

Dec. 16, 1924.

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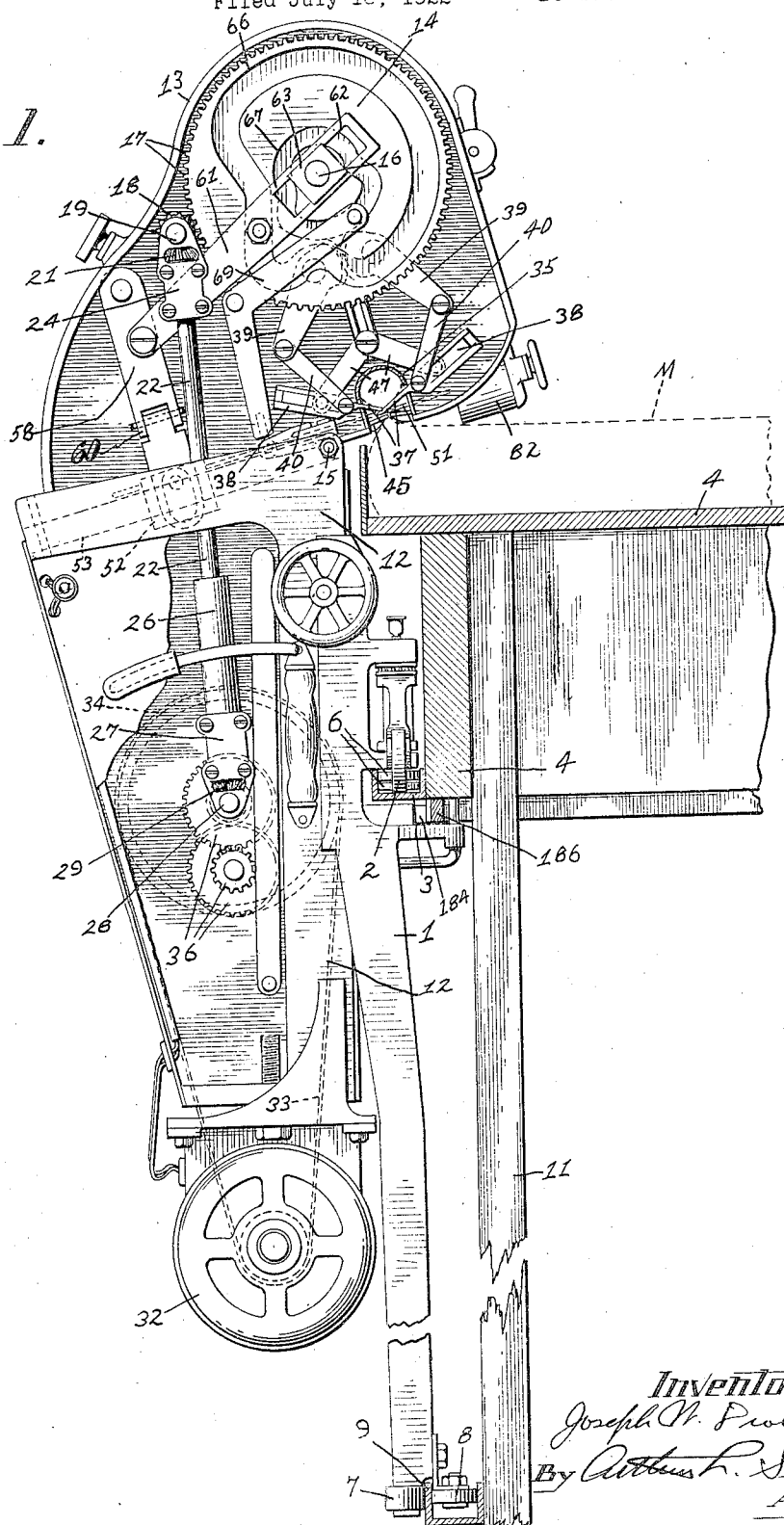
J. W. DROLL

STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

Filed July 18, 1922

14 Sheets-Sheet 1

Fig. 1.



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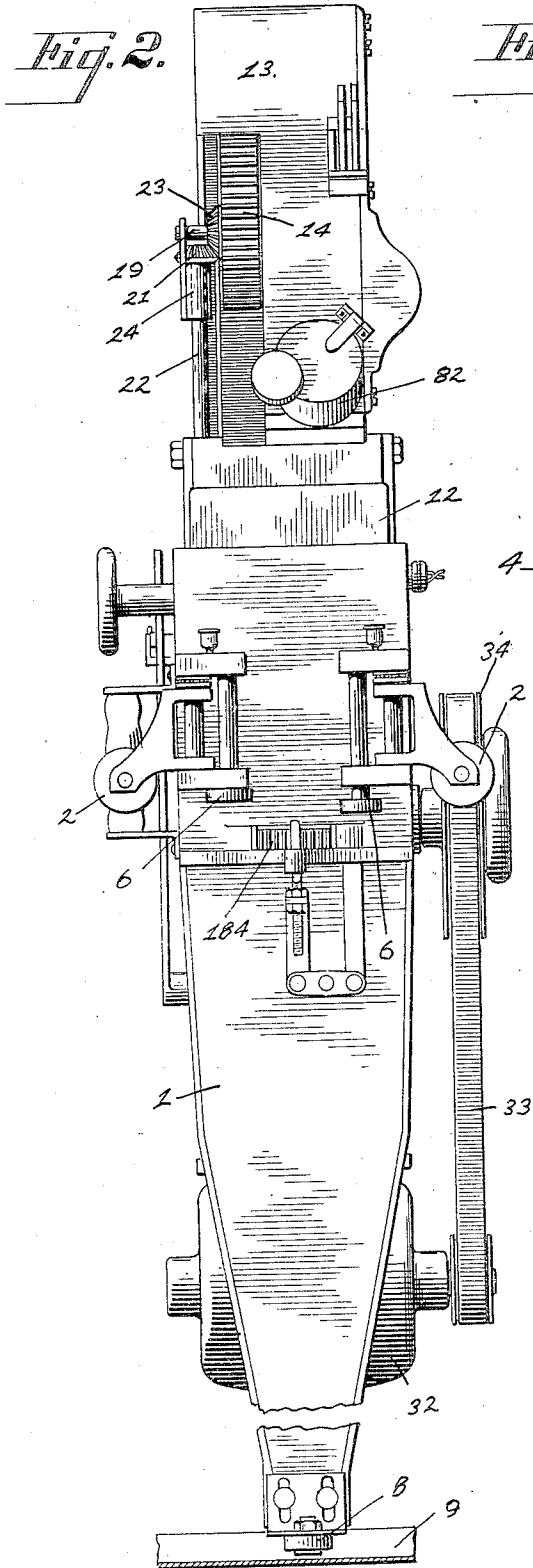
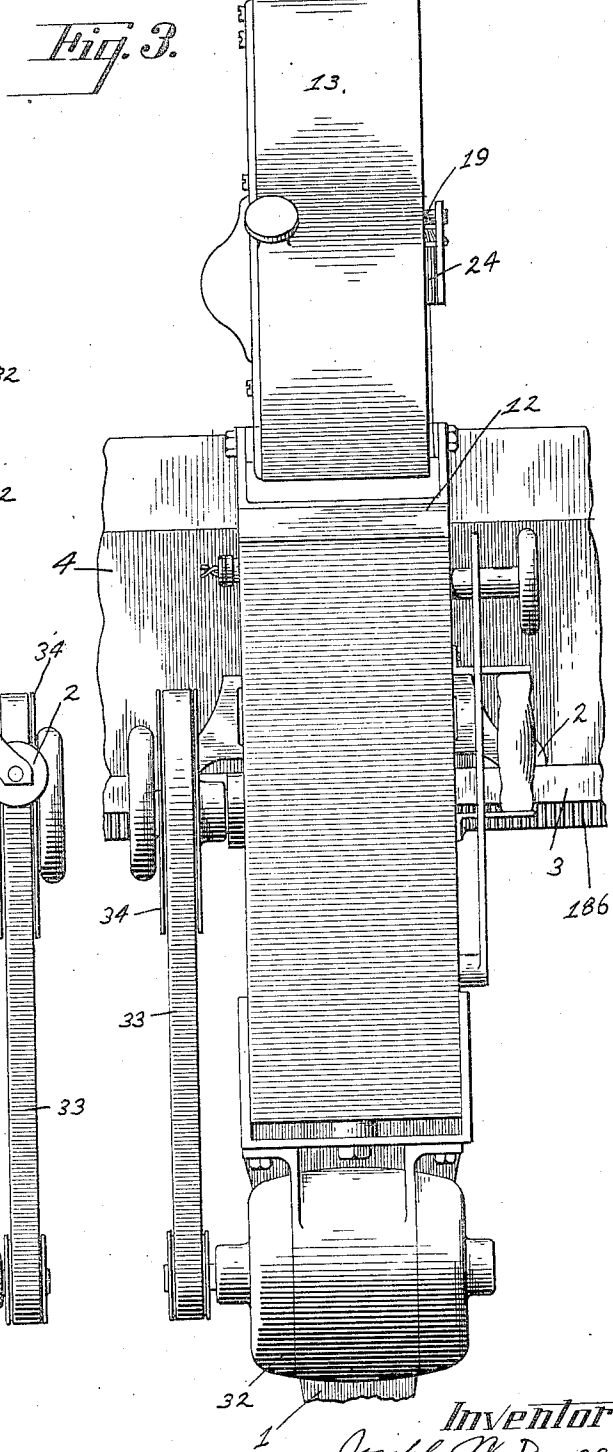
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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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14 Sheets-Sheet 2



