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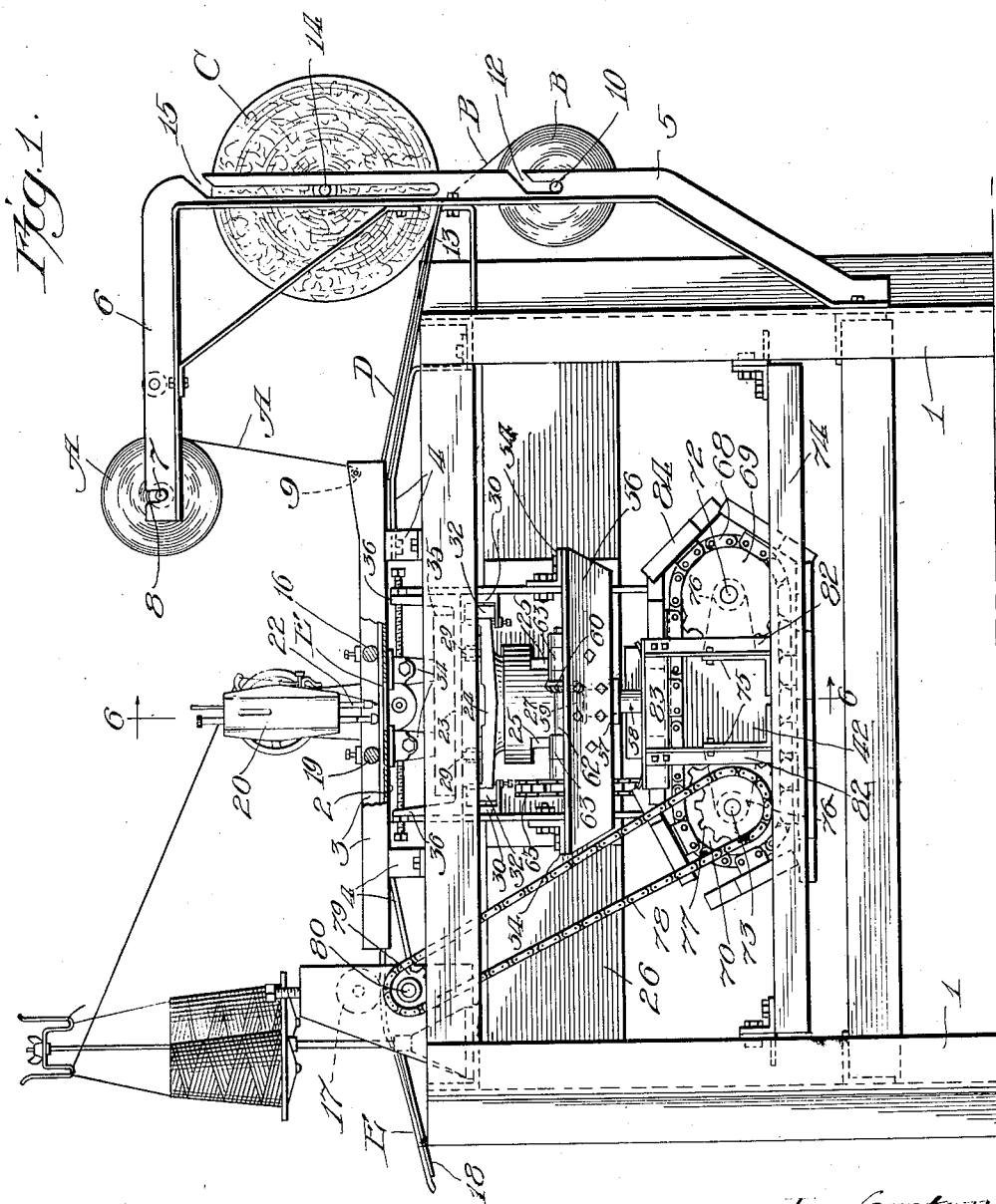
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2,059,845

MACHINE FOR QUILTING MATTRESS BORDERS

Filed May 16, 1934

6 Sheets-Sheet 1



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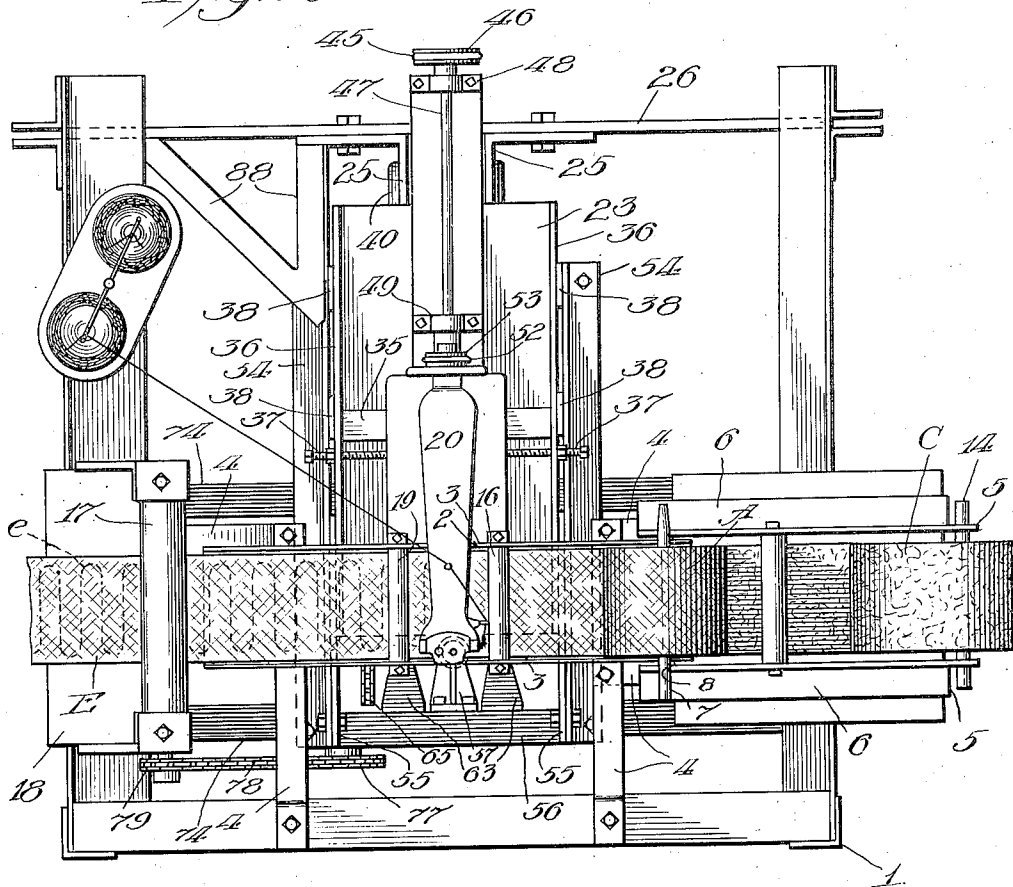
2,059,845

