Oct. 28, 1952 R. S. NOGLER ET AL 2,615,409

ELASTIC THREAD LAYING ATTACHMENT FOR SEWING MACHINES

Filed Nov. 17, 1950 2 SHEETS—SHEET 1

Fig. 1.

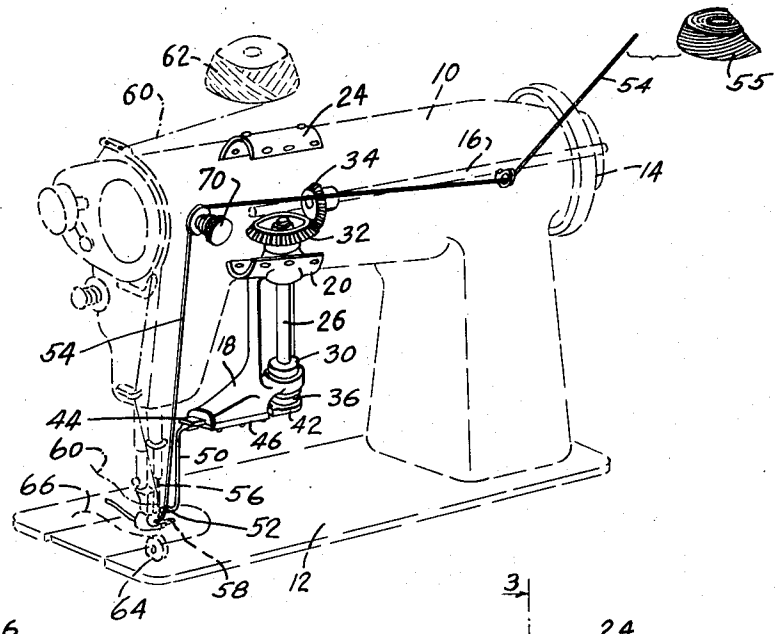


Fig. 7.

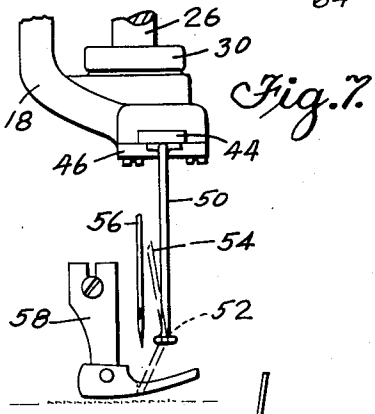


Fig. 2.

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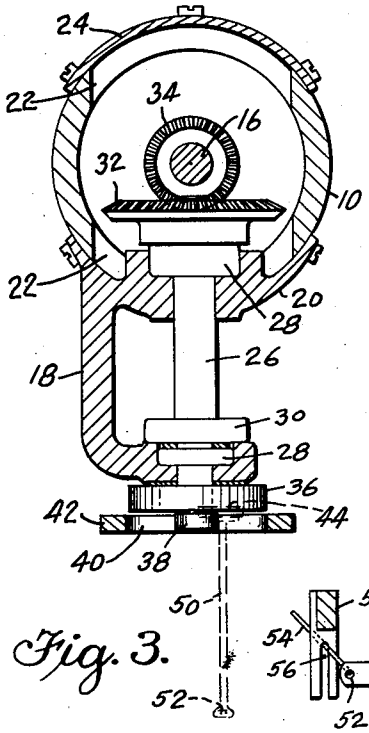


Fig. 3.

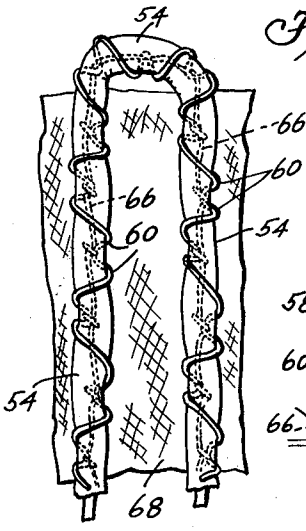


Fig. 9.

