

Feb. 10, 1942.

H. G. BAILEY ET AL

2,272,180

STITCHING MECHANISM

Filed Aug. 20, 1938

3 Sheets-Sheet 1

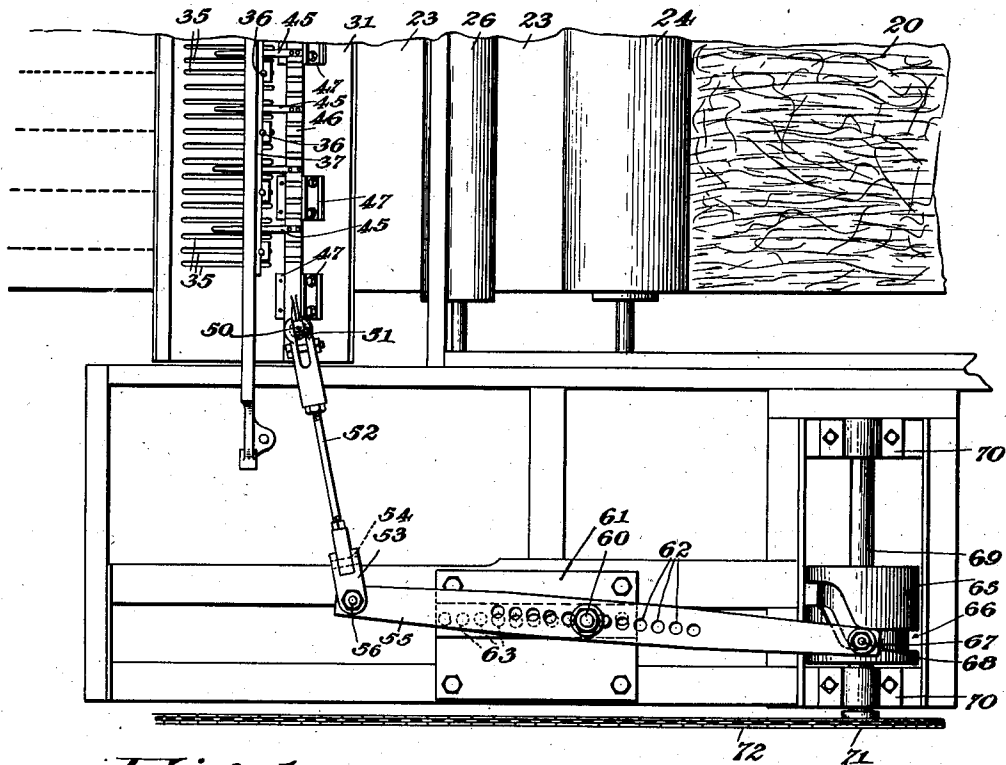


Fig. 1.

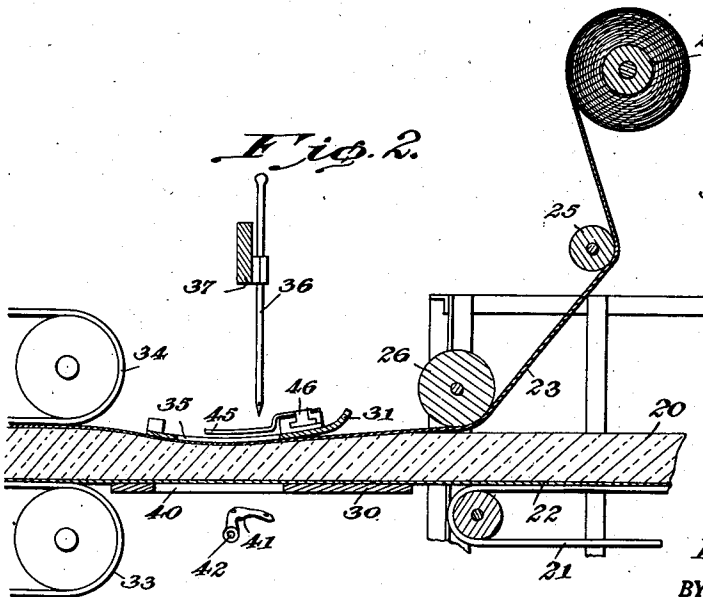


Fig. 2.