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6 Sheets-Sheet 2

Fig. 2.



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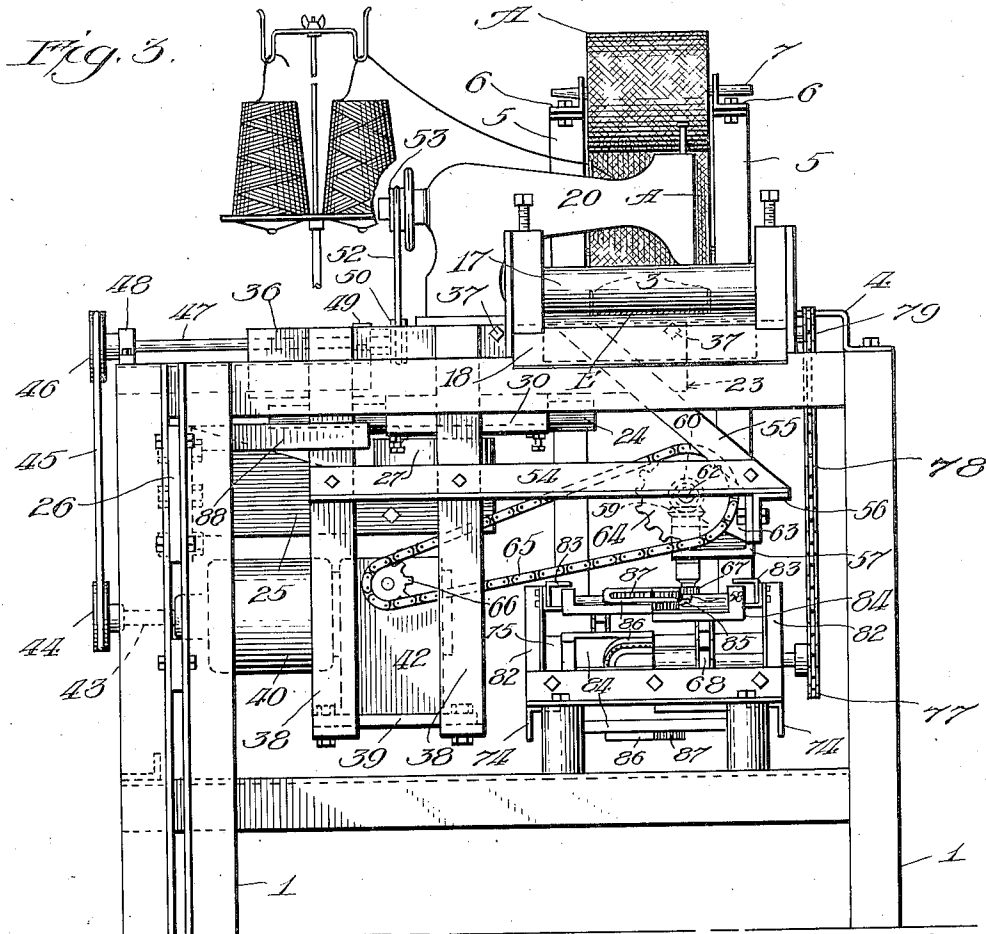
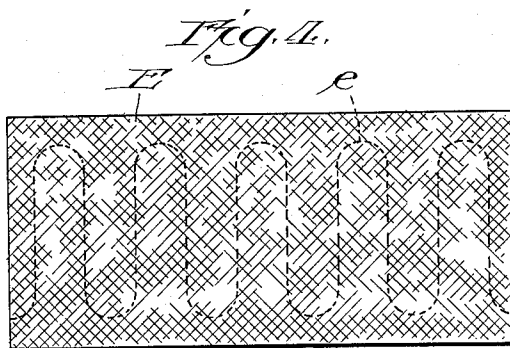
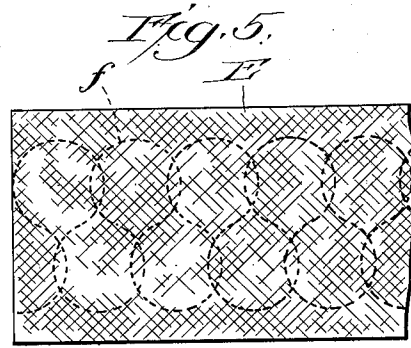
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MACHINE FOR QUILTING MATTRESS BORDERS

