April 14, 1959 W. C. CREMER ET AL 2,881,724

THREAD TENSIONING DEVICE FOR A SHIRRING ATTACHMENT FOR SEWING MACHINES

Filed July 21, 1955

3 Sheets-Sheet 1

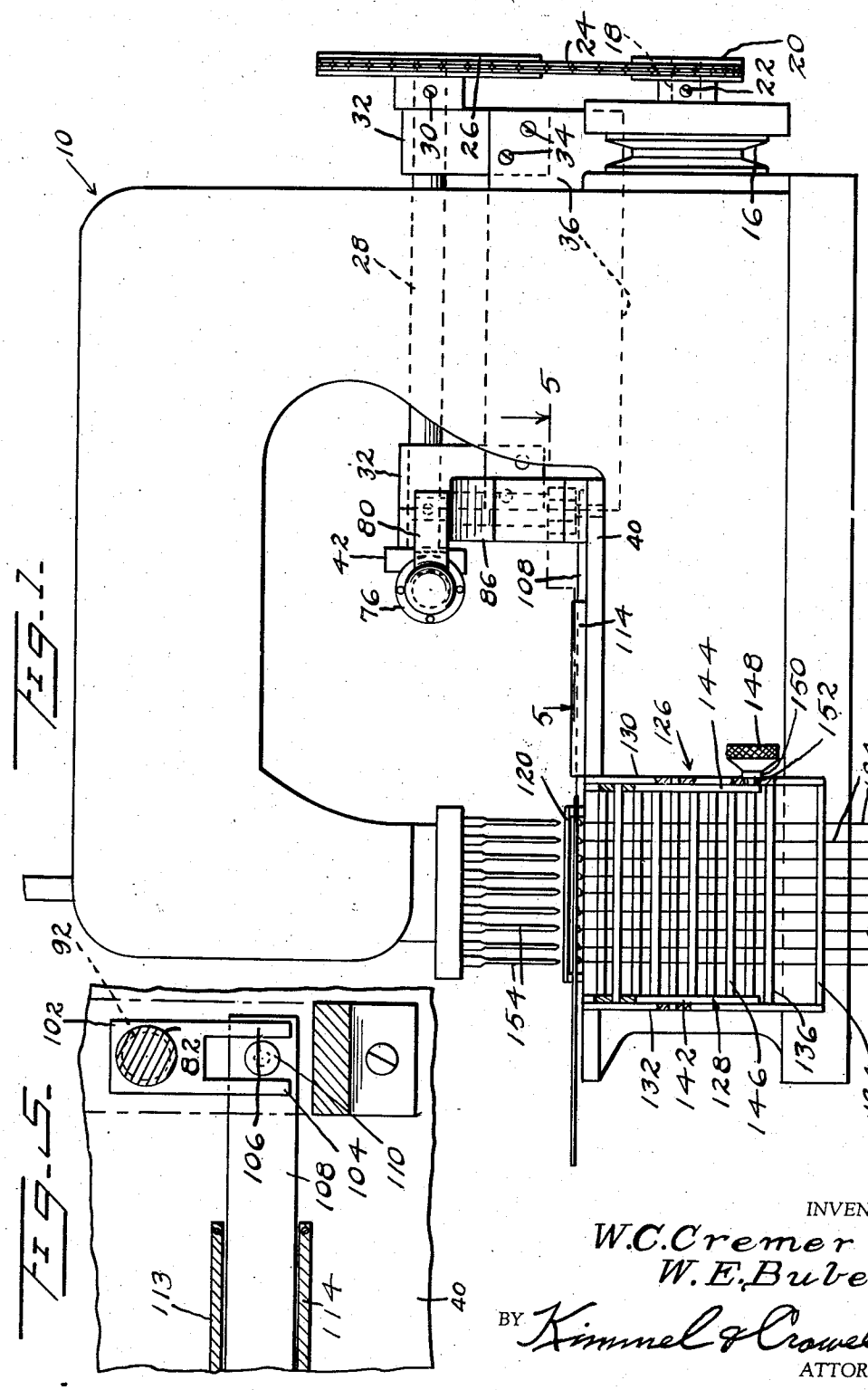


FIG. 1.

FIG. 5.