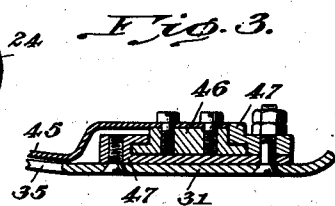


Fig. 3.

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Fig. 4.

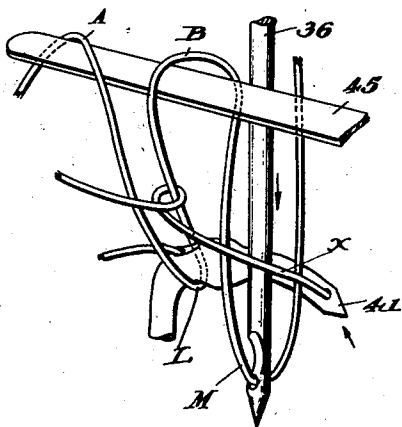


Fig. 5.

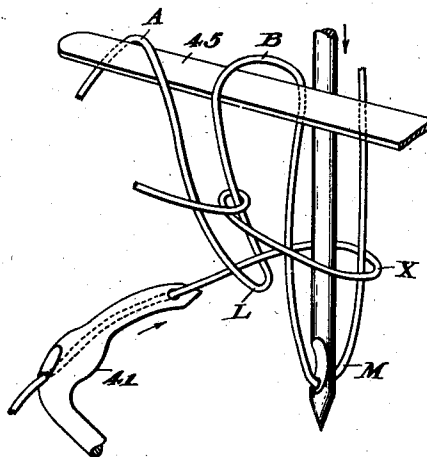


Fig. 6.

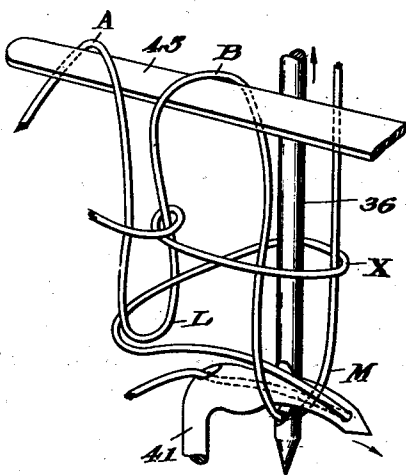
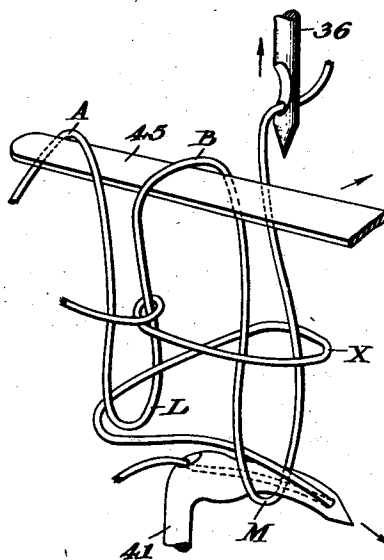


Fig. 7.



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Fig. 8.

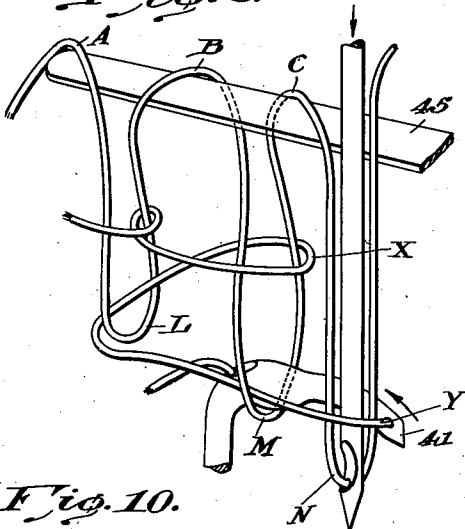


Fig. 9.