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14 Sheets-Sheet 3

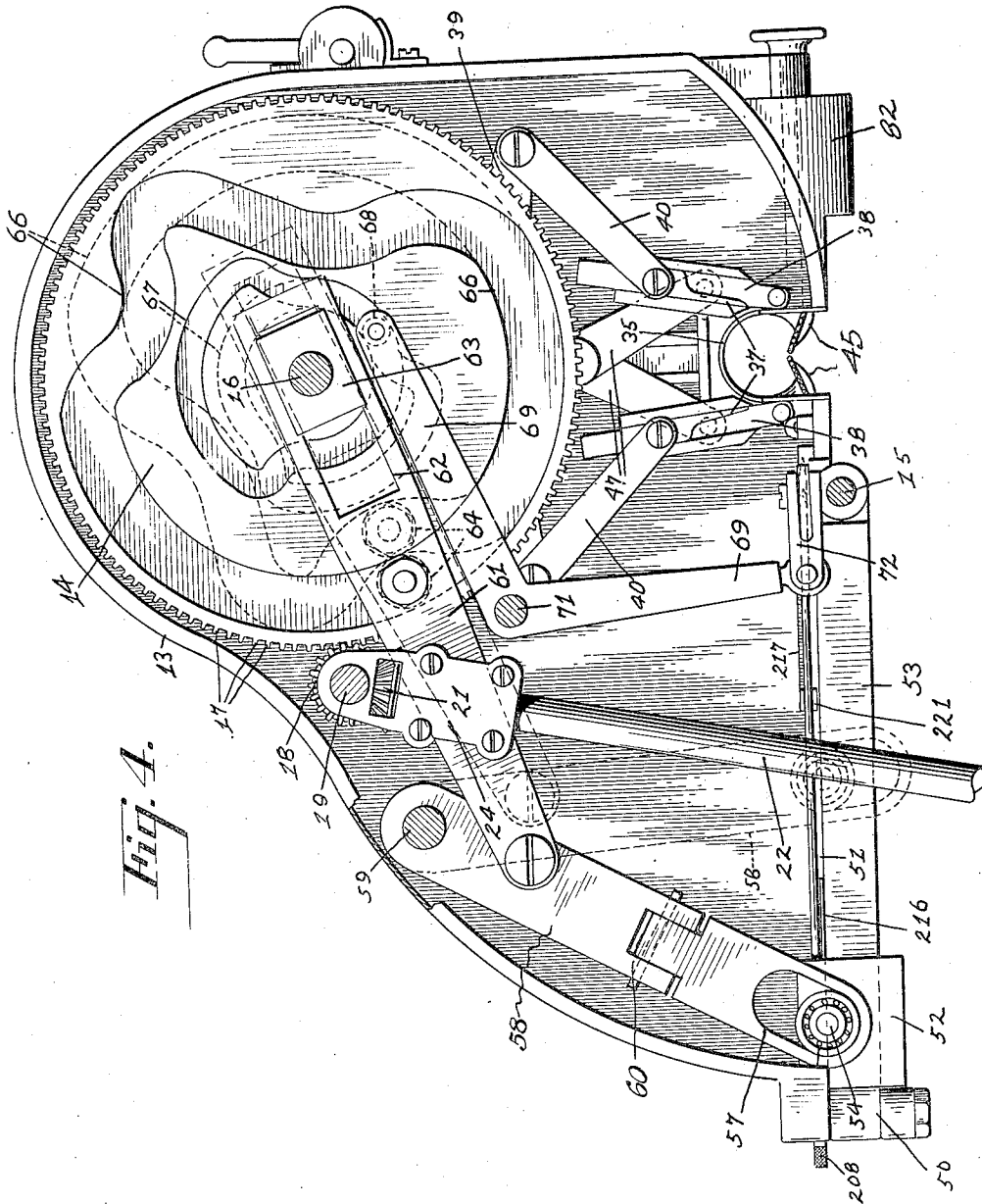


Fig. 4.

