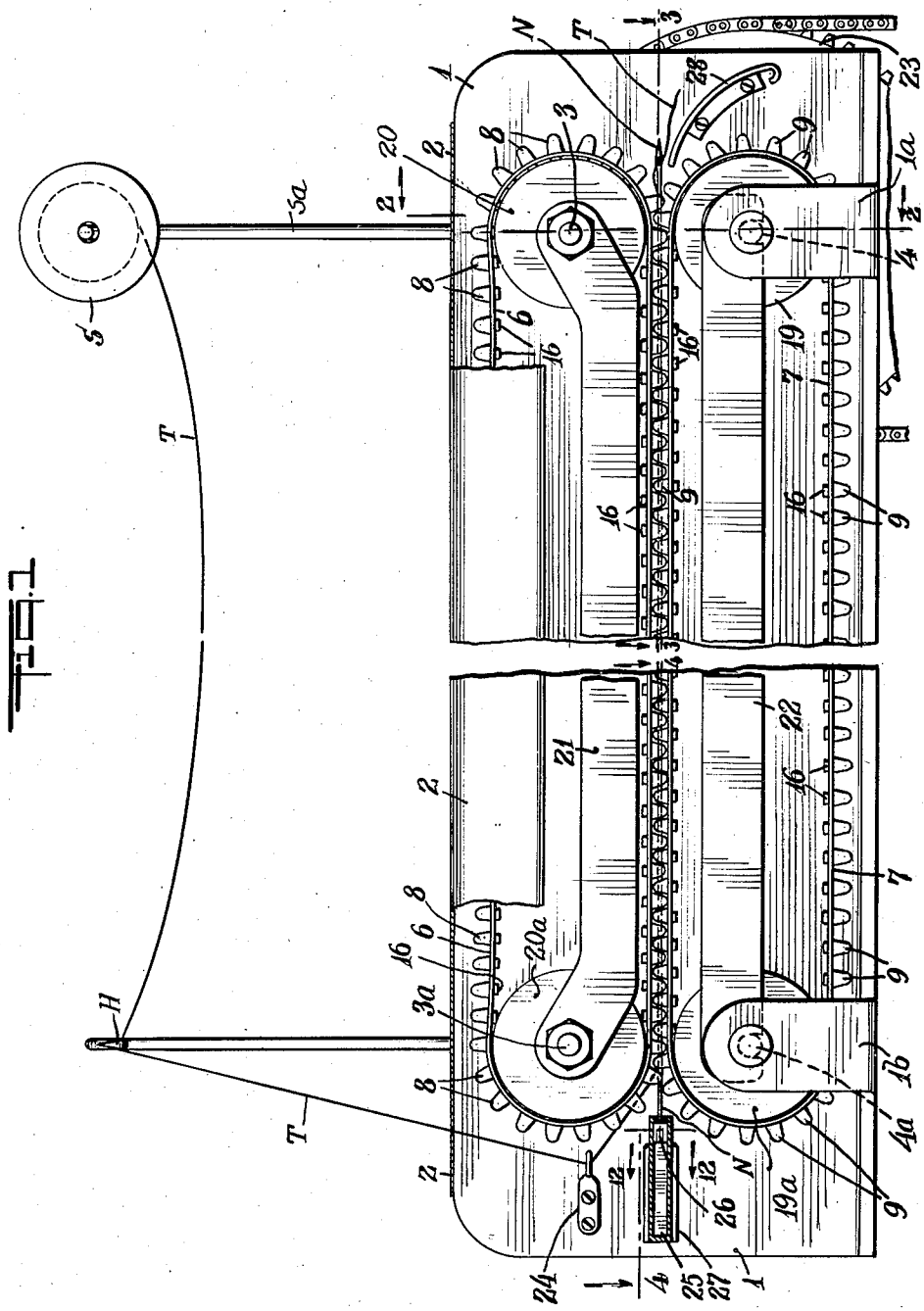
Nov 2, 1937. M. M. NEWMAN ET AL 2,098,009

