No. 613,475. Patented Nov. 1, 1898.

F. H. RICHARDS.

THREAD CONTROLLING ATTACHMENT FOR SEWING MACHINES.

(Application filed Feb. 3, 1898.)

(No Model.)

Fig. 1.

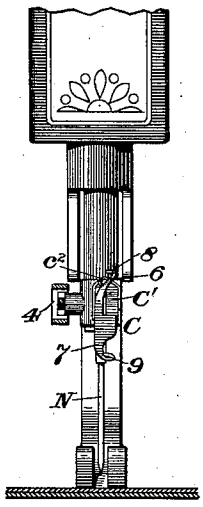


Fig. 2.

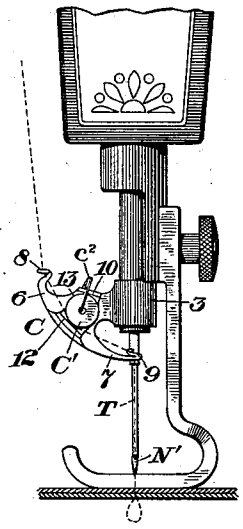


Fig. 3.

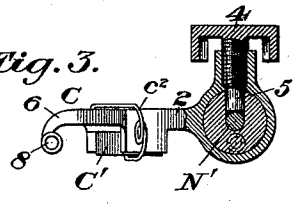


Fig. 5.

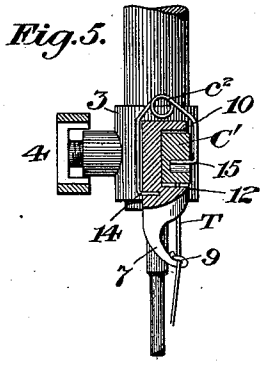
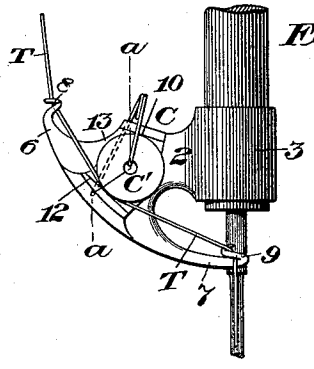


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

THREAD-CONTROLLING ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 613,475, dated November 1, 1898.

Application filed February 3, 1898. Serial No. 669,008. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Thread-Controlling Attachments for Sewing-Machines, of which the following is a specification.

This invention in sewing-machines relates more particularly to a thread-controlling attachment of the genus described in my contemporaneously-pending application, Serial No. 675,335, filed March 26, 1898, to which reference may be had.

The object of my present invention is to provide a simple and efficient thread-controlling device which may be readily attached to or removed from the needle-bar of a sewing-machine and which will not only constitute a guide for, but will also automatically clamp, the needle-thread at a point in close proximity to the needle and positively hold that portion of the needle-thread located below the eye of the needle against retractive or backward movement without retarding or obstructing the advancing movement of said thread.

A further object of my present invention is to provide, in connection with the needle-bar of a sewing-machine, a controlling device comprising a bracket having two remote thread-guides and also having intermediate of said guides two opposing wedge-faces, one of which constitutes a bed for supporting the thread, and a thread-clamping roll supported between the wedge-faces and adapted for rotative movement and also for movement toward and away from the apex of the plane of the wedge-faces.

In the drawings accompanying and forming part of this specification, Figure 1 is a front view of the lower part of the head of a sewing-machine, together with the presser-bar, needle-bar, and needle, with the improved thread-controlling attachment removably secured to the lower end of said needle-bar. Fig. 2 is a side view of the parts shown in Fig. 1 as seen from the right in said figure. Fig. 3 is a plan view, on a relatively large scale, of the thread-controlling attachment in connection with the needle-bar, said needle-bar being shown in cross-section. Fig. 4 is a side view similar to Fig. 2, on a relatively large scale, of the thread-controlling attachment, a portion only of the needle-bar and needle being shown; and Fig. 5 is a vertical cross-sectional view taken in dotted line *a a*, Fig. 4, showing the parts at the right-hand of said line.

Similar characters designate like parts in all the figures of the drawings.

In the accompanying drawings only so much of a sewing-machine is shown as is considered necessary to illustrate the construction, application, and mode of operation of my present improvements, and it will be understood that the thread-controlling attachment which constitutes the subject-matter of my present invention is applicable in various ways to different kinds of sewing-machines. It is, however, more especially adapted for that class of sewing-machines in which it is necessary to form a loop from the needle-thread for the looper or shuttle to engage and in which it is necessary to prevent "in-drawing" of said loop after the same is formed and is expanded during the first stage of the upstroke of the needle.