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6 Sheets-Sheet 3



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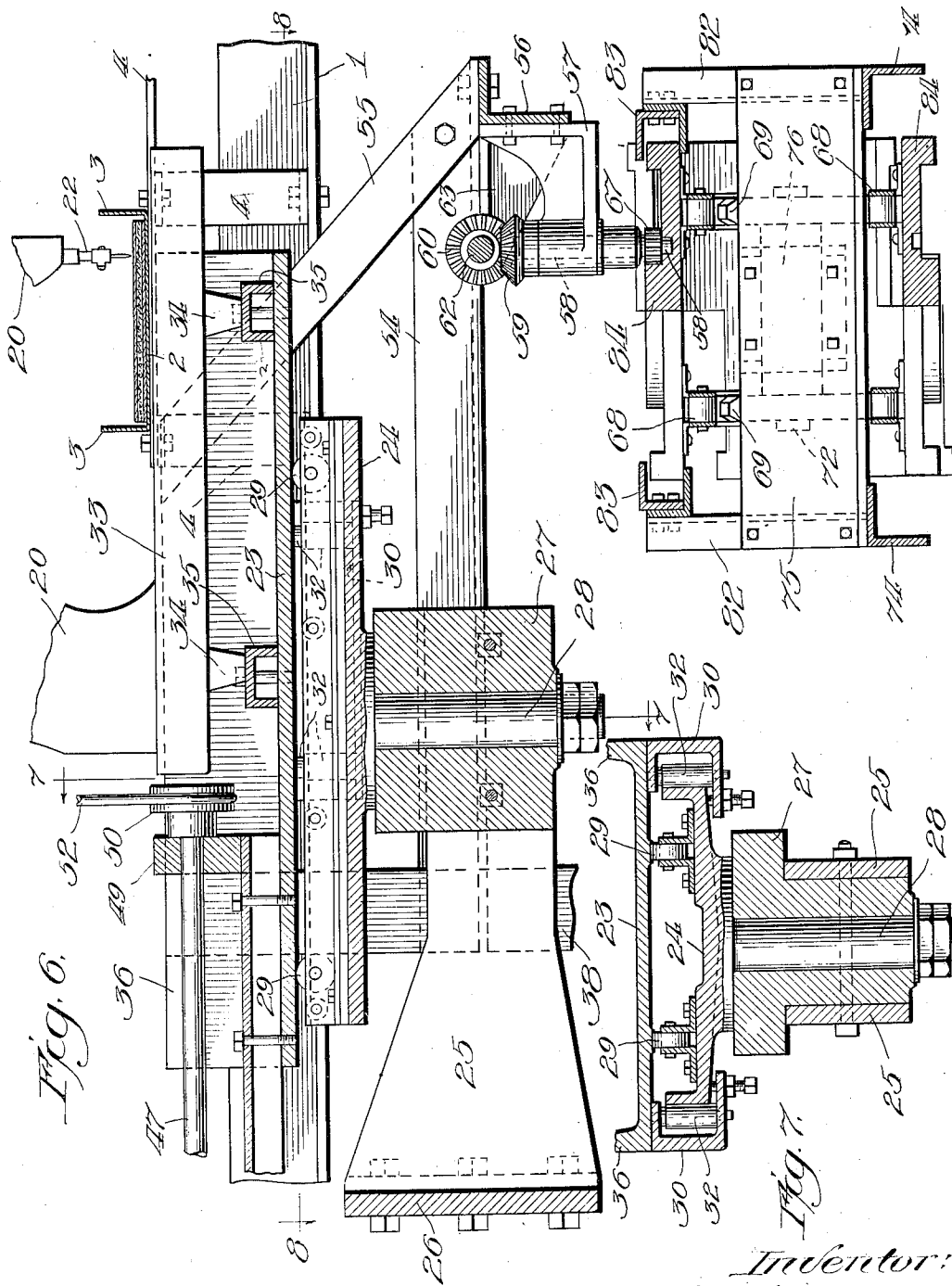
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MACHINE FOR QUILTING MATTRESS BORDERS

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6 Sheets-Sheet 4



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MACHINE FOR QUILTING MATTRESS BORDERS

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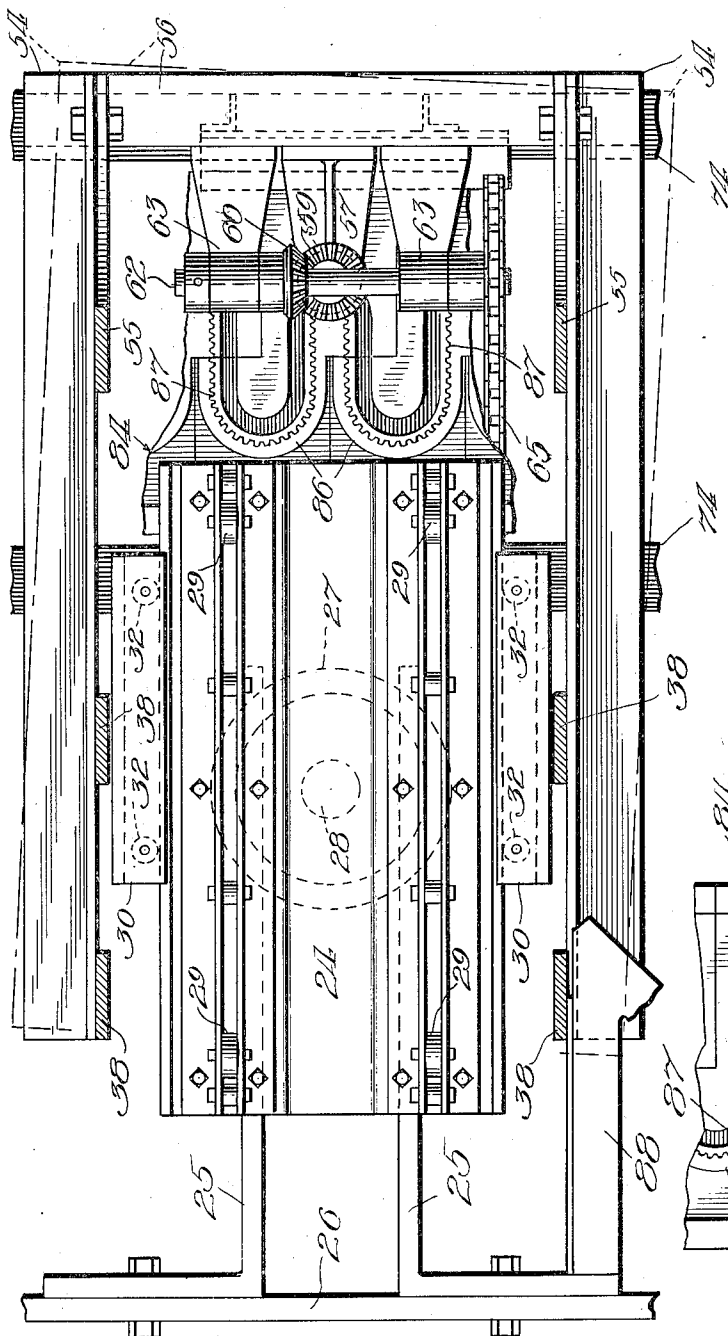