SEWING MECHANISM

Filed Aug. 14, 1936 3 Sheets-Sheet 1



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SEWING MECHANISM

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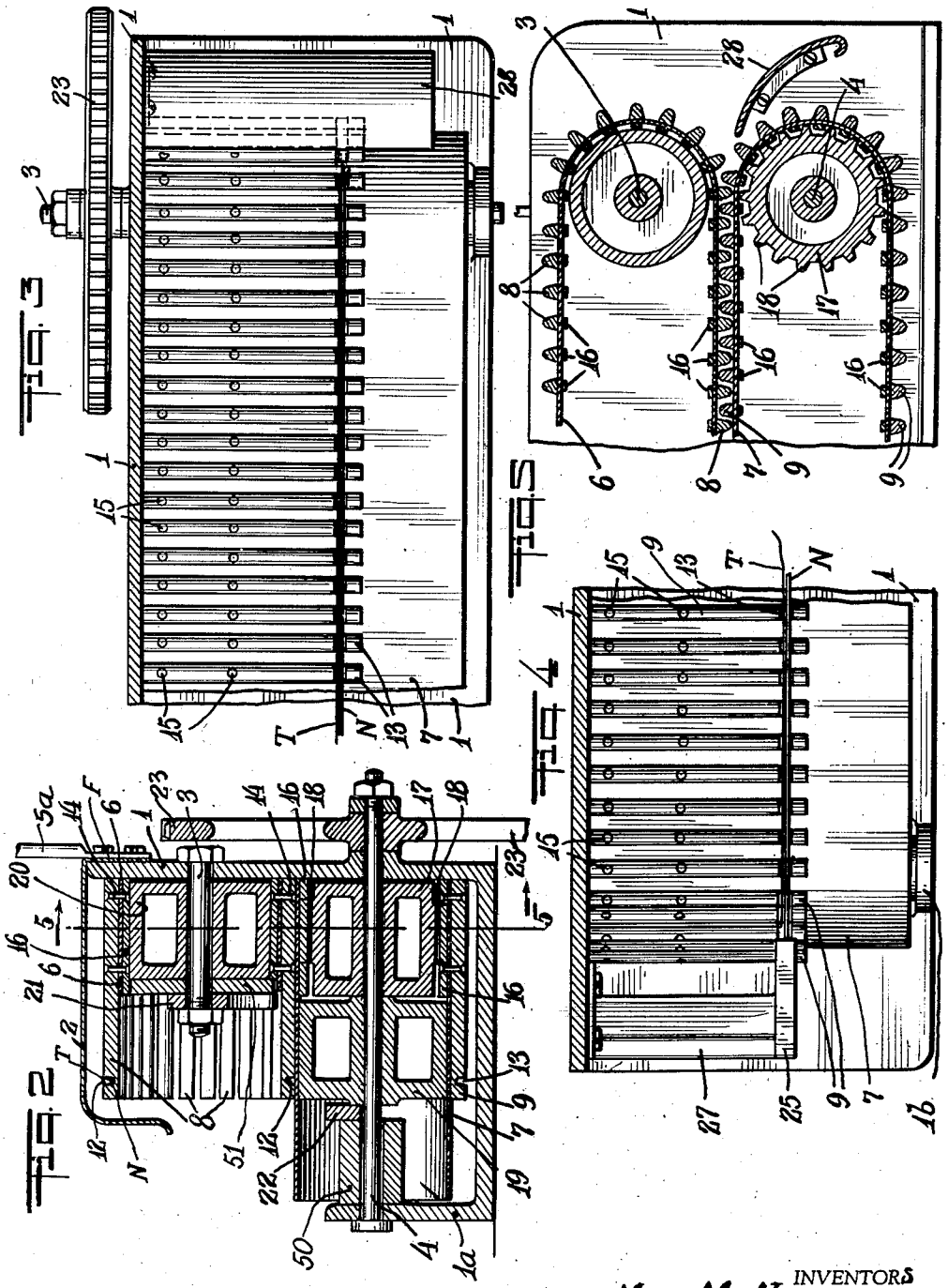