In sewing-machines generally, and especially in those in which the loop of the needle-thread is formed on the downstroke of the needle and is spread sidewise or distended during the first stages of the upstroke of the needle to condition the same for engagement by the looper, it has been found in practice that on the beginning of the upstroke of the needle the needle-thread, being up to this time drawn taut and under considerable tension above the needle-eye, has a tendency to draw up or retract that portion of said thread located below the needle-eye, said thread, owing to this tension, being drawn backward as soon as the downward-pulling stress of the needle-thread is released by the beginning of the upstroke of the needle, thus drawing in or reducing the size of the loop formed below the work to such an extent as to prevent its engagement by the hook of the looper, causing the stitch mechanism frequently to drop stitches and impairing the value of the work produced.

To obviate the disadvantage above recited, I have provided an improved thread-control-

ling means adapted to be secured to a needle-bar, preferably at the lower end thereof, in close proximity to the needle and consequently in close proximity to the upper side of the fabric when the needle has passed through the same and is about to begin its upstroke, and which thread-controlling means is constructed and organized to engage the needle-thread and hold the loop against retractive movement during the first stages of the upstroke of the needle and until said loop is engaged by the looper.

The thread-controlling attachment, in the preferred form thereof, (shown in Figs. 1 to 4 of the drawings,) comprises two coöperative thread-controlling members, (designated in a general way by C and C′, respectively,) one of which is in the nature of a thread guiding and supporting bracket and embodies means whereby the same may be secured to the needle-bar and the other of which is in the nature of a clamp-roll supported for rotative and transverse movement on the bracket intermediate the guides and is adapted to coöperate with said bracket for holding the needle-thread normally against retractive movement, while permitting, under a predetermined stress, a free advancing movement thereof.

The thread-controlling member or bracket C, in the preferred form thereof, (shown most clearly in Figs. 3 and 4,) comprises the main body portion 2, terminating at one end in a sleeve or hub 3, having an interiorly-threaded boss at one side thereof and which sleeve or hub is adapted to encircle the needle-bar and be movably secured thereto by any suitable fastening device, said fastening device in the present instance consisting of a set-screw 4, extending through the threaded portion of the hub, the inner end of the shank of the set-screw being preferably of reduced diameter and extending through a smooth bore 5 in the needle-bar and engaging the needle N′ and holding this in place, as well as holding the member C in place on the needle-bar.

The main body portion 2 of the bracket or member C is shown as having two oppositely-disposed arms 6 and 7, one, 6, of which projects upward and is provided at its outer end with a loop or thread guide 8, and the other, 7, of which projects downward and is provided at its outer end with a loop or thread guide 9, said thread-guide 9 being so disposed relatively to the needle N that that portion of the needle-thread T located between the eye of the needle and the last-mentioned thread-guide 9 will lie parallel to the path of movement of said needle.

Formed upon one side face of the body portion 2 of the bracket, substantially midway between the two thread-guides 8 and 9, are two opposing flanges 10 and 12, which flanges are located one above the other and have their adjacent faces inclined one relatively to the other, the space between said flanges constituting a runway 13, converging toward the outer end of the bracket or member C, as will be understood by reference to Fig. 4 of the drawings.

The other controlling member C′ is shown in the nature of a roll or disk supported between the wedge-like faces of the two flanges 10 and 12. This clamp roll or disk is supported in the runway 13 and is held in place preferably by a resilient roll-actuator, (designated in a general way by c^2,) which in the present instance is shown as a substantially U-shaped spring coiled at the bend thereof and having one end bent inwardly, as shown at 14, and seated in a recess in the body portion 2 of the bracket and having the opposite end thereof bent inwardly, as at 15, and seated in a recess formed in the outer face of the clamp-roll C′, as shown most clearly in Fig. 5.

By reference to Figs. 3 and 4 of the drawings it will be seen that the end 14 of the roll-actuator c^2 is located considerably in advance of that portion 15 of said actuator which supports the roll C′, and in practice such spring will be so formed and tempered as normally to force the roll C′ toward the contracted end of the runway in which it is seated to thereby bring the working face of said roll into coöperative relation with the bearing-face of the lower flange 12, which flange constitutes the intermediate support for the needle-thread T.