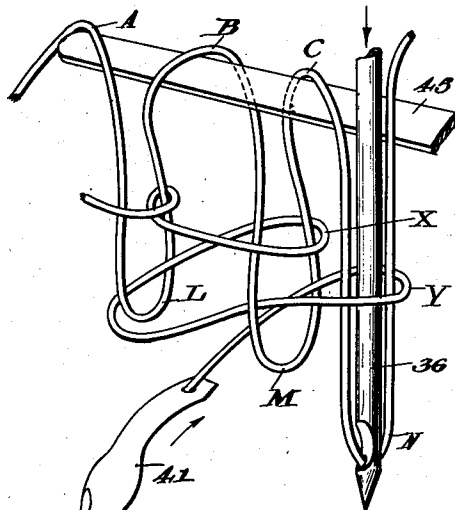


Fig. 10.

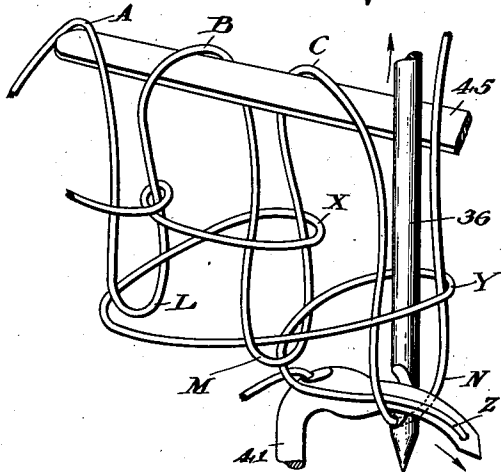


Fig. 11.

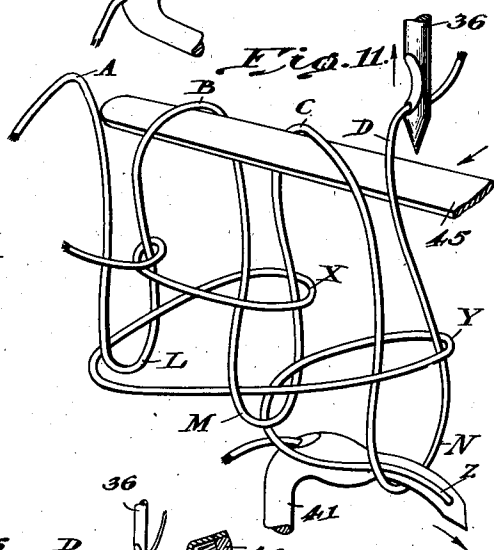
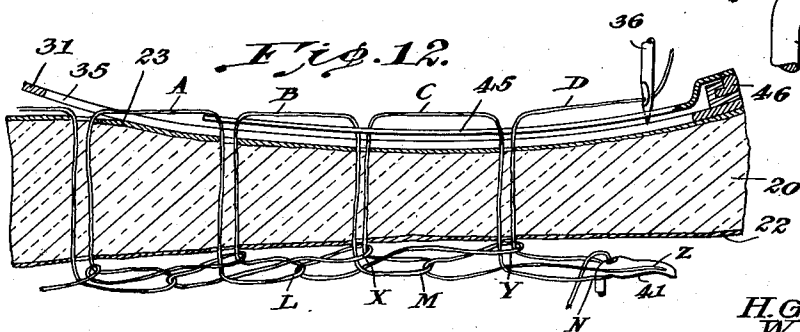


Fig. 12.



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UNITED STATES PATENT OFFICE

2,272,180

STITCHING MECHANISM

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Application August 20, 1938, Serial No. 225,942

3 Claims. (Cl. 112—117)

The present invention relates to a stitching mechanism especially adapted for stitching thick material such as compressible or resilient heat insulation blankets having thicknesses more generally about two to six inches thick, more or less as desired.