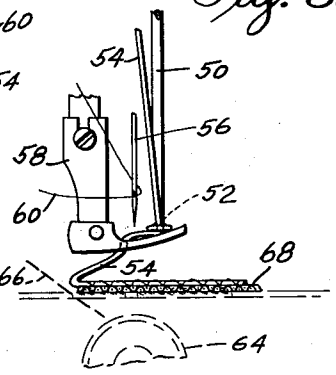


Fig. 8.

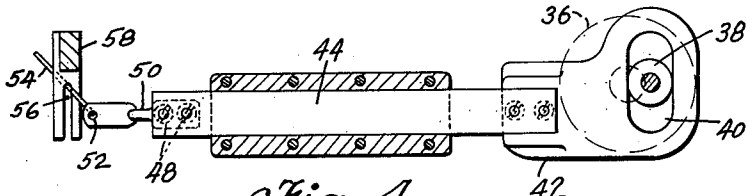


Fig. 4.

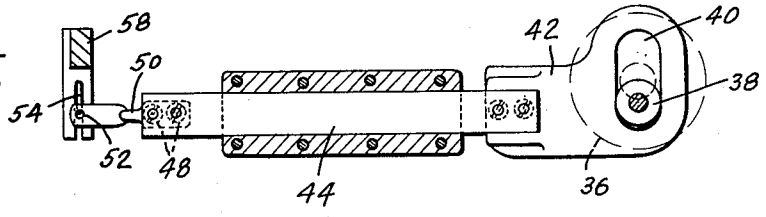


Fig. 5.

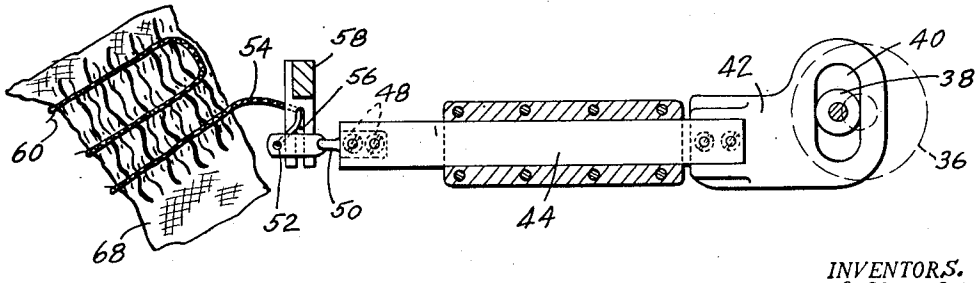


Fig. 6.

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2,615,409

ELASTIC THREAD LAYING ATTACHMENT FOR SEWING MACHINES

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Application November 17, 1950, Serial No. 196,195

9 Claims. (Cl. 112—100)

1

This invention relates to an improved elastic thread laying attachment for sewing machines and has for one of its principal objects the provision of means which can be applied to practically any commercial or industrial sewing machine on the market and which will perform a specific purpose, namely, the application of a resilient strand, cord or strip to a sheet of substantially non-resilient fabric, the resilient cord being applied under tension so that when the tension is released, the fabric will assume a shirred or puckered state and appearance.

One of the important objects of this invention is to provide an attachment for sewing machines for producing a shirred effect on fabrics, which attachment shall be compact, easily applied to practically any industrial sewing machine now on the market with little or no change or adaptation, and which will enable a much faster and more efficient production of shirred fabrics than has heretofore been considered possible.

Another and further important object of this invention resides in the provision of a shirring attachment for sewing machines which will enable the application of a practically continuous length of resilient cord to a fabric while the cord is under tension and which will further enable the convenient doubling back of the cord and the immediate resumption of a stitching operation for producing another line of such attached resilient cord without interfering with the continuity of effort, stitching or final result.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawings and following specification.

The invention, in a preferred form, is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure 1 is a perspective view of a head of a typical sewing machine showing the new shirring attachment of this invention applied thereto and in actual operation thereon.

Figure 2 is a longitudinal section of the attachment showing the same as applied to the sewing machine and illustrating the main features thereof.

Figure 3 is a vertical section taken on the line 3—3 of Figure 2 looking in the direction indicated by the arrows.

Figure 4 is a horizontal section taken on the line 4—4 of Figure 2 looking downwardly and showing the guide for the resilient strand in rearward position.

2

Figure 5 is a view similar to Figure 4, but showing the guide in middle position.