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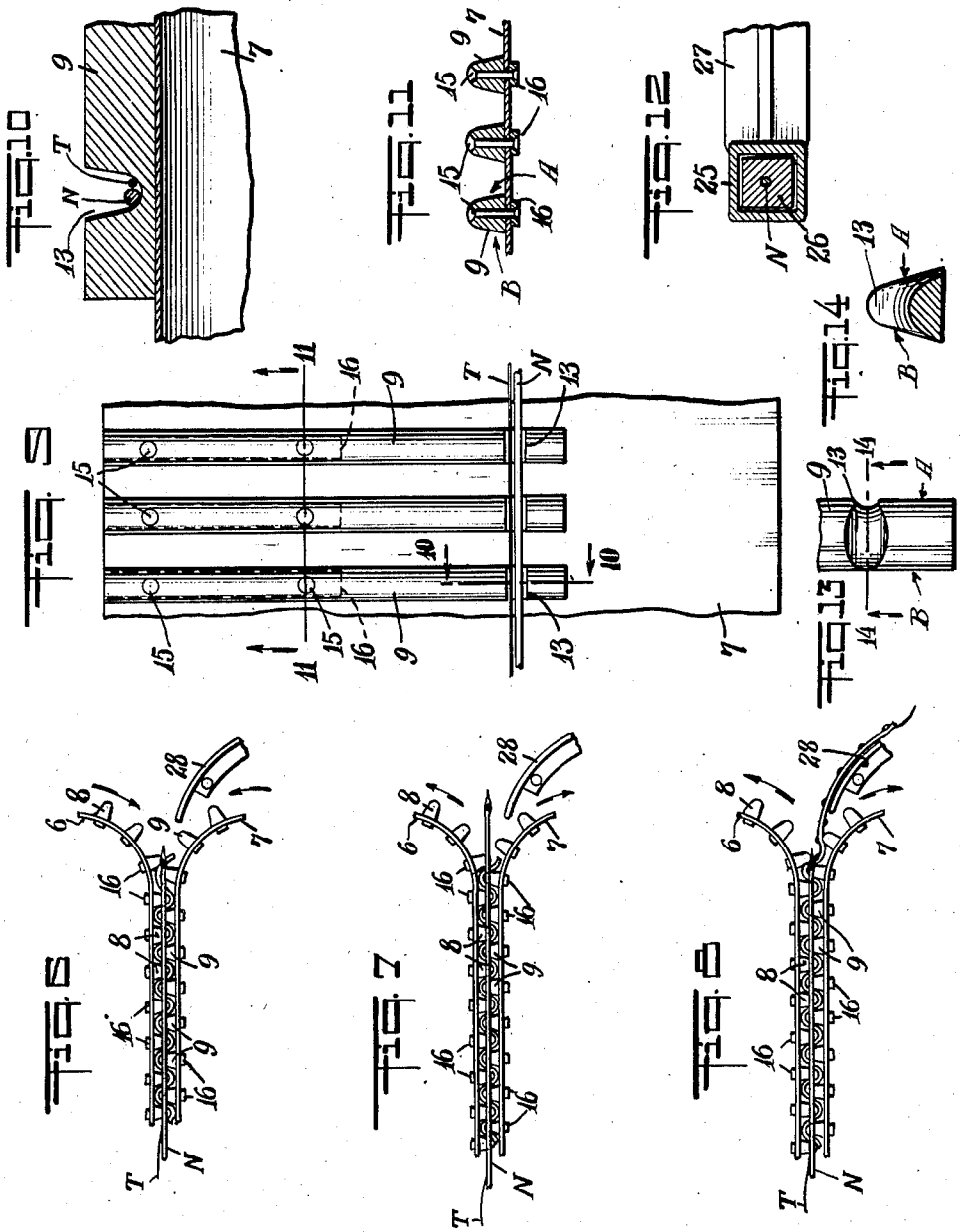

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SEWING MECHANISM

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Application August 14, 1936, Serial No. 95,967

7 Claims. (Cl. 112—174)

Our invention relates to a new and improved sewing mechanism.

This application is in part a continuation of application Serial No. 34,314 filed by us in the United States Patent Office on August 2, 1935 for improvements in "Sewing mechanism."

One of the objects of our invention is to provide an improved device for duplicating a hand-stitch. The invention is particularly useful in sewing neckties, in order to produce the effect of an ordinary hand-stitch, but the invention is generally applicable for making all types of sewed articles.

Another object of our invention is to provide improved mechanism whereby crimping members are mounted on two endless members, said endless members being chains or belts or bands or the like. A series of crimping members which are mounted on these two endless members, crimp the piece or pieces of fabric in regular formation, and the fabric is also moved relative to a long needle which may be held stationary during the formation of the stitch. Said long needle passes through the crimped layers of fabric.