Heretofore, when stitching thick blankets with the conventional sewing machines using a single thread chain stitch, a lock stitch or the double thread chain stitch as used by a Norwood stitcher, the progress of the needle through the blanket may cause the stitches already formed to pull down and unduly compress the blanket at the stitches. Thus, if a resilient blanket is being stitched, the thickness of the blanket at the stitches may be considerably less than the normal thickness, and the cross-section of a blanket taken across the rows of stitches may be one of undulating contours. Such blankets which are pulled down to smaller dimensions at the stitches cannot properly fill a heat insulating space, and as a result, the heat insulating properties of the blanket are materially decreased.

It is an object of the present invention to provide a stitching mechanism, particularly adapted for thicker types of blankets which will enable a blanket to retain a substantially fixed predetermined dimension throughout its surface including the points where the stitches are located. Such a mechanism we have termed a loose stitching mechanism.

Another object of the invention is to sew a blanket having a thickness greater than the distance between the bed plate and presser foot of the stitching mechanism. Often this latter distance at its maximum is about three inches and yet it is desired to sew a six inch blanket and have the thread fed in exactly the proper amount to permit the blanket to expand to the desired six inch thickness.

Another object of the present invention is to provide a loose stitching mechanism which will not break or jerk the thread or pull uneven loops as it is in operation.

Another object of the present invention is to provide a loose stitching mechanism operable at high speed.

Another object of the present invention is to provide a loose stitching mechanism which, while forming each stitch, will, if desired, hold the loops of more than one of the preceding stitches in a manner to prevent one loop from taking up the slack of a prior loop.

Another object of the invention is to provide a

mechanism which is simple and easy in operation, which can be assembled and taken down quickly and with minimum effort, and which can be adjusted for different types and sizes of blankets which are to be stitched.

Other objects and advantages will become apparent from the following description taken in conjunction with the drawings, in which:

Fig. 1 is a fragmentary plan view of a stitching mechanism incorporating the present invention;

Fig. 2 is a diagrammatic elevational cross-sectional view of our novel apparatus;

Fig. 3 is a cross-sectional elevational detailed view of a finger bar and slide;

Figs. 4 to 11 inclusive are diagrammatic views of the stitching element illustrating the mechanism for forming the stitches and causing the successive loops to be retained in drawn-out positions so that a loose stitched blanket may be produced; and

Fig. 12 is an elevational cross-sectional view of the stitching mechanism showing a series of stitches more or less diagrammatically.

Referring now more particularly to Figs. 1 to 3, a mat or blanket or other suitable work 20 is carried to the stitching mechanism on a belt 21. The work may have an outer cover 22 of paper, cloth, metal foil or the like, and if desired, a top cover 23 of similar material. The top cover may be fed in from a spool 24 and guided over rolls 25 and 26 to the top of the work 20.

The work 20 then is passed between a base plate 30 and a presser foot 31, where it is stitched. It is then drawn out by the caterpillar conveyors 33 and 34 working in conjunction with one another.

The presser foot 31 is provided with a series of slots 35 for receiving a series of reciprocating needles 36 mounted upon a needle arm 37 over the machine. The base plate 30 is also provided with a series of slots 40 registering with the slots 35, also for receiving the needles 36 as they pass down through the mat and coact with a series of loopers 41 pivoted upon a reciprocating and oscillating arm 42.

The operation of the needles 36 and looper 41 is similar to that of a conventional chain stitching machine employing a double thread chain stitch and hence need not be described more in detail.

The present invention is directed more particularly to the provision of a series of reciprocating fingers 45, one for each needle 36. The fingers are all arranged to extend longitudinally

of the work and are mounted upon a finger bar 46 extending transversely of the work and sliding in finger bar slides 47 which are mounted on the upper side of the presser foot 31 (see Fig. 3). These fingers 45 are adapted to move back or forth across the slots 35 in the presser foot under their respective needles when the latter are in their topmost position.