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3 Sheets-Sheet 2

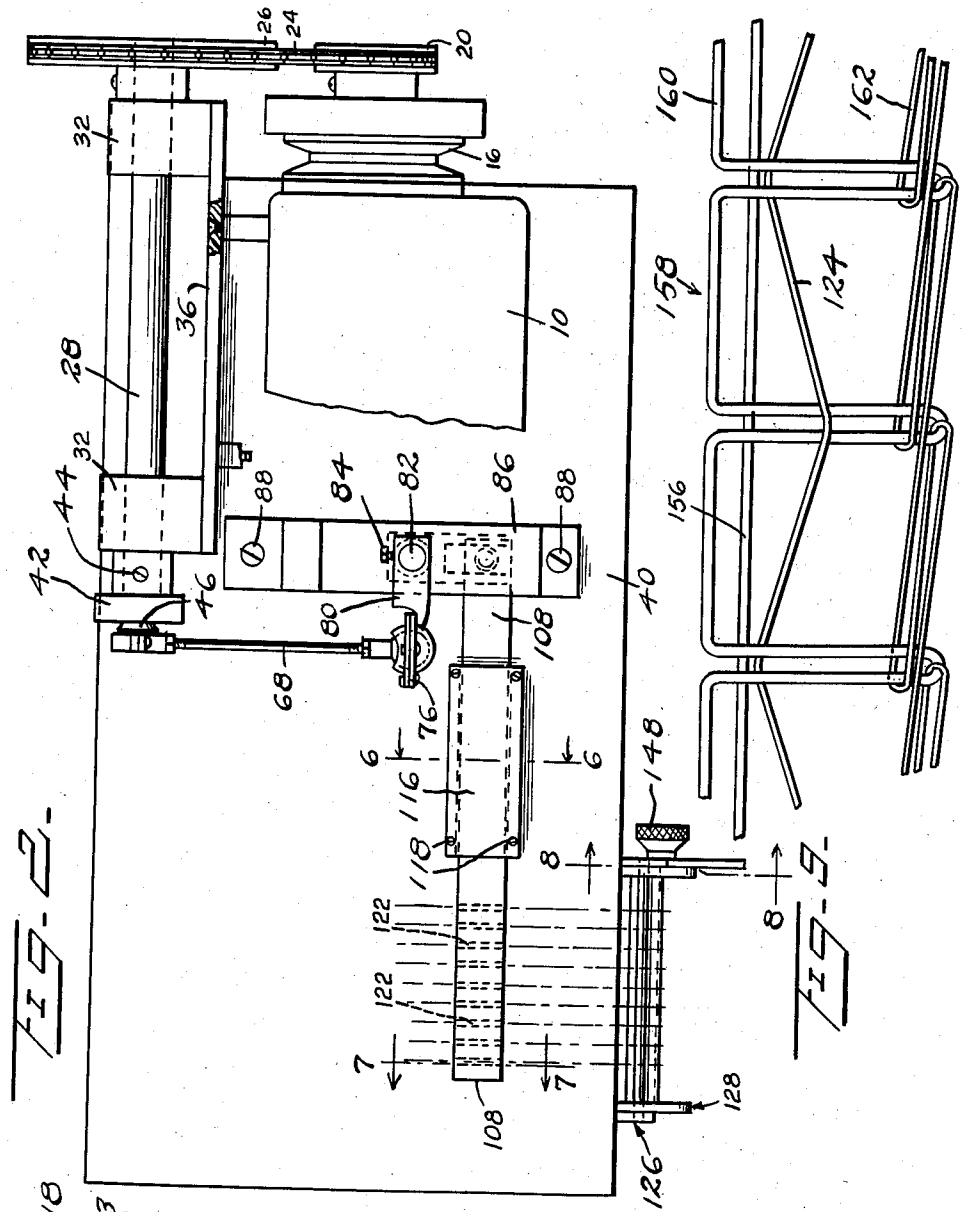


FIG. 2.

FIG. 5.

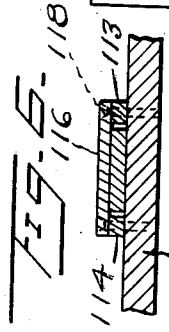


FIG. 7.

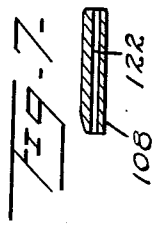


FIG. 9.