Figure 6 is a view similar to both Figures 4 and 5, but showing the guide in forward position and illustrating its relationship to the presser foot of the machine whereby the resilient cord is temporarily clamped, enabling turning of the material to be sewed for the purpose of starting another line of stitching.

Figure 7 is an end view showing particularly the guide for the resilient cord and the needle and the presser foot of the sewing machine, together with the spaced relationship between these parts in that particular position.

Figure 8 is a view similar to Figure 7 only showing the presser foot in raised position and illustrating the resilient cord clamped between its upper surface and the under face of the guide for this cord. This view corresponds to the showing in Figure 6.

Figure 9 is a plan view of a typical product of the sewing machine attachment of this invention and showing the elastic under tension.

As shown in the drawings:

The reference numeral 10 indicates generally a representative sewing machine, preferably of the type used for industrial production wherein great ruggedness and considerable speed of operation are combined. The machine is provided with the usual base plate 12 and balance wheel 14. A drive shaft 16 is connected to the balance wheel and extends longitudinally throughout the upper housing of the machine 10.

The attachment itself comprises a casting or the like 18, which is attached to the under face of the main body of the sewing machine 10 by means of an integral plate 20 or in some other manner. In order to fit the attachment into the machine an opening 22 is cut into the casing 10 and a removable cover 24 is provided for a desired finish and also for inspection or repairs.

The casting 18 may be of various sizes and shapes and may be in one or more parts, depending somewhat upon the particular machine and any special purpose for which it is used.

A drive shaft 26 is mounted in the casting 18, this being supported by suitable bearings 28 and a thrust bearing 30 is also fixed onto the shaft adjacent its lower end for the purpose of maintaining the same in desired position.

A bevel gear 32 is fixed to the upper end of the shaft and this is in mesh with a corresponding bevel gear 34 fixed on the main drive shaft 16 of the machine. The ratio between the two gears shown is two to one but this may be varied if desired or necessary.

A flat plate **36** which operates as a crank arm is affixed to the lower end of the shaft **26** and eccentrically mounted in the under face of this plate is a pin **38** which may be simply fixed in the plate or which may include a roller. This pin or roller **38** operates in a slot **40** formed in an adjacent plate **42** shaped as best shown in Figures 4, 5 and 6. The slot **40** is offset as shown so that the parts operated by the plate **42** will be similarly offset from the longitudinal center of the main drive shaft **16**.

Attached to the forward end of the plate **42** is a slide plate **44** which operates in a slot formed in the lower face of the casting **18**, and this slide plate is held in position in this slot by means of a cover plate **46** as best shown in Figure 2.

Removably attached to the forward end of the slide plate **44**, preferably by means of set screws **48**, is a guide element somewhat Z-shaped as shown in Figures 1 and 2 and indicated by the reference numeral **50**.

The upper end of this guide is adapted to be attached to the forward end of the plate **46** by means of the set screws **48** and the lower projecting end is parallel to the upper end, the whole being integral with the vertical portion **50**.

The lower projecting end has an opening **52** therein for the passage therethrough of a resilient cord or strip **54**. As best shown in Figure 8, the resilient cord guiding element **50** is offset from the sewing machine needle **56** so as to permit the regular operation of the needle by the main drive shaft **16** of the sewing machine but, at the same time, the resilient cord **54** is properly fed into a position adjacent the needle **56** during the stitching operation.

The usual pressor foot **58** is associated with both the needle **56** and the guide element **50**, the relationship between the parts being best shown in Figures 7 and 8.

A length of thread **60** is supplied from the spool **62** for the needle **56** and the resilient cord **54** is supplied from a spool **55**. These spools may be of quite a large size and can be positioned either adjacent the machine **10** or at quite a distance therefrom, the main idea being to provide a practically continuous length of both resilient cord and stitching thread whereby uninterrupted operation of the machine is made possible.

A bobbin **64** is provided beneath the base plate **12** of the machine in the usual manner and this bobbin is preliminarily loaded with a length of thread **66** which, when the machine is operated, will form a lock stitch in conjunction with the thread **60**.

The length of resilient cord **54** is adapted to be applied to a piece of fabric **68** as best shown in Figure 9, the resilient cord being under tension when stitched to the fabric by means of the threads **60** and **66**. This tension is regulated by the usual attachment **70** fitted onto the head of the machine **10** as shown in Figure 1.