Fig. 8.

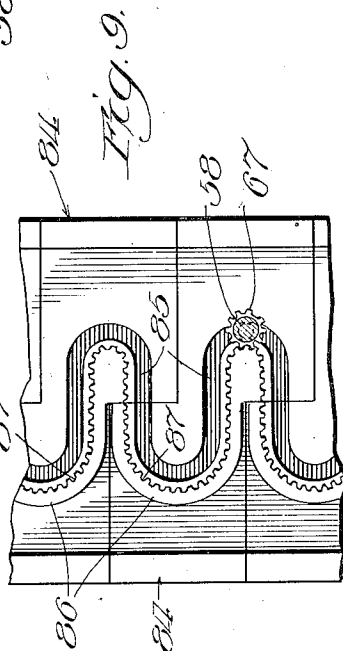


Fig. 9.

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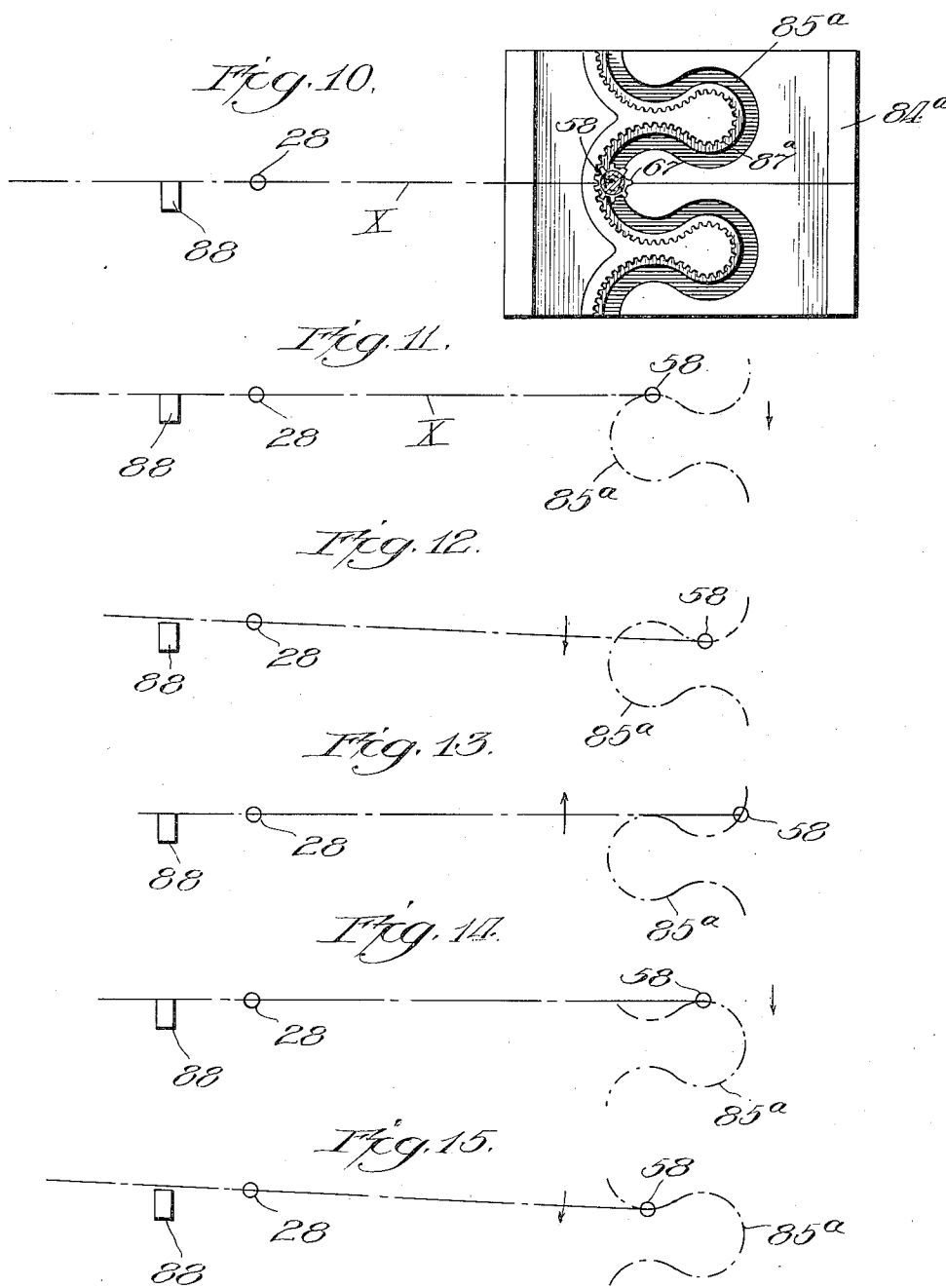
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MACHINE FOR QUILTING MATTRESS BORDERS

Filed May 16, 1934

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,059,845

MACHINE FOR QUILTING MATTRESS
BORDERS

Joseph W. Bowersox, Chicago, Ill.