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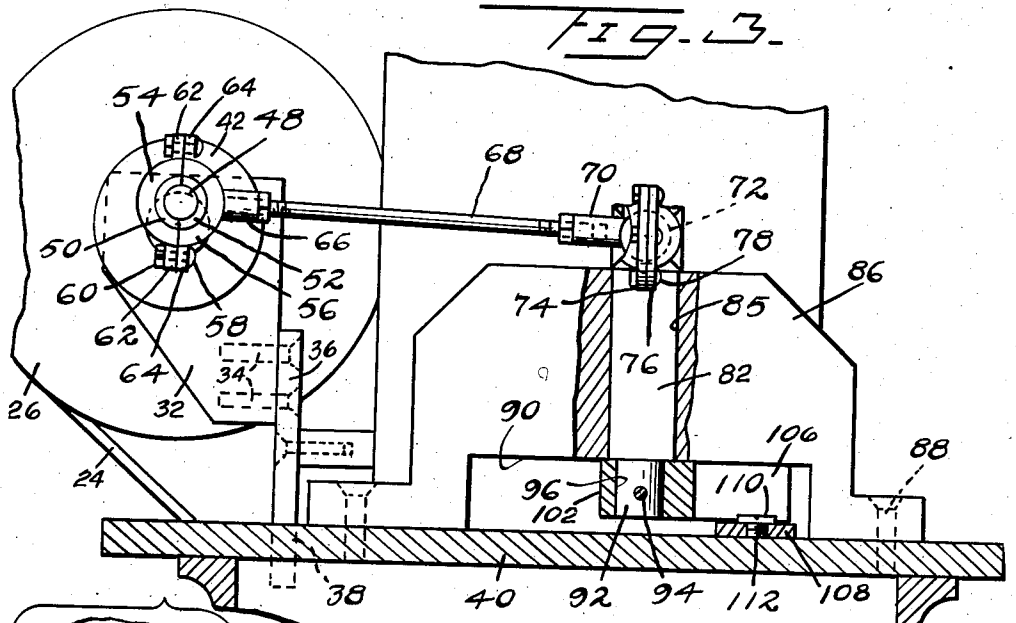
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FIG. 3.



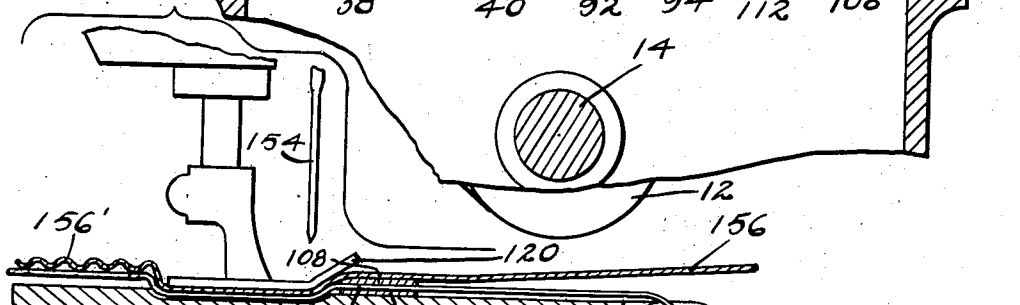
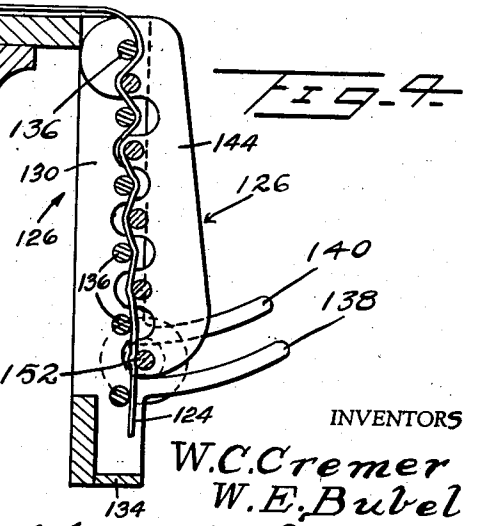


FIG. 4.



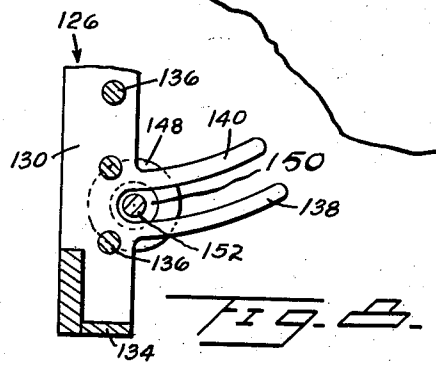


FIG. 5.

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United States Patent Office 2,881,724 Patented Apr. 14, 1959

2,881,724

THREAD TENSIONING DEVICE FOR A SHIRRING ATTACHMENT FOR SEWING MACHINES

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Application July 21, 1955, Serial No. 523,450

2 Claims. (Cl. 112—101)

This invention relates to sewing machines, and more specifically to an attachment therefor especially designed for effecting a shirring of fabric goods as the goods are being sewed.