Another object of our invention is to provide a device of this type having a long needle which is held securely against lateral bending or shifting, during the formation of the stitch.

Other objects of our invention will be set forth in the following description and drawings, which illustrate a preferred embodiment thereof, it being understood that the above statement of the objects of our invention is intended generally to explain the same without limiting it in any manner.

Fig. 1 is a side elevation of the improved machine.

Fig. 2 is a sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view on the line 4—4 of Fig. 1.

Fig. 5 is a sectional view on the line 5—5 of Fig. 2.

Fig. 6 is a detail elevation of certain of the parts which are shown in Fig. 5.

Fig. 7 is a detail elevation showing parts of the endless members, the crimping members, and certain auxiliary parts.

Fig. 8 is a view similar to Fig. 7, but showing the parts in a different position.

Fig. 9 is a partial plan view showing an endless member and the attached crimping members.

Fig. 10 is a sectional view on the line 10—10 of Fig. 9.

Fig. 11 is a sectional view on the line 11—11 of Fig. 9.

Fig. 12 is a sectional view on the line 12—12 of Fig. 1.

Fig. 13 is a plan view showing the recess in a crimping member.

Fig. 14 is a section on the line 14—14 of Fig. 13.

The parts of the device are supported upon an angular plate 1, which is provided with spaced bearing lugs 1*a* and 1*b*. A shaft 4 is turnably mounted in the lug 1*a*, and in the vertical flange of the angular plate 1. Said shaft 4 is connected to a driving member, which may be a sprocket wheel 23 or any other suitable device, whereby said shaft 4 may be turned continuously or intermittently, either in the same direction, or in opposite directions.

A pulley 19 and a sprocket wheel 17 are connected to the shaft 4 so as to turn in unison with said shaft 4. The shaft 4 may have a drive fit in the bores of the pulley 19 and of the sprocket wheel 17.

A spacer 50 may be mounted on the shaft 4.

A shaft 4*a*, which corresponds generally to the shaft 4, is mounted in the lug 1*b* and in the vertical flange of the plate 1. The shaft 4*a* is generally identical in construction with the shaft 4 save that the shaft 4*a* is an idler. Said shaft 4*a* is provided with a pulley 19*a*, which is similar to the pulley 19, and it may also have a spacer 50.

A longitudinal bar 22 has recesses whereby it can fit loosely upon the shafts 4 and 4*a* so as to serve as a spacer. There is sufficient clearance between the bar 22 and the members 19 and 19*a*, so as to permit the free turning of the members 19, 19*a*, and 17.

An endless member 7, which may be a flexible steel band, is mounted upon the members 17 and 19 of the shaft 4. The width of said member 7 exceeds the combined width of the members 17 and 19. Any suitable flexible endless member could be used in place of a flexible steel band.

Said endless member 7 is provided at its inner surface with spaced lateral bars 16, which mesh with the teeth 18 of the sprocket 17, which is mounted on the shaft 4. Since the shaft 4 is positively driven, the steel band 7 drives the pulley 19*a* and it also drives the idler shaft 4*a*. Said pulley 19*a* may have recesses which mesh with bars 16.

An upper endless member 6 is provided, and this may also be a flexible steel band, and it has lateral spaced bars 16 at its inner surface, like

the member 7. The upper endless member 6 is mounted on two idler pulleys 20 and 20a. Said idler pulleys 20 and 20a are mounted upon shafts 3 and 3a which are connected to the vertical flange of the plate 1. The shafts 3 and 3a are identical in construction.

A longitudinal spacing bar 21 is loosely connected to the shafts 3 and 3a so as to permit the free turning of the pulleys 20 and 20a.

The lower band 7 is provided with spaced crimping teeth 9. As shown in Fig. 4, the width of said crimping teeth 9 is less than the total width of the band 7.

As shown in Fig. 3, the lateral bars or teeth 9 are connected to the band 7 by means of rivets which also enter or pass through the inner transverse bars 16 and said rivets are provided with heads 15. Said heads 15 have the same general contour as the bars 9 and said heads 15 are countersunk in the bars 9.

The upper endless member 6 is provided with lateral bars or teeth 8 and inner bars 16 which are connected thereto in similar manner, by similar rivets 14.

However, the pulleys 20 and 20a have smooth peripheries so that the members 16 do not act as driving members for the upper band 6.