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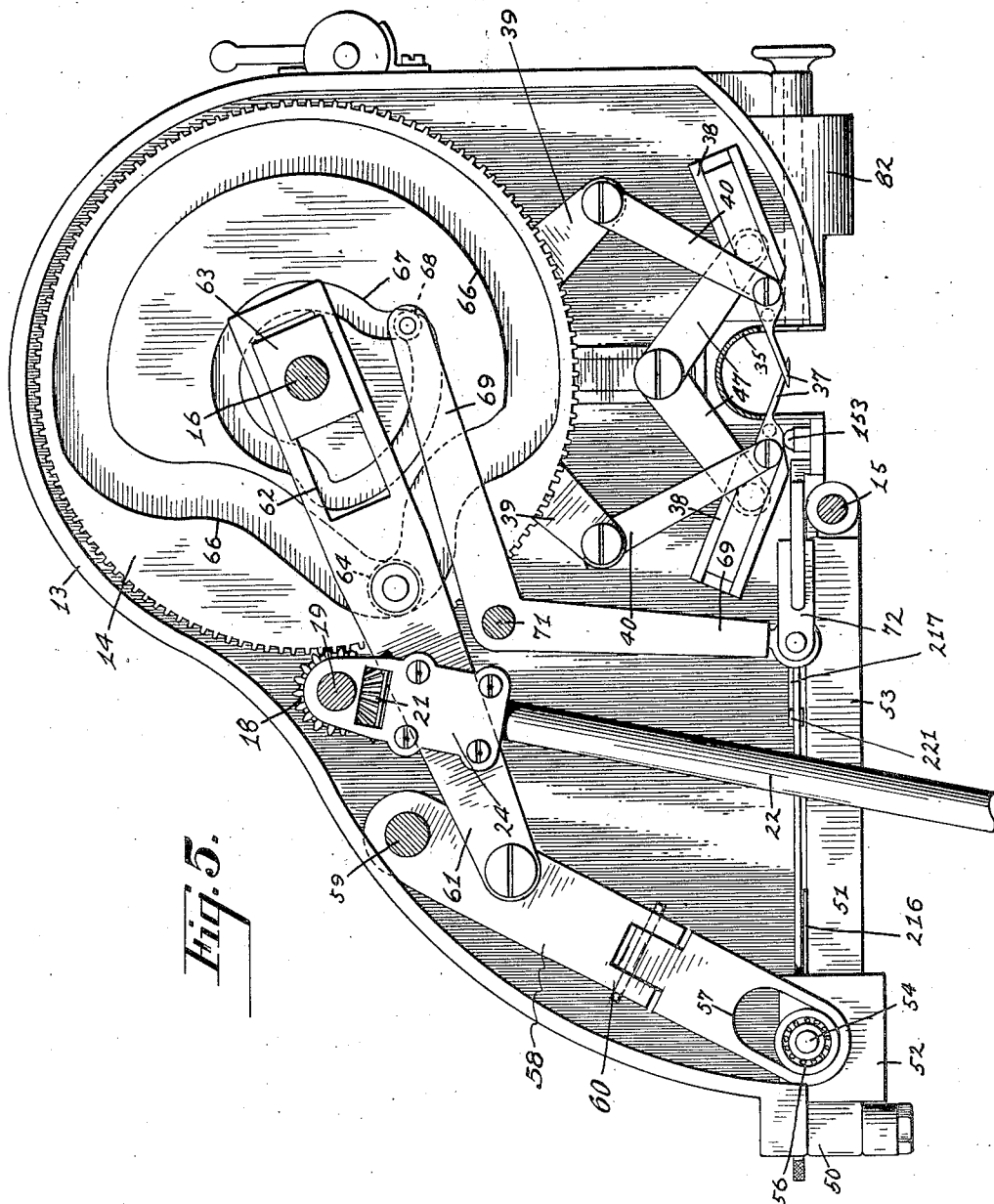
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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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14. Sheets-Sheet 4



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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

Filed July 18, 1922

14 Sheets-Sheet 5

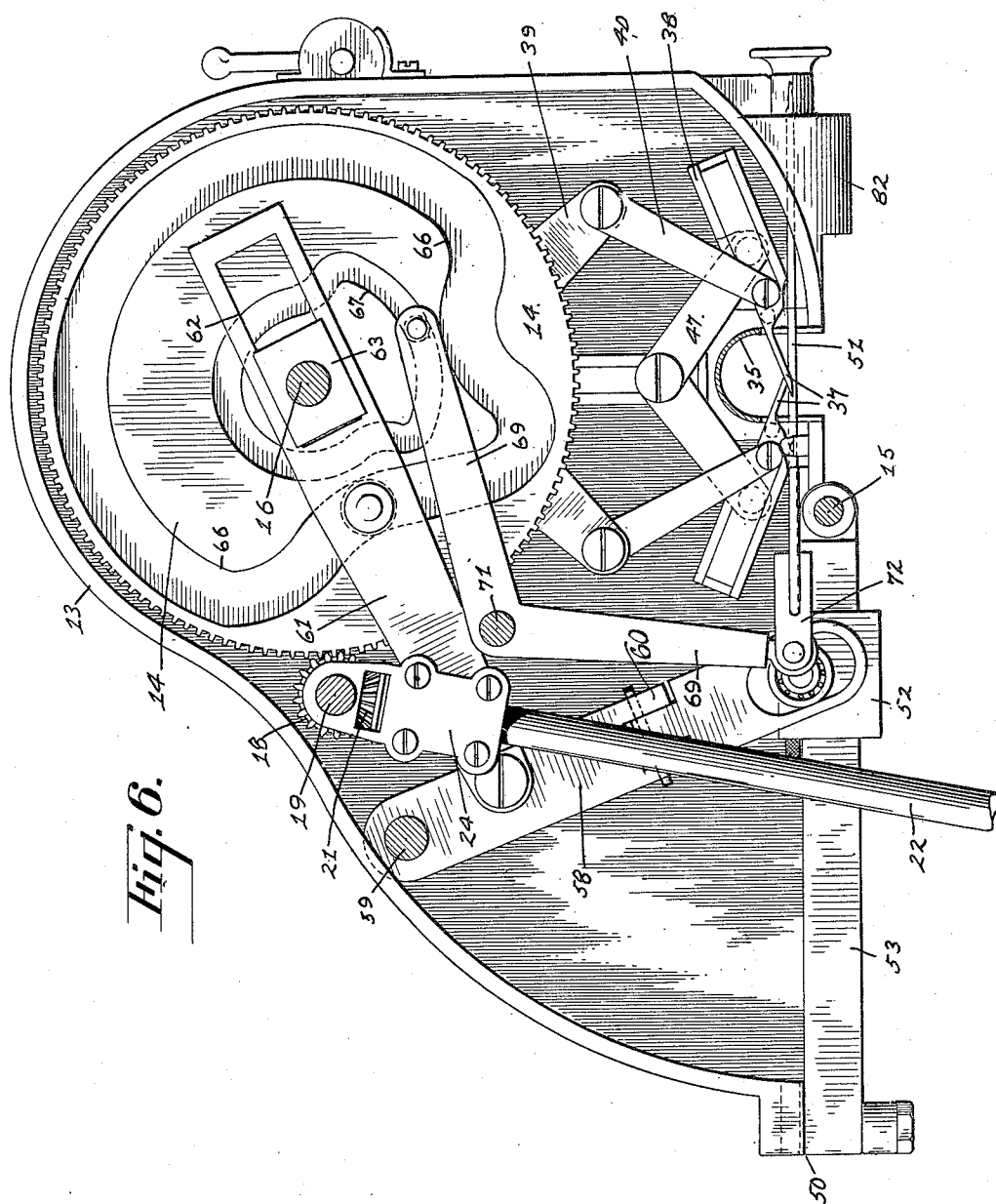


Fig. 6.

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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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14 Sheets-Sheet 6

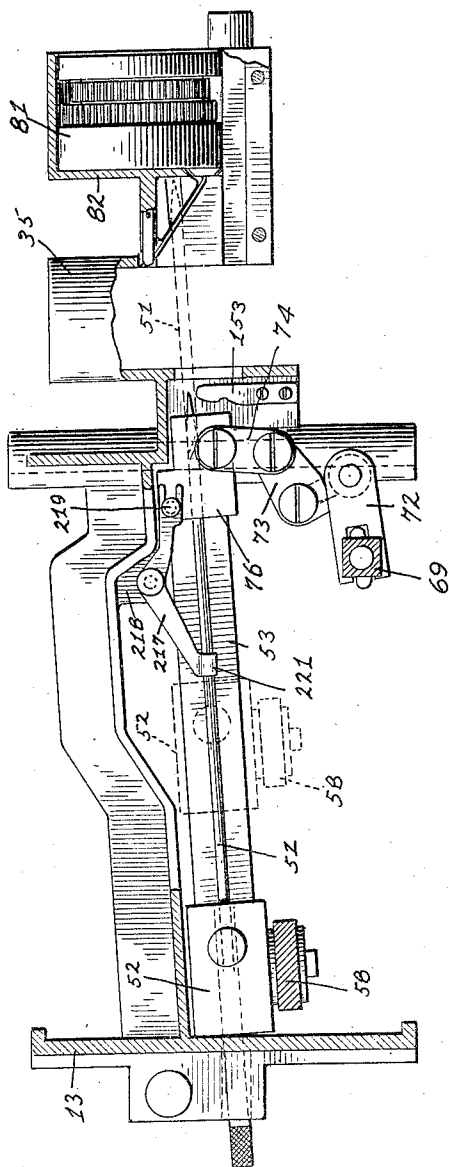


Fig. 7.