Application May 16, 1934, Serial No. 725,879

8 Claims. (Cl. 112—117)

Mattresses, particularly those having spring cores, usually have padded and quilted edge or border walls which are pre-formed as long strips which are afterwards assembled with the top and bottom mattress coverings to form complete casings for the mattresses. The object of the present invention is to produce a simple and novel machine for quilting such mattress border strips or boxings.

Obviously, by properly proportioning the parts of my improved machine, work of various other kinds may be quilted; so that the invention may be regarded as having for its object to produce a simple, novel and efficient quilting machine of general application.

In carrying out my invention, I employ an endless pattern device, or a pattern that travels in an endless path, and cause the necessary relative movements between a sewing machine head and the work to cause the work to be stitched in accordance with a predetermined design to be controlled by the pattern. Consequently, the present invention may be said to have for one of its objects to produce a novel form of movable pattern for a quilting machine or the like. Or, viewed in another of its aspects, the present invention may be said to have for its object to produce a novel quilting machine or the like that employs a movable pattern which controls the relative movements of the work and the sewing machine in a simple, novel way.

In carrying out my invention, a power driven member is so interconnected with the other parts of the machine that it drives a pattern device in an endless path and, under the control of the pattern device, effects certain relative movements between the work and the sewing machine, whereas other relative movements between the work and the sewing machine are caused by the driving of a work-feeding means from the pattern device. In the preferred embodiment of my invention, the pattern device is in the form of an endless belt-like structure having a continuous, longitudinal, serpentine track along which are arranged rack teeth so disposed that a pinion meshing with the teeth and having a part or trunnion engaged with the track, will at times drive the pattern device and at other times will be compelled to move bodily transversely of the central longitudinal line of the pattern device as a whole. The bodily transverse movements of the element carrying the pinion bring about relative transverse movements between the sewing machine and the work, while the forward feeding movements of the work coincide with the

movements of the pattern device in its endless path.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings; wherein:

Figure 1 is a side view of a machine embodying the present invention, a fragment of the work-supporting table being broken away; Fig. 2 is a top plan view of the machine; Fig. 3 is an end view of the machine showing the discharge end; Figs. 4 and 5 are plan views of fragments of a quilted border strip or the like, illustrating two different designs of stitching that may be done in this machine; Fig. 6 is a section, on an enlarged scale, on line 6—6 of Fig. 1; Fig. 7 is a section on line 7—7 of Fig. 6; Fig. 8 is a section on line 8—8 of Fig. 6; Fig. 9 is a plan view of a fragment of the pattern device appearing in Fig. 8; Fig. 10 is a view similar to Fig. 9, showing a fragment of another pattern device adapted to produce a stitching of the design shown in Fig. 5, whereas the pattern illustrated in Fig. 9 causes the design of the quilting to be similar to that illustrated in Fig. 4; and Figs. 11—15, inclusive, are diagrammatic views illustrating, in conjunction with Fig. 10 which also contains a diagrammatic representation, a complete cycle of swinging movements of the sewing machine in connection with the pattern of Fig. 10, whereby the quilting may be done along overlapping lines, as shown in Fig. 5.

In the drawings I have illustrated only a preferred form of my invention, in which the work is fed intermittently in the forward direction, whereas the other relative movements between it and the sewing machine, in order to cause the line of stitching to depart from a straight line extending longitudinally of the work, are brought about by bodily movements of the sewing machine; and, for the sake of brevity, only this particular embodiment will be described in detail, although it will be understood that the relative movements between the work and the sewing machine head, other than the mere forward feeding movements of the work, may be brought about in other ways.

Referring to the drawings, 1 represents any suitable stationary frame or framework on which the various parts constituting my improvements are mounted or carried. Located

a short distance above the stationary frame is a horizontal table 2 which, in the arrangement shown, is trough-shaped by reason of having at the long side edges upright flanges 3. The table is shown as supported on brackets 4 in the form of heavy flat metal straps bent into the form of wide, shallow inverted U's fixed to the stationary frame. The material to be quilted rests in the trough of the table and is fed lengthwise thereof during the quilting operation. In the arrangement shown, the material to be quilted consists of upper and lower fabrics A and B and an intermediate strip or sheet of padding C. These three sheets or strips are supplied in the form of rolls that are rotatably mounted in suitable supports on the stationary frame so that they may be drawn off the rolls, as required. In the arrangement shown, there are at the front or inlet end of the machine two uprights 5, each having at the upper end a horizontal arm 6 extending inwardly over the machine. The roll of material A is wound on a core having at its ends trunnions 7. These trunnions rest in upwardly-opening bearing seats 8 in the arms 6 just above the front end of the table. The strip A is carried down underneath a transverse guide 9 extending between the side flanges of the table at the inlet end of the latter. The roll B has trunnions 10 similar to the trunnions 7; these trunnions resting in seats 12 that extend inwardly and downwardly from the rear edges of the uprights 5 at some distance below the top of the main frame. There is what may be termed an auxiliary table 13 that extends from the uprights 5, a short distance above the roll B, to the under side of the inlet end of the main table, so that the strip from the roll B may be carried up along the auxiliary table to the main table. The roll of padding C is also provided with trunnions 14 similar to the trunnions 7 and 10. The trunnions 14 are engaged in slots 15 extending inwardly from the rear edges of the uprights and then vertically; the vertical portions of the slots being of great length and terminating at their lower ends in the vicinity of the auxiliary table 13. The trunnions 14, consequently, do not normally rest in underlying bearing seats, but the roll of padding material rests on the auxiliary table, the trunnions simply holding the roll against displacement except in the vertical direction. The strip B, carried up from underneath across the auxiliary table, underlies the strip of padding, so that these two strips enter upon the main table as a double strip indicated at D in Fig. 1. At the main table, the double strip meets the strip A and the resulting composite strip, E, which now is composed of three layers, passes under an idle roller 16 overlying and extending transversely across the table 2. While on the table this three-ply strip is quilted, as will hereafter be explained, and then passes between a set of feed rolls 17 at the rear or outlet end of the machine and, from the feed rolls, travels down over an inclined shelf 18.