The mechanism for reciprocating the finger bar 46 is shown more particularly in Fig. 1. At one end of the finger bar 46 is mounted a ball 50 which fits in a bifurcated clamp or socket 51, forming a ball and socket joint between the finger bar 46 and a pitman 52. The other end of the pitman 52 is secured to a pitman strap 53 by means of a pin 54 in order to permit free vertical swinging movement of the pitman 52. The pitman strap 53 is bolted to a pivot beam 55 by means of a pivot stud and bolt 56.

The pivot beam 55 is fulcrumed upon a beam stud 60 secured to a frame plate 61. A series of openings 62 are provided along the length of the pivot beam 55 through any one of which the pivot stud 60 passes in order to adjust the amount of leverage and length of travel imparted to the pitman 52 and the finger bar 46. The frame plate 61 is also provided with a series of openings 63 into which the pivot stud 60 may be secured according to the desired location of the fulcrum point for the lever beam 55. The openings 62 and 63 are preferably in register with one another when the pivot beam 55 is in center position so that any pair of registering openings may be used without shifting the beam endwise.

On the opposite end of the lever beam 55 is an actuating means comprising a cylindrical cam 65 having a cam track 66 in which rides a cam follower 67. The cam follower 67 may be secured to the lever beam 55 by means of a stud 68. The cylindrical cam 65 is mounted upon a shaft 69 riding in bearings 70 and actuated by a sprocket wheel 71 and chain 72. The chain 72 may be driven synchronously with the sewing machine mechanism and preferably by the same drive as the sewing machine.

The cylindrical cam 65 imparts an oscillating movement to the pivot beam 55 which in turn imparts a reciprocating movement to the fingers 45 and finger bar 46 through the intermediary of the pitman 52.

The length of travel of the fingers may be adjusted by placing the stud 60 into selected holes 62 and 63 to adjust the leverage and throw of the pivot beam 55.

In operation of the mechanism, each of the fingers 45 passes under its respective needle 36 in one direction while such needle is at its topmost position drawing the thread between the needle and the work into a loop about said fingers. The needle then travels downwardly to take a stitch, and when it has returned again to its topmost position, the finger 45 passes under the needle in the opposite direction drawing said thread into a second loop about the finger and whereupon another stitch is made. The thread forming the finger loops is drawn through the needle eye from the thread supply by the lateral reciprocation of the fingers. The edges of the slot 35 in the presser foot through which the needles reciprocate, hold the thread adjacent the top of the work to resist the strain of finger loop formation and prevent tearing of the top cover during the loop forming action of the fingers. The operation of the stitch forming mechanism and 75

formation of loops has been illustrated diagrammatically in Figs. 4 to 12 to which reference is now made.

In Figs. 4 to 12 a conventional chain stitch is being formed, modified, however, by our loose stitching mechanism and more particularly by the finger 45. In Fig. 4 of the drawings, finger loops A and B have already been formed and are still disposed over the finger 45. The needle 36 is just passing downwardly after having formed the finger loop B, and is passing a needle loop M through a looper loop X on the near side of the looper 41.

As shown in Fig. 5 the looper 41 then recedes, shedding the needle loop L. In Fig. 6 the looper has advanced again, this time on the other side of the needle, and is passing inside of the needle loop M.

As shown in Fig. 7 the needle then passes upwardly and while it is at its topmost position, the finger 45 moves under the needle preparatory to forming a new finger loop C which is shown in Fig. 8. Here it will be noted that the needle has again traveled downwardly with needle loop N for another stitch. The needle thus passes again on the near side of the looper 41 inside the looper loop Y.

In Fig. 9 the looper 41 again recedes to shed needle loop M.

Fig. 10 shows the looper 41 again advancing on the near side of the needle to carry the looper loop Z through the needle loop N.

In Fig. 11 the needle 36 has traveled upwardly once more, leaving the needle loop N around the looper 41. While the needle is again in its uppermost position, the finger 45 travels back again under the needle to form a new finger loop D. The cycle then repeats itself starting with the position shown in Fig. 4.