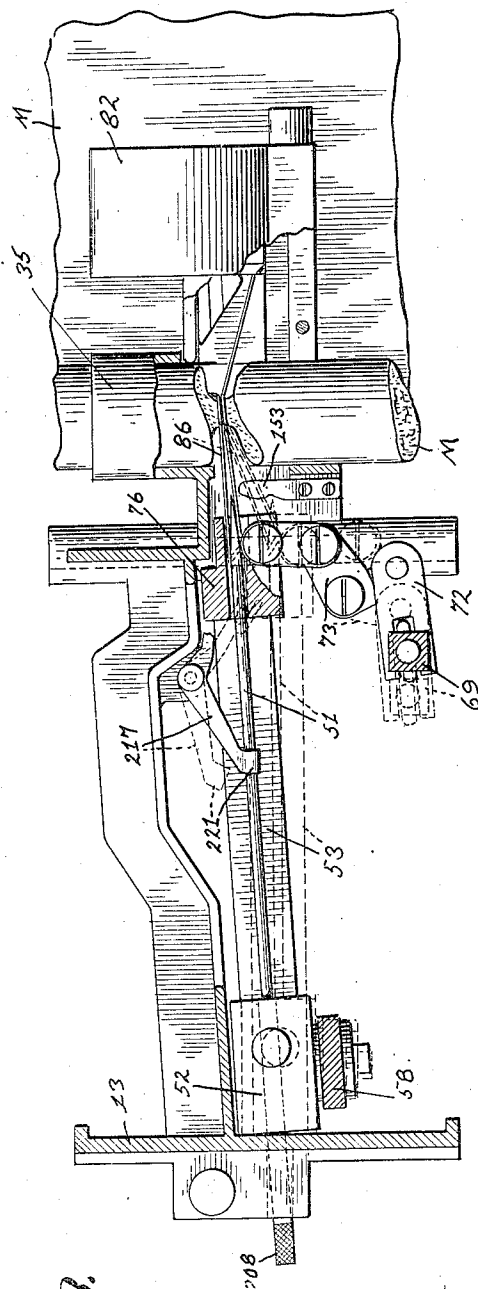


Fig. 8.

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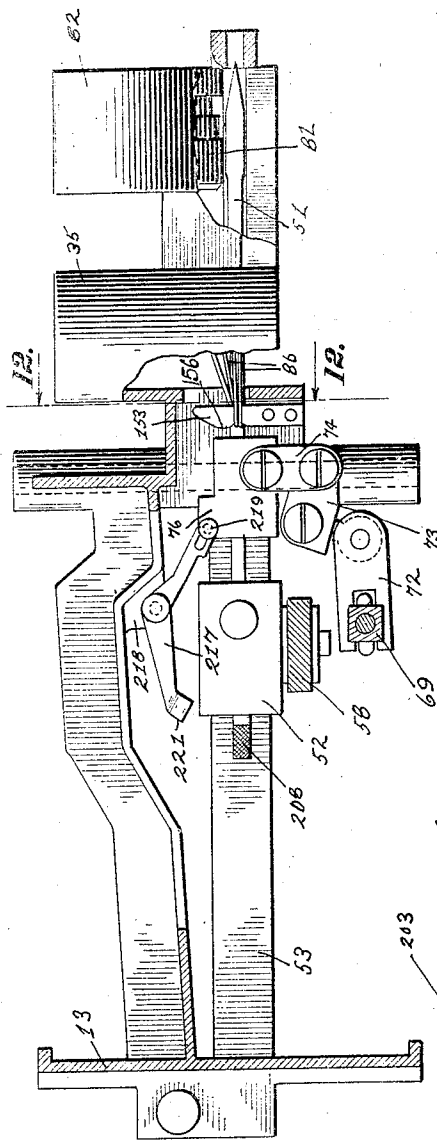
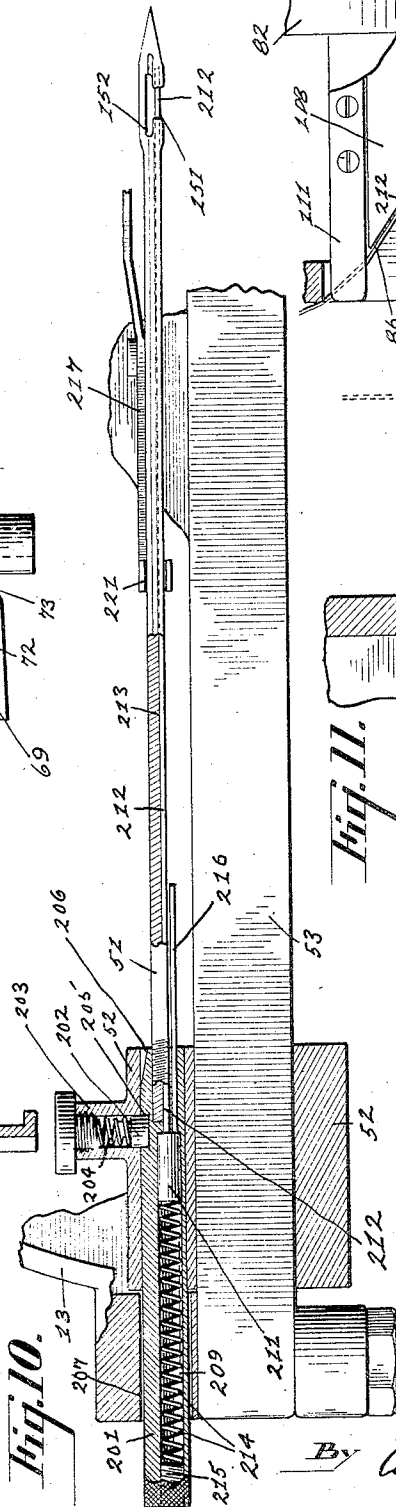
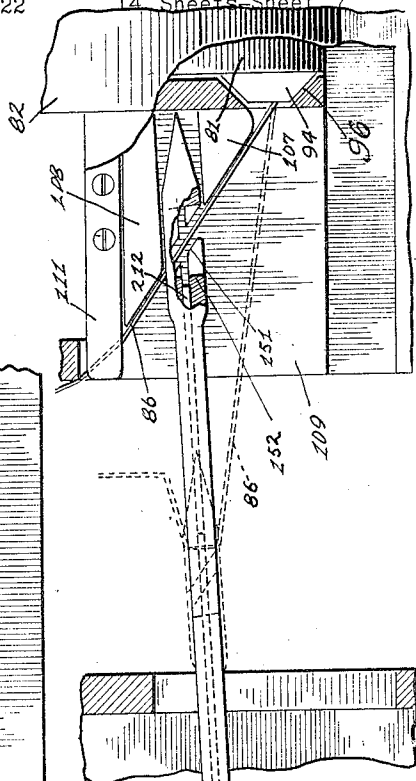
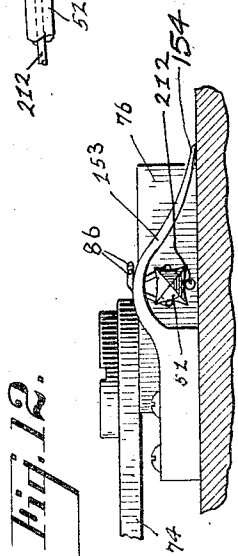
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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