One of the primary objects of this invention is to provide an improved elastic thread laying attachment for multiple needle sewing machines adapted for sewing a chain stitch which can be applied to practically any commercial or industrial sewing machine now available on the market, the attachment being adapted to apply a resilient strand, cord or strip, to a sheet of non-elastic fabric, the resilient element being applied to the fabric under tension, whereby, upon release of the tension, the fabric will present a ruffled or shirred appearance.

Another object of this invention is to provide means for securing an elastic thread or cord to the back side of a strip of fabric material being sewed with a multiple needle sewing machine sewing a chain stitch, the cord being disposed between the needle and the looper threads of the stitch on opposite sides of the needle at each successive stitch.

Other and further objects and advantages of the instant invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a side elevation of a conventional multiple needle sewing machine for sewing a chain stitch, and including an attachment for laying and attaching an elastic thread or cord to a piece of fabric material.

Figure 2 is a top plan view of the device shown in Figure 1.

Figure 3 is a partial transverse cross-sectional view of the sewing machine and attachment, certain parts thereof being broken away.

Figure 4 is a fragmentary detail cross-sectional view.

Figure 5 is a fragmentary cross-sectional view taken on the horizontal plane of line 5—5 in Figure 1, looking in the direction of the arrows.

Figure 6 is a fragmentary cross-sectional view taken on the vertical plane of line 6—6 of Figure 2, looking in the direction of the arrows.

Figure 7 is a fragmentary detail cross-sectional view taken on the vertical plane of line 7—7 of Figure 2, looking in the direction of the arrows.

Figure 8 is a detail cross-sectional view.

Figure 9 is a schematic view of a chain stitch having an elastic thread or cord incorporated therewith in accordance with the present invention.

Referring now more specifically to the drawings, reference numeral **10** designates, in general, a conventional multiple needle sewing machine. The sewing machine **10** is provided with an electric motor **12** having a drive shaft **14** on which is mounted a pulley **16** for driving the conventional sewing machine mechanism. The drive shaft **14** carries an extension **18** on which is mounted a V-pulley **20** secured thereto by set screw **22**. An endless V-belt **24** connects the pulley **20** with a second V-pulley **26** which

is mounted on one end of a shaft **28** and is secured thereto for rotation therewith by a set screw **30**. The shaft **28** is supported between a pair of journals **32** which are secured by screws **34** to an elongated substantially rectangular side plate **36** which is, in turn, detachably mounted by conventional means in an elongated slot **38** formed in the base plate **40** of the sewing machine **10**. A disc **42** is secured to the other end of the shaft **28** by means of a set screw **44**.

The disc **42** is provided with a laterally extending offset boss **46** having a laterally extending crank pin **48**. The crank pin **48** is embraced within a pair of bearing sleeves **50**, **52** disposed within the oppositely disposed, substantially semi-circular split bearing members **54**, **56**, the latter being joined together by bolts and nuts **58**, **60** which extend through confronting flanges **62**, **64**.

The bearing member **56** is provided with an integrally formed, radially extending, internally threaded sleeve **66** which is adapted to receive one externally threaded end of a shaft **68**. The other end of the shaft **68** is also externally threaded and is received in an internally threaded sleeve **70** which terminates at its other end in an enlarged sphere or ball **72**. The ball **72** is received within a split bearing socket including the confronting members **74**, **76** which are secured together as by the bolts **78**. The split bearing members **74**, **76** are disposed at one end of a lever **80** having its other end fixedly secured to the upper end of a shaft **82** by means of the set screw **84**. The shaft **82** is rotatably mounted within an elongated vertically extending circular passage **85** extending transversely through a journal block **86** secured to the base plate **40** by the screws **88**.

The journal block **86** is provided with an inverted substantially U-shaped recess **90** extending inwardly from the lower end thereof and receives therein a reduced diameter depending portion **92** of the shaft **82**. The depending portion **92** of the shaft **82** is fixedly secured by set screw **94** within a passage **96** formed in one end of a throw-block **102**, the throw-block **102** being bifurcated at its other end to provide a pair of throw-bars **104**, **106**. The throw-bars **104**, **106** extend transversely across a reciprocating bar **108** and alternately engage opposite sides of an enlarged head **110** of a bolt **112** threaded into the bar **108**. The bar **108** extends longitudinally of the base plate **40** between a pair of guide rails **113**, **114** and beneath a cover plate **116**. The guide rails **113**, **114** and cover plate **116** are secured to the base plate **40** as by the screws **118**.

The other end of the bar **108** is disposed adjacent to and in confronting relationship with respect to the presser foot **120** and is provided with a plurality of spaced transversely extending passages **122**, each of which is adapted to slidably receive therethrough an elastic thread or cord **124**.