As shown in Fig. 2, the width of the upper band 6 is slightly greater than the width of the pulleys 20 and 20a. The teeth 8 extend laterally beyond the upper band 6, so that the width of the teeth 8 is the same as the width of the teeth 9.

The shafts 3 and 3a are provided with spacers 51, which are of identical construction. The meshing between the teeth 9 and 8 drives the upper band 6.

The cross sections of said teeth 8 and 9 may be substantially triangular save for said rounded surfaces.

Hence, and as indicated in Fig. 11, each tooth 9 has walls A and B which are inclined to each other and which make equal angles with the base of the tooth. The base of the tooth may have a width of about one quarter of an inch and the height of the tooth may also be substantially one quarter of an inch.

As shown in Fig. 10, the teeth are formed with longitudinal recesses in which the needle N is located while the stitch is being made. This corresponds to the position of the needle which is shown in Fig. 1.

The recesses of the teeth 9 are designated by the reference numeral 13. In order to form said recesses, an ordinary file can be used, and this file is first moved back and forth while it is held parallel to the base of the tooth 9. After a recess has been thus formed to the desired depth in the inclined faces A and B, the file is then moved to and fro upon the inclined face A of the tooth 9, while the file is held substantially parallel to said inclined face A. This results in filing the inclined face A to a depth which is greater than the depth of filing of the other inclined face B.

Likewise, the recess is made wider at face A than at face B.

As shown in Fig. 10, the file has the usual tapered contour. The filing action in a direction parallel to the face A produces a lateral wall or lateral walls in the recess at face A, which lateral walls are inclined to the axis of the needle.

The filing in a direction parallel to the inclined face A may extend to the base of the tooth, or it may stop a little short of the base of the tooth, as about a sixteenth of an inch.

Likewise the file may be used so as to grind away the edges of the recess 13 at the face A, so that the distance between the walls of the recess at the face A exceeds the distance between the walls of the recess at the face B.

As the teeth are moved relative to the needle, and while the needle is held stationary during the formation of the stitch, the faces A of the respective teeth 9 are first presented to the stationary needle. The additional width of the recesses at the faces A permits the needle to enter said recess without binding and the inclined lateral walls of the recess at the face A assist in causing the needle to enter the recess without any binding action. Said inclined lateral walls may be designated as the entering walls of the recesses, since they move towards the butt end of the needle while the stitch is being made.

The needle fits quite snugly between the walls of the recess at the successive faces B, thus preventing any lateral bending or movement of the needle. Since this needle is long and flexible it is important to prevent any such lateral bending of the needle.

The construction of the teeth 8 is the same as the construction of the teeth 9 in this respect.

Hence when the teeth 8 and 9 mesh at the adjacent portions of the runs of the belts 6 and 7, the needle N is held without lateral bending in the aligned recesses of said teeth, and this is done while permitting the needle to enter said recesses freely and while guiding the needle as it enters said recesses.

The needle N has an enlarged butt end 26 which has a rectangular cross section. Said butt end 26 fits slidably in a hollow guide 25 which also has a corresponding rectangular cross section. The guide 25 is held by means of a bracket or arm 27, to the plate 1.

The operation of the device is as follows:—

The needle N is moved until its butt end 26 abuts the right-hand side of the guide 25, this being the position shown in Fig. 1. The needle N is suitably threaded with thread T. The material which is to be sewed is fed between the bands 6 and 7, at the right-hand side of the device shown in Fig. 1, so that the crimping teeth 8 and 9 crimp the fabric and also move it to the left, so that the needle N pierces the crimped layers of fabric. While this is being done, the pressure which is necessary to force the crimped layers of cloth on the needle, immediately causes the needle to move to the left until the end 26 of the needle abuts the left-hand side of the member 25.

Prior to the formation of the stitch, the needle N can be pushed by hand until the butt end 26 of the needle abuts the left-hand side of the member 25. This is not necessary because the cloth pushes the needle N back almost instantly so that the needle can be considered as being stationary during the formation of the stitch.

After the fabric has been moved upon the needle up to about the pulleys 19a and 20a, or to any desired shorter length, the operation of the machine is reversed so that the pulley 20 turns counterclockwise and the pulley 19 turns clockwise, thus moving the crimped fabric off the needle. During this movement the friction of the work on the needle moves the needle back to the position shown in Fig. 1, so that the eye of the needle is easily accessible.