Filed July 18, 1922

14 Sheets-Sheet 7



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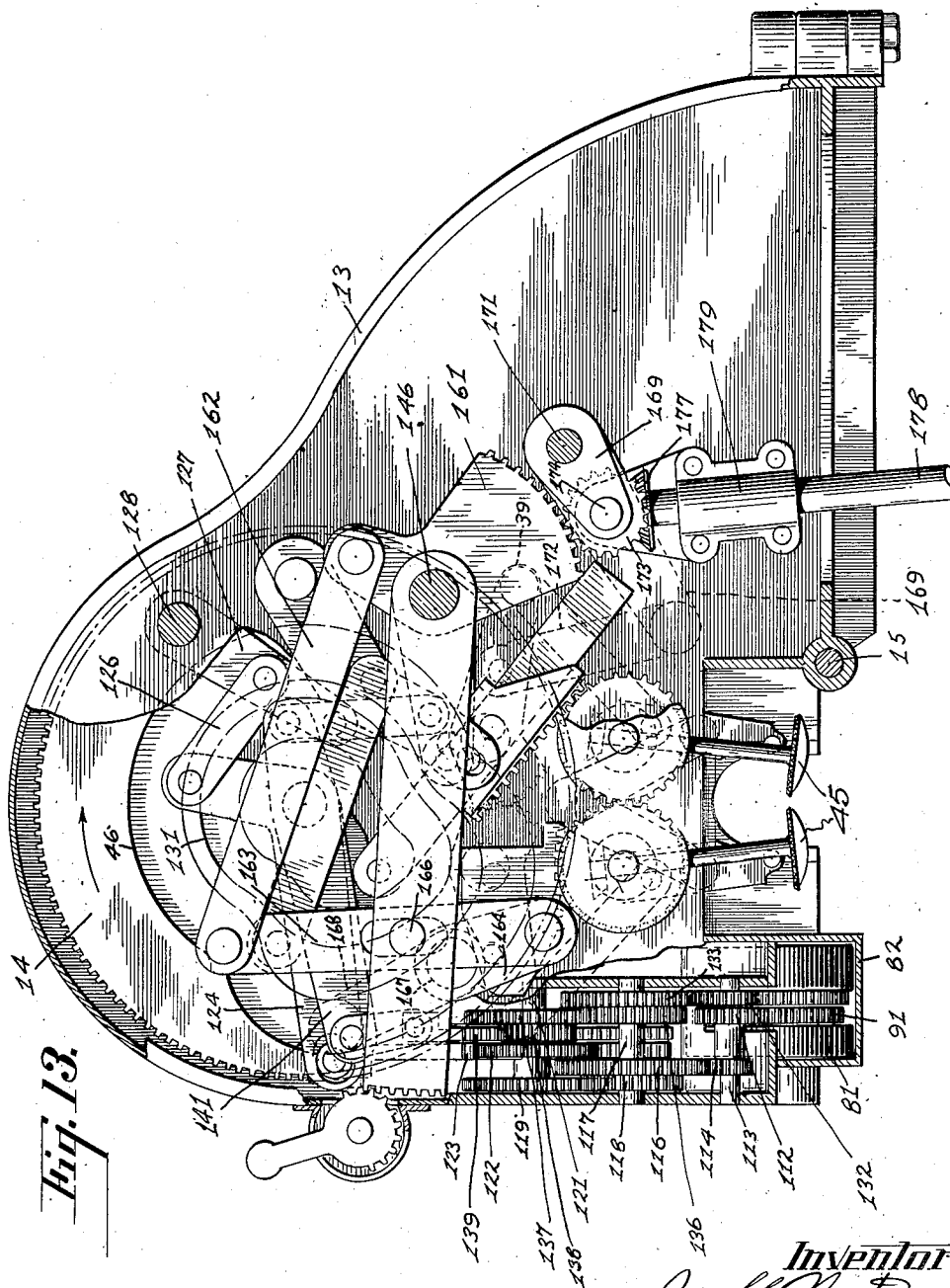
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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES.

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14 Sheets-Sheet 8



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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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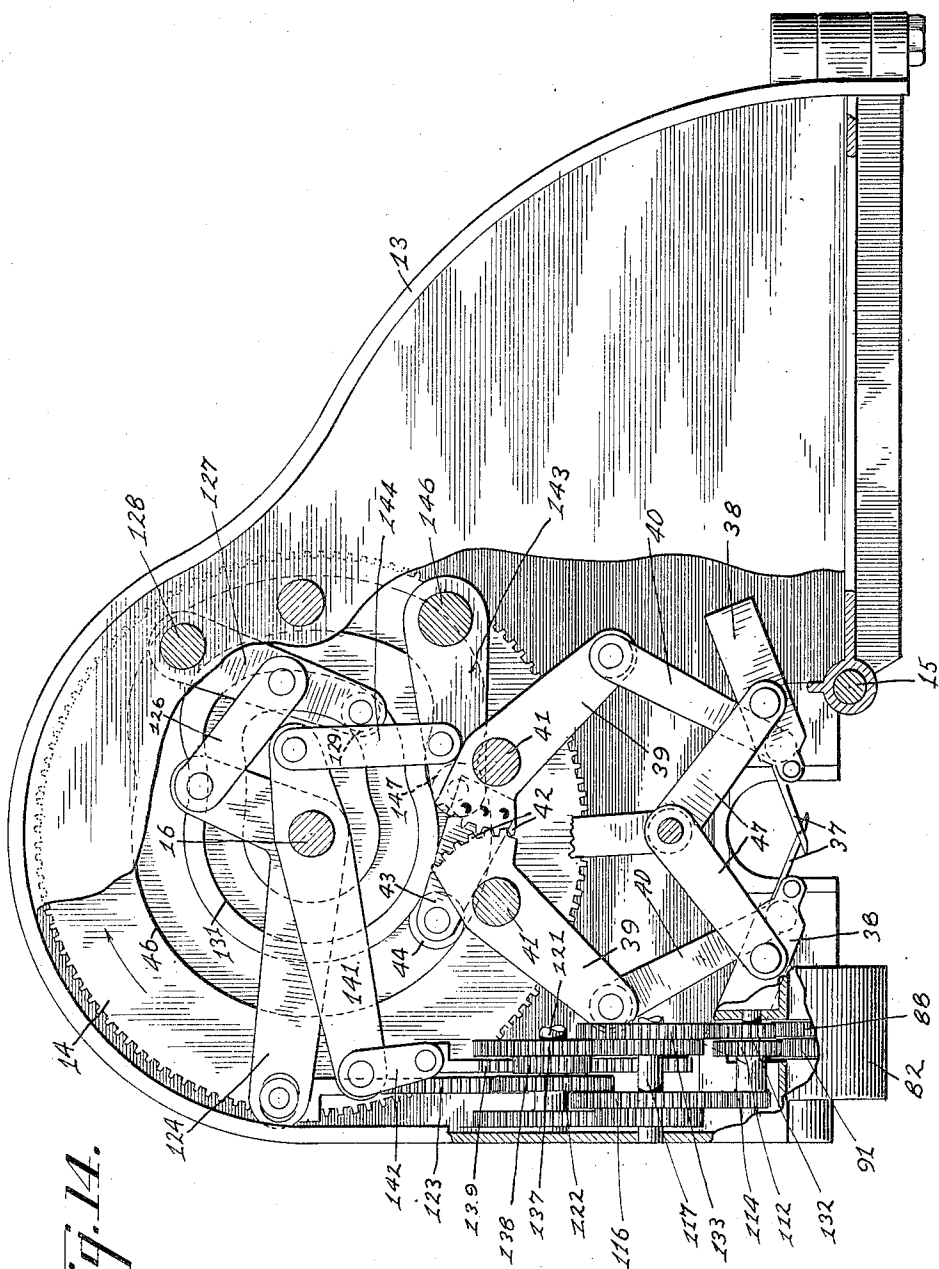


Fig. 14.