The elastic threads **124** are fed upwardly from a source of supply (not shown) through a pair of racks **126** and **128**. The rack **126** depends from the base plate **40** at one side of the sewing machine **10** and is secured thereto by any conventional means. The rack **126** is formed of a pair of side members **130**, **132** connected at their lower ends by a cross-member **134**. A plurality of elongated cylindrical rods **136** extend horizontally of the rack **126** in vertically spaced relationship, and have their opposite ends supported in the side members **130**, **132**. The side member **132** is provided, adjacent its lower end, with a pair of arcuately shaped, spaced lateral extensions **138**, **140**, which are adapted to serve a function to be described.

The rack **128** comprises a pair of side members **142**, **144** and the upper ends thereof are pivotally mounted on the uppermost of the rods **136**. The side members **142**, **144** engage the opposite ends of a plurality of elongated,

horizontally arranged substantially cylindrical rods **146**, which are vertically spaced and are so arranged as to be staggered with respect to the rods **136**. A knurled nut **148**, having an enlarged flange **150**, is threaded into the lower end of the side member **144** with the shank portion **152** thereof extending between the arcuately shaped lateral extensions **138**, **140**. Thus it is seen that the rack **128** may be pivoted relative to the rack **126** and maintained in adjusted position by the frictional engagement of the flange **150** against the extensions **138**, **140**.

In operation, energization of the motor **12** will drive the drive shaft **14** which in turn rotates the pulley **20**, which is in driving relationship with the pulley **26** through the endless belt **24**. The pulley **26** being fixedly mounted on the shaft **28** rotates the same and imparts a rotary movement to the offset crank pin **48**. The crank pin **48**, being journalled in split bearing members **54**, **56**, imparts an arcuate and reciprocating action to the shaft **68** which, in turn, oscillates the lever **80** through the universal connection which includes the members **72**, **74** and **76**. The shaft **82** having the lever **80** secured thereto is thereby given an oscillatory movement thereby which is imparted to the throw-block **102** to effect an engagement of the bifurcated arms **104**, **106** alternately, and in opposite directions, upon the enlarged head **110** of the bolt **112**. This action produces a reciprocating movement of the bar **108** longitudinally of the base plate **40** whereby the elastic threads **124** are moved to opposite sides of the needles **154** on each successive stitch. Thus, it will be seen that as the non-resilient fabric **156** is passed transversely across the base plate **40** beneath the pressure foot **120**, the needles **154** will form a chain stitch **158** attaching the elastic threads **124** to the back side of the fabric **156** with the elastic threads **124** being disposed between the needle thread **160** and the looper thread **162**, as illustrated in Figure 9 of the drawings.

As the stitching proceeds, and the fabric is released from beneath the pressure foot **120**, the fabric **156** is placed under tension by the elastic threads **124** and assumes the shirred appearance designated by the reference numeral **156'** in Figure 4 of the drawings.

It is to be understood that the threads **124** are first pre-tensioned by their threaded engagement with alternate sides of the racks **126** and **128**, and the proper pretensioning stress is placed thereon by the displacement of the rack **128** relative to the rack **126**.

Having described and illustrated one embodiment of this invention in detail, it is to be understood that the same is offered merely by way of example, and that the invention is to be limited only by the scope of the following claims.

What is claimed is:

1. A multiple thread tensioning device for shirring attachments to multiple needle sewing machines comprising a vertically disposed rack adapted to be detachably secured rigidly to said sewing machine, said rack including a pair of upright side members, a plurality of horizontally disposed vertically spaced parallel rods having their opposite ends supported in said side members, a second rack including a second pair of upright side members, said second pair of side members having their upper ends journalled on the uppermost of the parallel rods in said first rack, a second plurality of horizontally disposed vertically spaced parallel rods having their opposite ends supported in said second pair of side members, said second plurality of rods being alternately positioned between the rods of said first plurality with said second rack swung to the position closely adjacent said first rack, and means on said racks for releasably securing said racks together in a plurality of adjusted positions with relation to each other whereby with the threads lying between said first and second plurality of rods and engaged oppositely by said rods of each rack the tension on said threads may be adjusted by adjusting said second rack relative to said first rack.

2. A device as claimed in claim 1 wherein the means releasably securing said racks together comprises a pair of arcuate spaced apart generally parallel rigid extensions integrally formed on one of said racks, and a screw clamp mounted on the other of said racks for movement between said extensions with said screw clamp being adapted to clamp said other rack to said extensions in a plurality of adjusted positions thereon.

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