Overlying the composite strip on the main table, is a second idle roller 19 spaced apart from and parallel to the roller 16. The stitching or quilting is done on that part of the work lying between and held down by the rollers 16 and 19; the stitching being done by a sewing machine head 20 so supported that the vertical needle bar 22 always lies in the space bounded at the front and rear by the roller 16 and 19 and at the sides by the two flanges of the main table.

The sewing machine head is fixed upon a suitable horizontal bed 23 which rests and is slidable on an oscillating carriage 24. The carriage 24 is supported on the free end of a horizontal cantilever device 25, fixed to and extending inwardly from one of the side portions 26 of the main frame. The cantilever device has, at its inner, free end, a sturdy block 27 provided with a vertical bore through which extends and in which is rotatably held a cylindrical stem 28 projecting downwardly from the carriage 24. Consequently, the carriage may swing about the vertical axis of its stem, while the weight thereof is borne by the cantilever arm. The carriage is provided with a series of rollers 29 rotatable about horizontal transverse axes. The under face of the bed 23, that supports the sewing machine head, is machined so as to provide smooth plane surfaces for engagement with the rollers 29. Fixed to the under side of the bed 23, on opposite sides of the carriage 24, are channel-shaped bars 30 whose flanges are horizontal and directed inwardly. Between the flanges of each of the members 30 are a plurality of vertical rollers 32 that engage with the side edges of the carriage and thus compel the sewing machine head to maintain a fixed positional relation to the carriage, excepting that it may move lengthwise of the carriage on the anti-friction rollers which support the same.

The sewing machine head is preferably detachable from the supporting bed therefor, in order that the standard sewing machine head may be employed. In the arrangement shown, the base 33 of the head is provided with downwardly-projecting feet 34 which rest upon two raised cross pieces or rails 35 on the bed 23. As best shown in Fig. 6, the parts are so proportioned that the top of the base 33 lies only a slight distance below the under side of the table 2, with the feet 34 resting on the supporting rails. Consequently, the work resting on the table occupies substantially the same relation to the needle as though the work were resting directly on the base of the sewing machine in the usual way. The bed has high upright side flanges 36. Aligned screws 37 extend through these side flanges and into engagement with the feet or other portions of the base of the sewing machine head, on opposite sides of the head, so that the head as a whole may be accurately adjusted in the direction of the length of the main table on which the work is supported.

Fixed to the vertical sides 36 of the bed that supports the sewing machine head, at one end of the bed, are long metal beams 38, which hang down into the interior of the stationary frame-work and are there connected by a cross piece 39, so as to form a hanger for supporting a combined motor and speed-reducing mechanism, the motor being indicated at 40 and the casing of the speed-reducing mechanism at 42. Therefore the motor moves bodily in unison with the sewing machine head. The sewing machine is driven from the motor as follows: One end of the motor shaft 43 has thereon a pulley 44. A belt 45 extends around this pulley and around a second pulley 46 fixed on a shaft 47 slidable in a stationary bearing 48 on the main frame and extending at its inner end through a bearing member 49 mounted on and fixed to the supporting bed for the sewing machine head, as best shown in Fig. 6. On the inner end of the shaft 47 is a wheel or pulley 50. A belt 52 extends around

the pulley 50 and around the usual driving wheel or pulley 53 on the sewing machine head.

What may be termed the swinging and sliding supporting structure for the sewing machine head is provided with a second hanger arrangement formed of horizontal beams 54 fixed to the vertical beams 38 and extending laterally therefrom underneath the sewing machine head. The projecting ends of the beams 54 may be supported by braces 55 fixed thereto and extending upwardly to the walls or flanges 36 where they are fastened. The two beams 54 are also connected together at their projecting ends by a horizontal cross beam 56 extending longitudinally of the machine. Fixed to the beam 56 is a bracket 57 in which is journaled a vertical stub shaft 58 on the upper end of which is a beveled pinion 59 which, in turn, meshes with a complementary pinion 60 on a short horizontal shaft 62 journaled in and supported by a pair of additional brackets 63 fixed to and carried by the beam 56. On one end of the shaft 62 is a sprocket wheel 64 around which runs a sprocket chain 65 that also extends around a small sprocket wheel 66 on a shaft extending out through the casing 42 of the speed-reducing apparatus. It will thus be seen that the motor serves not only to drive the sewing machine, but also to turn the short vertical shaft 58. This shaft 58, which cooperates with the pattern to be hereinafter described, lies directly below and is axially aligned with the needle holder 22 of the sewing machine, as best shown in Fig. 6. In other words, whatever path the axis of the stub shaft 58 traverses, the sewing machine needle must follow an identical path.

On the shaft 58, near the lower end, is a pinion 67. This pinion and the short section of shaft extending beyond the same cooperate with a novel pattern device to control the relative movements of the sewing machine head and the work.