In operation, the needle **56** is moved up and down through the fabric **68** in the usual manner and the presser foot is accordingly shifted for a feeding of the material. At the same time, the lower end of the guide **50** for the resilient cord is reciprocated, moving the cord from one side of the needle to the other in proper timed relationship with the speed of the needle and under feed. This movement is best illustrated in Figures 4 and 6, which represent the two extremes of position of the lower end of the guide and showing the same in relationship to the presser foot **58**.

Due to the motion, the thread **60** is applied to the resilient cord **54**, first on one side and then on the other side thereof, and at each piercing of the fabric by the needle **56**, a lock stitch is formed in conjunction with the thread **66** from the bobbin **64**, all as illustrated in Figure 9. In this manner, the resilient cord **54** is applied under a desired tension to the fabric **68** and stitch thereto at regular predetermined intervals all along the length or width of the particular fabric **68** and in a straight or curved line, as desired.

When the end or side of the fabric **68** is reached, the operator stops the machine normally and in the position shown in Figures 6 and 8. At this point, the presser foot **58** is raised and the guide **50** for the resilient cord is in its forward position, whereupon the resilient cord will be clamped between the upper face of the presser foot and the underface of the extension of the guide **50**. This enables the operator to move the fabric around through an arc of one hundred and eighty degrees for the purpose of starting a new line of stitched resilient cord. An intermediate step in this movement of the operation is shown in Figure 6.

The desired tension is obviously maintained on the resilient cord **54** by reason of the fact of its being clamped between the presser foot and the guide, while, at the same time, the operator has preliminarily provided a sufficient excess length of this cord beyond the edge of the fabric **68** to produce a suitable U-turn as shown in Figure 6. As soon as the fabric **68** is again in desired position with the next line of stitching, the operation is resumed with little or no loss of time. This does not apply solely to the repetition of lines of stitching upon one piece of fabric, but the same operation is employed when shifting from one piece of fabric to another.

Assuming that there are no accidental breaks in the resilient cord **54** or the thread **60**, the operation can be made continuous over many hours of working time, depending solely upon the size and capacity of the bobbin **64**.

It will be evident that herein is provided a shirring or puckering attachment for sewing machines which will greatly facilitate the production of a particular type of fabric besides providing a much more uniform finished construction and one which is practically free from flaws due to breakage or replacement of the thread or other material. The device is capable of withstanding top speed operation for extended periods of time and the ease of operation makes for greatly increased production and satisfied operators.

We are aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and we, therefore, do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

We claim as our invention:

1. An attachment for sewing machines for applying, under tension, a resilient thread-like member to a base fabric comprising a frame work adapted to be fitted onto the housing of a sewing machine, a vertical shaft rotatably fitted into the frame work, a gear drive connection between the said shaft and the main drive shaft of the machine, a cam plate on the lower end of the first named shaft, a slide plate in the frame-work adapted to be reciprocated by the cam plate

and a guide element for the resilient thread-like member on the end of the slide plate.

2. A device as described in claim 1, wherein the guide element has an opening in its lower end for the continuous passage therethrough of a length of said resilient thread-like material.

3. A device as described in claim 2, wherein means are provided for placing the length of resilient material, when passing through the opening, under a predetermined tension.

4. A device as described in claim 3, wherein the end of the guide element is adjacent the needle and the presser foot of the sewing machine.

5. A device as described in claim 4, wherein means are provided for reciprocating the end of the guide element laterally across the plane of movement of the needle and presser foot during the stitching operation and across the path of movement of the fabric being fed into the machine.

6. A device as described in claim 5, wherein a length of thread is supplied to the needle from above and another length of thread is supplied to the needle from a bobbin in the machine to

produce a lock stitch about the length of resilient stretched material and fasten the same to the base fabric.

7. A device as described in claim 6, wherein the ratio between the bevel gears on the driving and driven shafts is one to two.

8. A device as described in claim 7, wherein the cam plate includes a stud movable in a slot in the slide plate.

9. A device as described in claim 8, wherein the stud in the cam plate is offset with relation to the longitudinal center of the main drive shaft of the machine.

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