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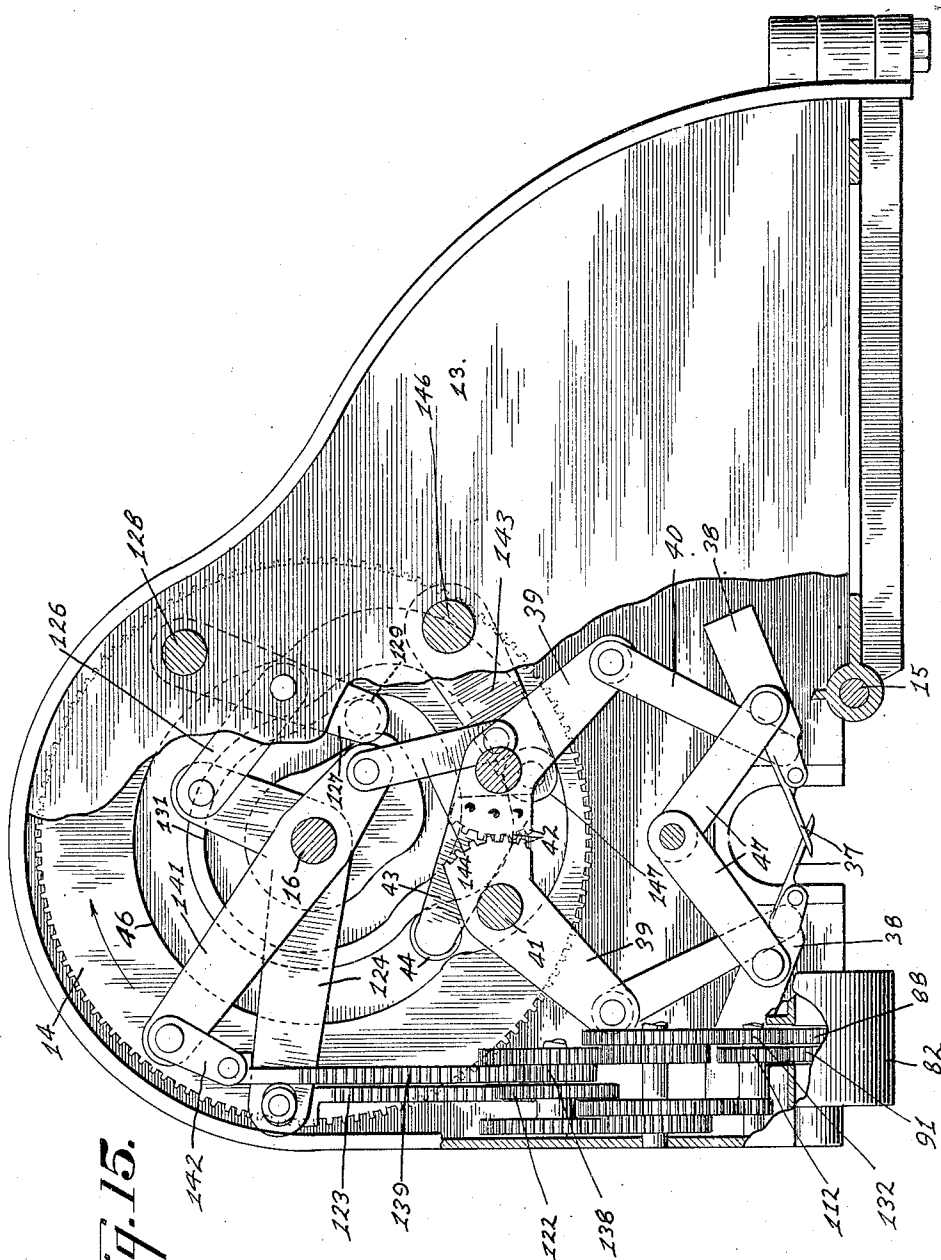
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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

Filed July 18; 1922

14 Sheets-Sheet 10



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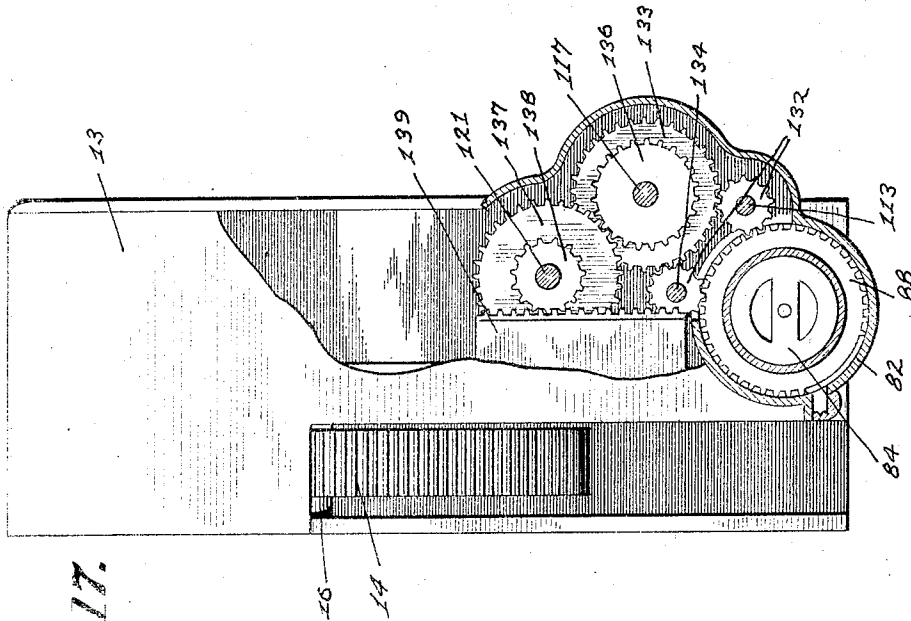
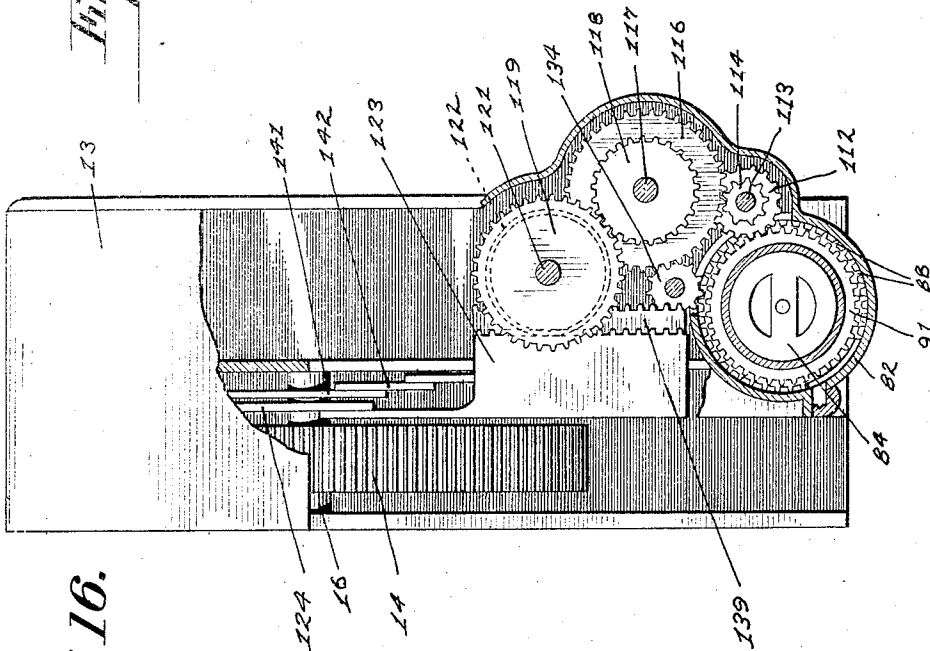
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Filed July 18, 1922