The pattern device is based on the principle of an endless belt having an endless serpentine groove extending longitudinally of the same, to receive the lower end of the shaft 58, and rack teeth beside and following the contour of the groove and meshing with the pinion 67. In the particular embodiment illustrated, there are two endless sprocket chains 68 each running around two vertical sprocket wheels 69 and 70 spaced apart from each other in the direction of the length of the machine. The two sprocket wheels 69 are fixed to a transverse horizontal shaft 72 and the sprocket wheels 70 are fixed to a similar shaft 73. These shafts are supported on an auxiliary frame fixed within and supported by the main frame. Thus, the main frame is provided with two longitudinal beams 74 secured in a suitable way to the front and rear ends of the main frame, at a considerable distance below the lower end of the stub shaft 58. These beams are connected together by two heavy angle irons 75 overlying the same; each angle iron having one flange resting on top of the beams and the other rising vertically above the latter. The angle irons are oppositely disposed, so that the horizontal flanges are directed toward each other. The shaft 72 and 73 are journaled in suitable brackets 76, 76 carried by and projecting from the angle irons 75. One end of the shaft 73 is extended and has thereon a sprocket wheel 77. A sprocket chain 78 extends around the sprocket wheel 77 and around a sprocket wheel 79 fixed to the end of the shaft 80 of one of the feed rolls

17. Consequently, the feed rolls are driven directly from the pattern device. Rising from each of the beams 74 are a pair of uprights 82 conveniently secured in place by being bolted or riveted to the vertical flanges of the angle irons 75. The upper ends of each pair of uprights are connected together by channel-shaped members 83 lying on the inner sides thereof with their troughs or channels directed toward each other. The channels 83 lie just above the plane of the tops of the sprocket wheels 69 and 70, and serve as guides for the upper run of the pattern proper.

The actual pattern consists of a series of blocks 84, each somewhat longer than the distance between the sprocket chains. Consequently, when the blocks are secured upon the sprocket chains so as to form the exterior face of an endless belt, the ends of the blocks extend into the troughs or channels of the members or guides 83. Each of the blocks 84 has in its outer face a groove section 85, the ends of which register with the adjacent ends of groove sections in contiguous blocks so that, when the sprocket chains with the attached blocks are laid flat, the various groove sections form a continuous groove throughout the length of the flattened structure. Consequently, when the belt-like structure is secured around the sprocket wheels, the groove may be said to constitute an endless groove because there is never any break in the same along the upper run of the belt-like device. In other words, that part of the belt-like device, which is engaged with the guides 83, contains a number of pattern blocks lying in the same plane and close together. Each pattern block has thereon, beside and following the contour of the groove therein, a raised section or ledge 86 having on the side toward the groove rack teeth 87.

The parts are so proportioned that the lower end of the stub shaft 58 extends down into the groove of that block in the upper run of the endless pattern device which is immediately below the same, whereas the pinion 67 on this shaft meshes with the corresponding rack teeth. Obviously, whenever the shaft 58 revolves, either the endless pattern device or the said shaft must move bodily since the pinion must roll along the rack teeth or the rack teeth must be moved by the driving action of the pinion on the shaft. Actually, both of these movements occur, the pinion at times driving the endless pattern device ahead and at other times rolling along portions of the racks and causing the sewing machine head to move transversely of the work-supporting table. Furthermore, at times both the pattern device and the sewing machine head move in unison.

The design in the pattern device present in the machine as illustrated is one in which the groove consists of a series of straight transverse sections each joined at its ends to the contiguous straight sections by semi-circular sections. The quilted design produced in the work from this pattern is similar to that of the groove, as indicated by the line of stitching *e* in Fig. 4. The line of stitching, with this design of pattern, need not correspond to the pattern design excepting that the stitching must consist of a series of parallel transverse sections connected by sections that are more or less curved and extend lengthwise of the work between the transverse sections. This follows from the fact that the speed at which the feed rolls for the work are driven depends upon the ratio between the

rate of travel of the pattern and the rate of feed of the work. If the work be fed faster than the speed at which the pattern moves, the transverse lines of stitches will be spaced farther apart than are the straight transverse groove sections in the pattern. On the other hand, if the work moves more slowly than the pattern, the straight transverse sections of stitching will be closer together than are the corresponding parts of the groove in the pattern. To the extent just explained, the design of the quilting may be varied for a given pattern by changing one or both of the sprocket wheels 77 and 79 or otherwise changing the driving connection between the pattern device and the feed rolls for the work.

The swinging movements of the sewing machine head are not required to come into play while quilting according to the simple design appearing in Figs. 2 and 4. However, as there is a tendency to swing the head in one direction, at least, when a pattern of this simple design is used, some means must be provided to prevent such undesired swinging of the head. I have therefore placed on the main frame of the machine a stop that prevents swinging movements of the head in one direction from what may be termed its normal position, while permitting swinging movements in the opposite direction. This stop consists of a bracket 88 fixed to the main frame beside the tail end of the bed 23. Normally one of the vertical members 38 of the swinging structure abuts against the stop and the swinging structure is prevented from swinging so as to move the needle in the opposite direction from the feed of the work. However, the stop does not interfere with swinging movements in the opposite direction. The effect of the stop can be understood by noting the action of the pinion 67 in Fig. 9. Assuming the pinion to be rotating in the counter-clockwise direction, it will be seen that any longitudinal component of the pressure between the same and the rack, in the positions of the parts illustrated, tends to drive the pattern device ahead and push the shaft 58 in the opposite direction. In other words, the back pressure on the shaft is in a direction to hold the swinging structure against the stop. As the pinion makes the turn to the adjacent straight portion of the rack, the shaft moves toward the left. While the pattern is advancing, thus causing the sewing machine to travel transversely of the work while the work is being driven ahead by the pattern device. As soon as the pinion reaches the straight portion of the rack, the pattern stops moving and the sewing machine continues to move transversely of the work which, however, is no longer being moved ahead; and thus a transverse straight line of stitching is produced. When the next curved section of the rack is reached we find the swinging structure again being pressed against the stop so that the sewing machine simply moves transversely of the work while the work is being fed ahead, there being no force tending to swing the swinging structure away from its stop.