As the work is forced off the needle, either by the action of the bands or by hand, the thread must be carried along with the fabric, so as to

retain the stitch. The accessibility of the eye of the needle makes it possible to pull the thread out of the eye of the needle so that the thread stays in the cloth. This can be readily done by hand, as the fabric is finally pulled off the needle, so that the thread remains in the eye of the needle and a short length of the thread projects beyond the eye of the needle, after the thread has been cut or broken so as to release the thread from that part thereof which has been sewed into the fabric.

As the work is forced off the needle, it may be guided by the member 28.

While the needle has a limited to-and-fro movement, it is in effect stationary while the stitch is being made, as distinguished from sewing machines in which the needle is vibrated in order to make the stitch.

We claim:

1. Sewing mechanism comprising a pair of endless members, crimpers connected to said endless members and moving in unison with said endless members, the outer ends of said crimpers being separated from each other in the outer runs of said endless members, means for guiding said endless members so that their crimpers intermesh in a portion of the runs of said endless members, said crimpers having recesses which are aligned with each other when said crimpers intermesh, a stationary needle located in said recesses, the walls of the intermeshing portions of said crimpers being sufficiently spaced from each other to permit the pleating of a piece of fabric between said intermeshing crimpers, the inner end walls of said recesses being inclined to the axis of the needle.

2. Sewing mechanism comprising a pair of endless members, crimpers connected to said endless members and moving in unison with said endless members, the outer ends of said crimpers being separated from each other in the outer runs of said endless members, means for guiding said endless members so that their crimpers intermesh in a portion of the runs of said endless members, said crimpers having recesses which are aligned with each other when said crimpers intermesh, a stationary needle located in said recesses, the walls of the intermeshing portions of said crimpers being sufficiently spaced from each other to permit the pleating of a piece of fabric between said intermeshing crimpers, the inner end walls of said recesses being inclined to the axis of the needle, said inner end-walls being parallel to each other when said crimpers intermesh.

3. Sewing mechanism comprising a pair of endless members, crimpers connected to said endless members and moving in unison with said endless members, the outer ends of said crimpers being separated from each other in the outer runs of said endless members, means for guiding said endless members so that their crimpers intermesh in a portion of the runs of said endless members, said crimpers having recesses which are aligned with each other when said crimpers intermesh, a stationary needle located in said recesses, the walls of the intermeshing portions of said crimpers being sufficiently spaced from each other to permit the pleating of a piece of fabric between said intermeshing crimpers, the inner end walls of said recesses being inclined to the axis of the needle, said inner end-walls being parallel to each other when said crimpers intermesh, the needle contacting with portions of said inner end-walls.

4. Sewing mechanism comprising a pair of endless belt-like members having spaced runs and adjacent runs, crimpers connected to the runs of said endless members and moving in unison with said runs of the endless members, said crimpers being mounted so as to intermesh in the adjacent runs of said endless members, said crimpers having recesses which are aligned with each other in said adjacent runs, so that a needle can be located in said recesses, said needle being mounted movably in a direction parallel to the length thereof.

5. Sewing mechanism comprising a pair of endless members having spaced runs and adjacent runs, crimpers connected to said endless members and moving in unison with said endless members, said crimpers being mounted so as to intermesh in the adjacent runs of said endless members, said crimpers having recesses which are aligned with each other in said adjacent runs, so that a needle can be located in said recesses, said needle being mounted so that it can be moved in a direction parallel to the length thereof in said recesses, and means operative to permit a limited free movement of said needle.

6. Sewing mechanism comprising a pair of endless members, crimpers connected to said endless members and moving in unison with said endless members, said endless members having adjacent runs in which said crimpers intermesh, said crimpers having recesses which are aligned with each other in said adjacent runs, so that a needle can be located in said recesses, said crimpers having side walls which are inclined to each other, said recesses being deeper in one of said side walls than in the other thereof.

7. Sewing mechanism comprising a pair of endless members, crimpers connected to said endless members and moving in unison with said endless members, said endless members having adjacent runs in which said crimpers intermesh, said crimpers having recesses which are aligned with each other in said adjacent runs, so that a needle can be located in said recesses, said recesses being wider at their inlet ends than at their outlet ends.

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