14 Sheets-Sheet 11



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14 Sheets-Sheet 12

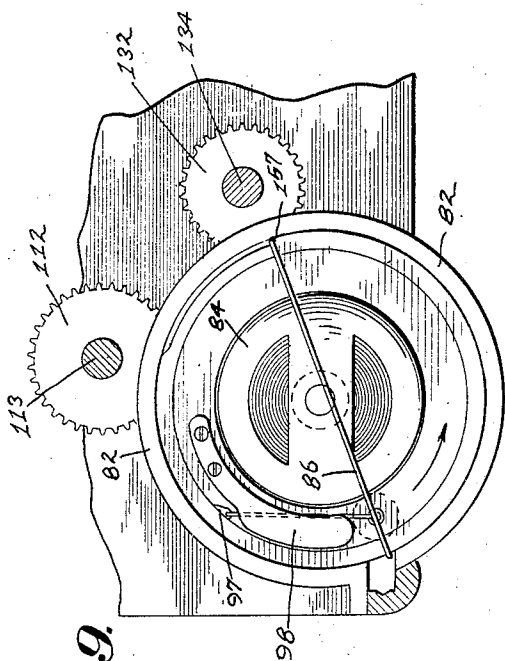


Fig. 19.

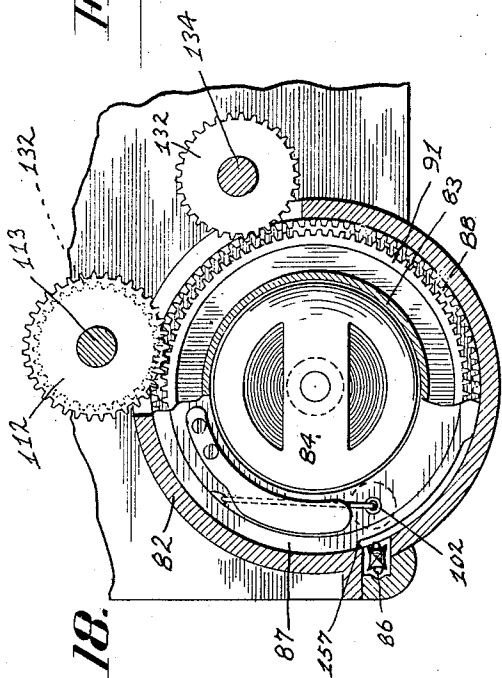


Fig. 18.

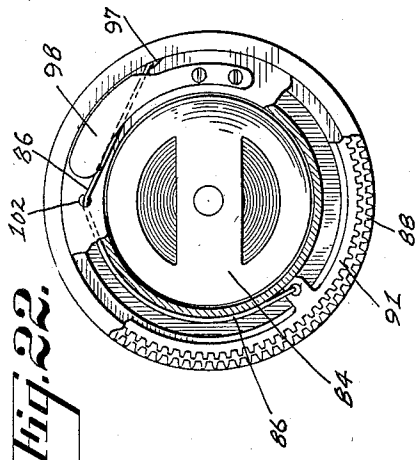


Fig. 22.

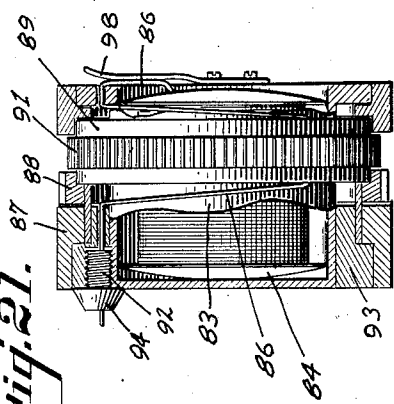


Fig. 21.

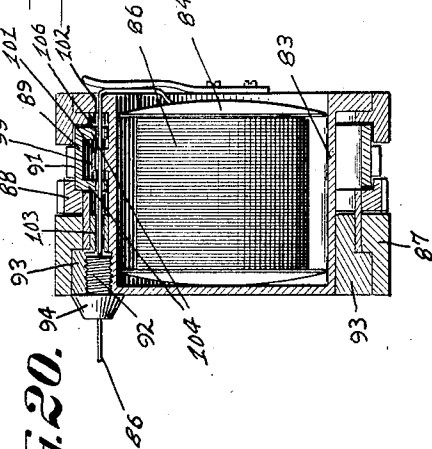


Fig. 20.

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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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14 Sheets-Sheet 13

Fig. 23.

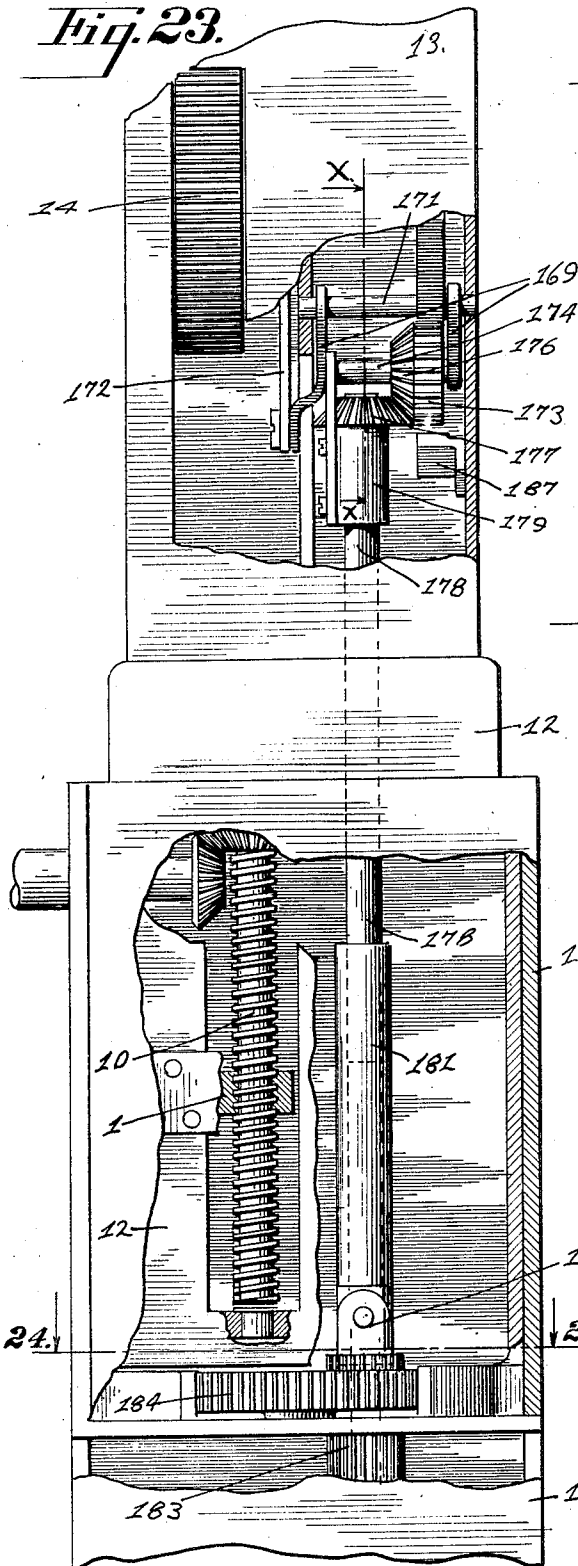


Fig. 24.