By supporting the rotative clamping member of the thread-controlling attachment between the wedge-faces of the two flanges 10 and 12 in the manner described and providing a resilient actuator for normally retaining the opposite portions of the working face of said roll in operative relation with the adjacent faces of said flanges said actuator operates, after the manner of a tension device, to create a tension between the working face of the roll and the thread supported on the thread-supporting flange, and holds said thread under more or less tension, according to the stress exerted by the roll-actuator, which tension may be varied by employing roll-actuators capable of exerting a greater or less stress upon the roll.

In threading the machine the upper or needle thread is first passed through the upper thread-guide 8, thence between the working face of the roll and the bed or supporting-flange 12, thence through the lower thread-guide 9, whence it is carried downward parallel to the axis of movement of the needle and passed through the eye of said needle.

By reference to Fig. 4 of the drawings it will be seen that the working faces of the opposing flanges 10 and 12 are so disposed to each other and to the clamp-roll that said roll bears upon the lower flange or upon the thread supported upon said flange at a point between the axis of said roll and the outer end of the bracket C and that it bears against the upper

flange at a point intermediate its axis and the axis of movement of the needle, so that when a pulling stress is exerted upon the needle-thread from below the bearing-point of the roll that portion of the needle-thread between the two thread-guides 8 and 9 will act upon the bearing-point of the roll at one side of the vertical plane of the axis of said roll and in a line intersecting the axis of movement of the needle-bar and will force said roll backward toward the needle-bar and out of close relation with the lower thread-supporting flange, the resistance of the actuator determining the tension exerted upon the thread at this point and consequently the stress required for drawing the roll backward to overcome this tension and release said needle-thread.

The stress exerted by the roll-actuator for retaining the roll in working engagement with the thread-supporting flange will in practice be slight, so as not materially to interfere with the drawing out of the needle-thread from above the controlling device during the formation of successive loops in sewing.

By reference to Figs. 3, 4, and 5 it will be seen that the roll-actuator is so constructed as to press the inner face of the roll inward against the side face of the inner wall of the runway 13, the friction of these parts retarding the rotative movement of the roll sufficiently to decrease to a considerable extent the momentum of the roll.

Having described my invention, I claim—

1. A thread-controlling attachment for a sewing-machine, comprising a bracket having a thread-guide and two oppositely-inclined flanges, and a rotary thread-clamp supported intermediate said flanges.

2. A thread-controlling attachment for a sewing-machine, comprising a bracket having two remote thread-guides and also having a wedge-like runway for a clamp-roll, and a clamp-roll supported intermediate the thread-guides in said runway and organized to clamp a thread extending through said guides between the perimeter of the roll and one face of the runway.

3. A thread-controlling attachment for a sewing-machine, comprising a bracket having a thread-support or flange; a rotary thread-clamp supported in operative relation with the thread-support and organized to hold the thread against retraction while permitting an advancing movement thereof; and an actuator in connection with said thread-clamp.

4. A thread-controlling attachment for a sewing-machine, comprising a bracket having a thread-support or flange; a rotary thread-clamp supported in operative relation with the thread-support and organized for rotative and longitudinal movement relative to said support and adapted for normally holding said thread against retraction while permitting an advancing movement thereof; and a resilient actuator in connection with said thread-clamp.

5. The combination, with the needle-bar of a sewing-machine, of two thread-controlling members, one of which is in the nature of a bracket and is fixed to the needle-bar and has two oppositely-inclined flange-faces, and the other of which is in the nature of a roll shiftably supported between and in operative relation with the flange-faces; and a resilient actuator in connection with said roll.

6. A thread-controlling attachment for a sewing-machine, comprising a bracket having a sleeve for encircling the needle-bar of a sewing-machine and also having a thread support or bed; a rotary thread-clamp supported in position on said bracket to engage the thread on its passage through said bed and operable for preventing the retraction thereof; and fastening means in connection with said sleeve and adapted for securing the bracket in position on the needle-bar.

7. The combination, with a sewing-machine needle-bar carrying a needle, of a thread-controlling attachment comprising a bracket having a hub encircling said needle-bar and also having two oppositely-extending arms each provided with a thread-guide at the outer end thereof, and a thread support or bed intermediate said thread-guide; means for securing the bracket in position on the needle-bar; a rotary thread-clamp supported for movement longitudinally of the bed and in the plane of the thread supported thereon; and a resilient actuator in operative connection with, and adapted for normally forcing, the thread-clamp into close relation with the thread-supporting bed.

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