector with a thread or groove such as 202 of constant pitch, these pitches, however, increasing step-by-step from sector to sector towards the two ends, seen from the centre of the roller.

Fig. 7 shows a further form of the stretcher element 108 which increases in diameter from the centre towards its ends and has helical grooves 109 and 110 which constantly increase in pitch formed on the surface thereof.

Fig. 8 shows a stretcher element 208 which also extends conically from the centre towards its ends, but in this case the element decreases in diameter from the centre. It has been found in practice that this stretcher element, owing to the constantly increasing pitch of the grooves, exerts the same stretching action on the cloth web as the examples previously described.

In Figs. 7 and 8, the thread-like grooves 109, 209 and 110, 210 are only diagrammatically indicated.

Obviously, the directions of the threads or grooves on the stretcher rollers or elements according to Figs. 5 to 8 can be interchanged according to whether the roller is rotated by the cloth web or whether the element stands still and the cloth web runs over it.

With heavy fabrics, for example, woollen clothing materials, the beat of the slay is so strong that it is able to overcome the pull exerted by the cloth beam, so that the material is no longer under tension on the periphery of the stretcher roller 1 or element 8. In this case, the component effect of the threads or grooves on the roller or element is also lost, and it is

necessary to provide a supplementary tensioning means.

Examples of how such tensioning means may be arranged are illustrated in Figs. 9 to 14 and will now be described.

The tensioning means in accordance with Figs. 9 and 10 is illustrated as applied to the arrangement shown in Fig. 1. The stretcher roller 1 is arranged within a cylindrical member 5 formed with a longitudinal slot, the edges of which are indicated by the reference numerals 6 and 7. The cloth web 2 coming from the slay arrives at the edge 6 of the cylinder 5 and is pressed by the latter on to the stretcher roller 1, travels around the roller for the greatest part of its periphery and leaves the cylinder 5 by passing over the edge 7 (see Figs. 1 and 9) to travel to the left towards the cloth beam on which it is to be wound. In order that with heavy beating of the slay, the cloth web is not loose within the cylinder 5 and consequently not loose on the stretcher roller 1, the latter must be drawn by spring action towards the direction of winding of the cloth web. This is effected by a helical spring 12, the pre-tension of which may be regulated by means of a lever 14 adjustable by a set screw 13. 15 is a guide roller for guiding the cloth web towards the edge 6 of the cylinder 5.

The further example represented in Fig. 11 for the tensioning of the cloth web running over the stretcher roller comprises an angle iron 16 extending parallel to the latter and having a flange edge 17 over which the cloth web to be tensioned is guided. The stretcher roller 301 is drawn towards the angle section 16 by a spring 18, so that in proportion to the increase or decrease of the angle formed by the cloth web at the flange edge 17 and according to the amount of the stretcher roller periphery contacted by the cloth, the tension of the latter will be decreased or increased. In this regulating action, the stretcher roller carries out a substantially rectilinear movement. The spring 18 is connected to a pointer 20 cooperating with a scale 19 so as to allow the operator to read the tensioning of the spring 18.

The example represented in Figs. 12 and 13 shows two guide rollers 21 and 22 arranged on both sides of, and below, the stretcher roller 40', said rollers serving to lead the cloth web upwardly on to the stretcher roller and then downwardly again from the latter. The guide rollers 21 and 22 are mounted in horizontal slots 29 so that by displacement of these rollers in the slots, the tension of the cloth web may be varied. Set screws 30 are used for fixing the guide rollers in the slots.

In order to supplement the stretching action of the stretcher roller in the direction of the weft, one of these guide rollers, may be formed with thread grooves 23. As the supports of the guide rollers are fixed in a certain position, the thread grooves have only to extend around the periphery thereof for the distance that they are contacted by the cloth web.

The tensioning of the cloth web takes place as follows: Between the guide rollers 21, 22, which are fixed in a pair of supports 25, the stretcher roller is mounted in slots 26 and its spindle end 27 is urged upwardly under the action of a spring 28. Due to the influence of this spring 28, the cloth web 2 is always stretched between the guide rollers and is thus kept under tension.

5

In Fig. 14, both of the guide rollers 21' and 22', are provided with thread grooves 23' and 24'. Otherwise this embodiment is designed exactly like that shown in Figs. 12 and 13.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a loom, in combination, a stretcher roller arranged in the path of the woven fabric, oppositely arranged right- and left-hand threads arranged on said stretcher roller and extending from the center of said stretcher roller to the opposite ends thereof, each of said threads having a pitch increasing from the center of said stretcher roller towards the ends thereof; slotted supports arranged at the end of said stretcher roller, respectively, and engaged by said stretcher roller; resilient means arranged for cooperation with said stretcher roller for displacing same in the slots of said supports in order to adjust the tension of the fabric; a guide arranged parallel to said stretcher roller; and grooves on at least part of the circumference of said guide.

2. In a loom, in combination, a stretcher roller arranged in the path of the woven fabric, oppositely arranged right- and left-hand threads arranged on said stretcher roller and extending from the center of said stretcher roller to the opposite ends thereof, each of said threads having a pitch increasing from the center of said stretcher roller towards the ends thereof; a guide arranged parallel to said stretcher roller; grooves on at least part of the circumference of said guide, means for changing the distance apart of said stretcher roller and said guide; and means for holding said guide in position.

3. In a loom, in combination, a stretcher roller arranged in the path of the woven fabric, oppositely arranged right- and left-hand threads arranged on said stretcher roller and extending from the center of said stretcher roller to the opposite ends thereof, each of said threads having a pitch increasing from the center of said stretcher roller towards the ends thereof; slotted supports arranged at the end of said stretcher roller, respectively, and engaged by said stretcher roller; resilient means arranged for cooperation with said stretcher roller for displacing same in the slots of said supports in order to adjust the tension of the fabric; one or more guides arranged parallel to said stretcher roller; grooves on at least part of the circumference of said guide; means for changing the distance apart of said stretcher roller and said guide; and means for holding said guide in position.

4. In a loom, in combination, a stretcher roller arranged in the path of the woven fabric before the same is wound up on it on a take-up beam; said stretcher roller having a diameter increas-

6

ing from the center towards the end of said roller; oppositely arranged right- and left-hand threads arranged on said stretcher roller and extending from the center of said stretcher roller to the opposite ends thereof, each of said threads having a pitch increasing from the center of said stretcher roller towards the ends thereof; a cylindrical member arranged to surround said stretcher roller and having a longitudinal slot; and resilient means arranged to exert a force on said stretcher roller for assisting the stretching of the cloth.

5. In a loom, in combination, a stretcher roller arranged in the path of the woven fabric before the same is wound up on it on a take-up beam; said stretcher roller having a diameter decreasing from the center towards the end of said roller; oppositely arranged right- and left-hand threads arranged on said stretcher roller and extending from the center of said stretcher roller to the opposite ends thereof, each of said threads having a pitch increasing from the center of said stretcher roller towards the ends thereof; a cylindrical member arranged to surround said stretcher roller and having a longitudinal slot; and resilient means arranged to exert a force on said stretcher roller for assisting the stretching of the cloth.

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