If there is used a pattern of such design that the pinion at times tends to drive the pattern backward, then the swinging structure will leave the stop and allow the needles to move in the opposite direction from that in which work is fed. Such a pattern is shown in Fig. 10, the block being indicated at 84a, the groove at 85a and the rack at 87a. The longitudinal center line of the swinging structure, the stationary

stop, and the axis about which the structure swings are shown diagrammatically at X, 88 and 28, respectively. In this pattern, the design contains no straight lines. Assuming the pinion to be turning in the counter-clockwise direction in Fig. 10, as before, it will be seen that the back thrust on the shaft is such as to hold the swinging structure against the stop. This condition is maintained until the shaft reaches the point indicated in Fig. 11. Then, as the shaft descends into the valley of the groove, as it were, between the positions indicated in Figs. 11 and 12, respectively, the swinging structure is carried away from the stop. Then, through the position indicated in Fig. 13 to that of Fig. 14, the swinging structure remains in contact with the stop. In passing from the position in Fig. 14 to that of Fig. 15, the shaft again descends into a valley and the sewing machine is swung away from the stop. The result is that there are no straight line sections of stitching in the quilting, but the stitching will consist of curved lines only, on the order of the design followed by the stitching in Fig. 5.

It is believed that the operation of the machine has been sufficiently explained in the description of the structural features and that no further description of the operation is needed; it being, of course, understood that, once the materials for the three-ply strip have been drawn through the machine and between the feed rolls, the starting of the motor is all that is required to cause the materials to be automatically fed through the machine and quilted as long as the supply of materials lasts.

It will thus be seen that I have produced a simple and rugged machine embodying a novel form of pattern, for efficiently quilting materials in accordance with predetermined designs. It will also be seen that the patterns themselves are simple, requiring only a series of similar blocks which can easily be attached to and detached from the sprocket chains or other carrying means. All of the parts, aside from the sewing machine head and motor, are of simple construction; and, therefore, since the sewing machine heads and the motor may be the ordinary sewing machines and motors of commerce, my improved machine can be constructed at a low cost.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. In a quilting machine, a table to support a piece of work to be quilted, means to feed the work across the table, a sewing machine overhanging the table, means to support the sewing machine for movements transversely of the direction of travel of the work, pattern means travelling in an endless path, a driving connection between the pattern means and the work-feeding means; and an interconnection between the pattern means and the sewing machine, including a motor driven part, to cause both the sewing machine and the pattern to move intermittently in definite time relation to each other according to the shape of the pattern.

2. In a machine of the character described, a table to support a piece of work to be quilted,

means to feed the work across the table, a movable sewing machine overhanging the table, an endless belt-like pattern device having a serpentine groove extending throughout the entire circumferential length thereof, there being rack teeth beside and following the contour of the groove, a shaft mounted on the sewing machine and extending at one end into said groove, a pinion fixed to said shaft and meshing with said rack teeth, means to rotate said shaft, and a driving connection between said pattern device and the work-feeding means.

3. In a machine of the character described, a table, means to feed work across the table, a sewing machine in position to operate on work resting on the table, means to support the sewing machine for movements transversely of the direction of travel of the work and for swinging movements through a small angle, a pattern device, means interconnecting the sewing machine and the pattern to cause each to move intermittently and in definite time relation to the other, and driving means for the work-feeding means actuated by the pattern device.

4. A pattern device for use in a machine of the character described, comprising a movable endless carrier, and blocks secured along the carrier and each having in its outer face a curved groove extending lengthwise of the carrier; the parts being proportioned and arranged to cause the groove in each block, when the block reaches a predetermined point, to form with the groove in an adjacent block a substantially continuous groove or channel.

5. A pattern device for use in a machine of the character described, comprising a movable endless carrier, and blocks secured along the carrier and each having in its outer face a curved groove extending lengthwise of the carrier; the parts being proportioned and arranged to cause the groove in each block, when the block reaches a predetermined point, to form with the groove in an adjacent block a substantially continuous groove or channel; and there being rack teeth on each block beside and following the contour of the groove, the teeth being so arranged that a pinion at said predetermined point rolling along one of the two last-mentioned blocks will mesh with the teeth of the other of said two blocks upon reaching the latter block.

6. In a machine of the character described, a stationary frame, a table on said frame to support a piece of work, feed rolls to engage the

work and move it over the table, a member mounted on said frame for swinging movements about an axis transverse to the plane of the table, a sewing machine supported by and slidable along said member, a stop to limit the swinging movement of said member in one direction, a motor on said member, a movable pattern device below said member, a driving connection between said pattern device and the feed rolls; and interconnecting means between said sewing machine and the pattern device, including a part driven by said motor, to cause the sewing machine and the pattern device to move in definite time relation to and under the control of each other.

7. In a machine of the character described, a stationary frame, a table on said frame to support a piece of work, feed rolls to engage the work and move it over the table, a member mounted on said frame for swinging movements about an axis transverse to the plane of the table, a sewing machine supported by and slidable along said member, a stop to limit the swinging movement of said member in one direction, a motor on said member, a movable pattern device below said member, a driving connection between said pattern device and the feed rolls, said pattern device having therein a serpentine groove and rack teeth beside and following the contour of the groove, a rotatable shaft supported by the sewing machine and extending at one end into said groove, a pinion on said shaft meshing with said rack teeth, and means to cause the motor to rotate the shaft.

8. In a machine of the character described, a table to support a piece of work to be quilted, means to feed the work across the table, a sewing machine overhanging the table, an endless belt-like pattern device having a serpentine groove extending throughout the entire circumferential length thereof, there being rack teeth beside and following the contour of the groove, a shaft means including a bodily movable shaft to produce relative movements between the sewing machine and the table transversely of the path in which the work is fed across the table, the shaft extending at one end into said groove, a pinion fixed to said shaft and meshing with said rack teeth, means to rotate said shaft, and a driving connection between said pattern device and the work-feeding means.

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