During the operation of the cycle, the work 20 and finger loops pass toward the end of the finger 45 so that they are shed from the ends of the finger as new finger loops are formed. As shown in Fig. 10, the finger loop A has traveled to the end of the finger and is passing off, and in Fig. 11 the finger loop A has passed completely off to lie flat over the top of the work and hold it in position.

In Fig. 12 the formation of the successive finger loops over the finger 45 is shown. As will be noted, the finger loop A is just passing off the end of the finger 45, finger loops B and C are progressing toward the end, and finger loop D is just being formed.

Throughout the cycle the finger 45 has held the finger loops in predetermined distended or loosened condition at one or the other side of the needle. It is to be observed that the finger 45 may hold a plurality of finger loops simultaneously and thus prevent the thrust of the needle from pulling up any of the prior finger loops which have been formed.

While the present invention has been illustrated and described particularly in connection with a mechanism for sewing with a double thread chain stitch, it is to be observed that it is adaptable for use in like manner with similar mechanisms using a single thread chain stitch or a lock stitch or the like. The attachment would work in exactly the same way with other forms of stitches and can be applied to these other mechanisms in the same way with the like results.

Modifications and variations may be resorted

to within the spirit and scope of the present invention as defined in the appended claims.

We claim:

1. A loose stitching apparatus which comprises a series of needles arranged transversely of the travel of the work to be stitched, a series of loopers individual to each of said needles, means for actuating said loopers and said needles to form a series of chain stitches in said work, a series of fingers individual to each of said needles, said fingers overlying said work and extending longitudinally of the travel of said work, a finger bar upon which said fingers are mounted, and means for reciprocating said finger bar and fingers bodily as a unit and thereby causing said fingers to make passes under said needles as the latter are withdrawn from the work to draw the thread between the needle and work into a loop about said fingers providing slack for the loops formed by said needles and hold them in a distended position until the next succeeding series of stitches have been completed, and adjusting means for said reciprocating means to adjust the extent of reciprocation of said finger bar to adjustably vary the length of loops drawn by said fingers.

2. A loose stitching apparatus which comprises a series of needles arranged transversely of the travel of the work to be stitched, loopers individual to each of said needles to coact with said needles to form a series of stitches in said work, a series of fingers individual to each of said needles, said fingers overlying said work and extending longitudinally of the travel of said work, a finger bar upon which said fingers are mounted, means for reciprocating said finger bar and fingers bodily as a unit and thereby causing said fingers to make passes under said needles as the latter are withdrawn from the work, including a

beam pivotally mounted intermediate its ends, an articulation between one end of said beam and said finger bar, means at the other end of said beam to oscillate the same, and means for adjusting the position of said pivot to thereby vary the length of travel of the finger bar and fingers.

3. Apparatus for forming a yieldable heat-insulating stitched blanket having substantially planular outer surfaces which comprises a supporting plate for the blanket to be stitched, a presser foot spaced from the supporting plate and overlying said blanket in contact therewith and provided with slots extending in the direction of travel of the blanket, a series of reciprocating needles above said presser foot individual to said slots and adapted to pass through said slots to penetrate said blanket, loopers beneath the supporting plate coacting with said needles to form stitches, means for feeding the blanket between said presser foot and supporting plate, a series of fingers individual to each of said coacting needles and loopers, a finger bar located at the advance side of said needles upon which the fingers are mounted solely at their advance ends to extend freely in the direction of travel of the blanket and overlie in spaced relation the upper surface of the presser foot, a slide on said presser foot in which said finger bar is held and permitted to reciprocate, and means for reciprocating said finger bar and said fingers bodily as a unit to cause the free ends of the fingers to pass under said needles while the needles are withdrawn from the work to draw the thread between the work and needle into a loop about the fingers providing slack for the stitches and to hold the loops thus formed in distended position until the succeeding stitches are formed.

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