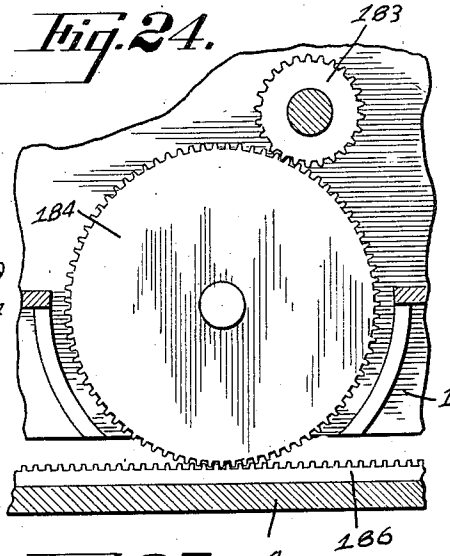
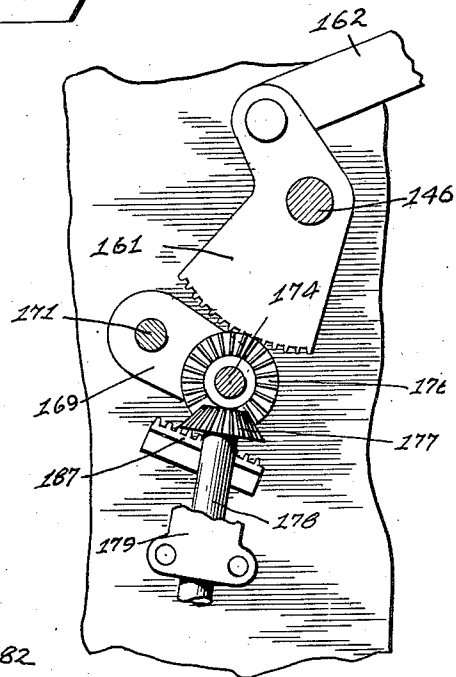


Fig. 25.



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STITCHING MECHANISM FOR MATTRESS ROLL FORMING MACHINES

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14 Sheets-Sheet 14

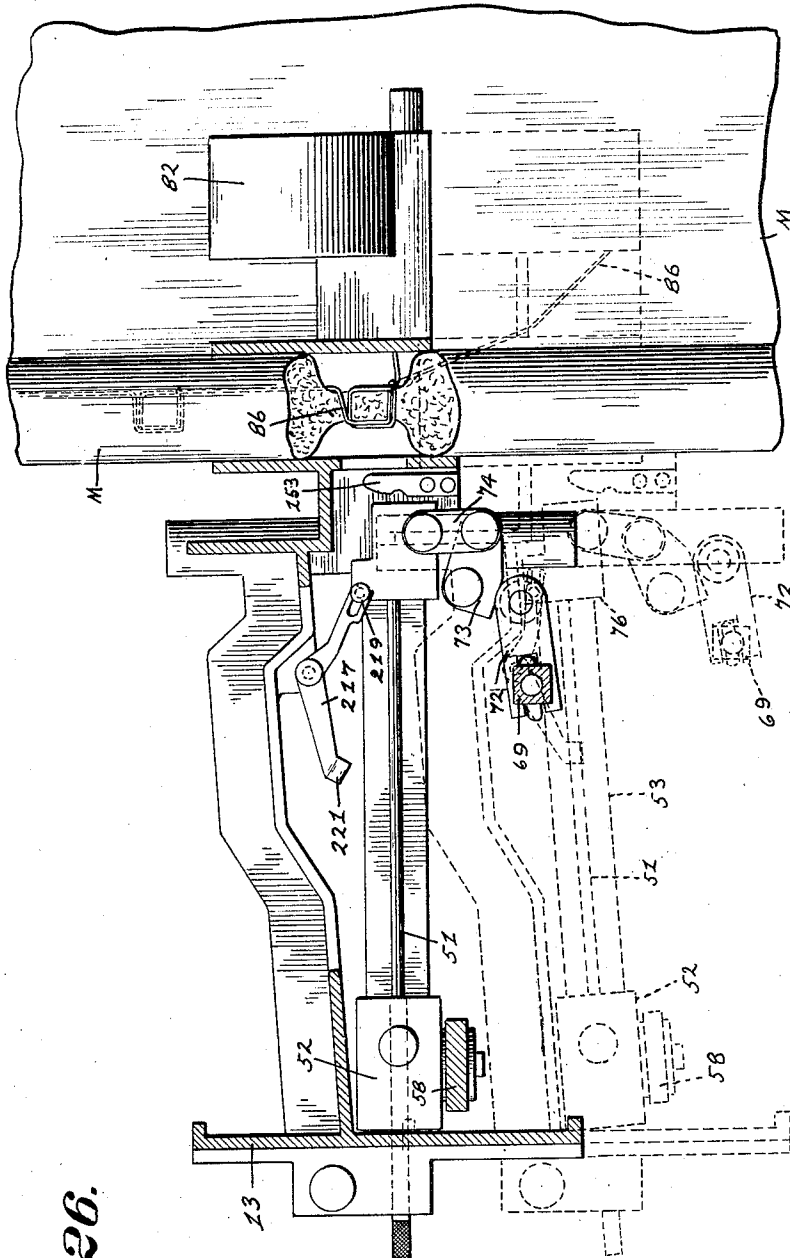


Fig. 26.

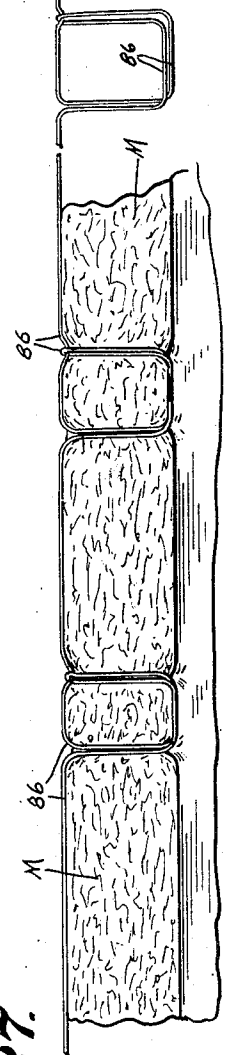


Fig. 27.

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Patented Dec. 16, 1924.

1,519,299

UNITED STATES PATENT OFFICE.

JOSEPH W. DROLL, OF CHICAGO, ILLINOIS, ASSIGNOR TO DROLL PATENTS CORPORATION OF DELAWARE, A CORPORATION OF DELAWARE.

STITCHING MECHANISM FOR MATTRESS-ROLL-FORMING MACHINES.

Application filed July 18, 1922. Serial No. 575,812.

To all whom it may concern:

Be it known that I, JOSEPH W. DROLL, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in a Stitching Mechanism for Mattress-Roll-Forming Machines, of which the following is a specification.

My invention relates to improvements in mattress stitching machines and the like and is particularly directed to an improved stitching mechanism arranged to make a single thread lock stitch for sewing a roll upon the edge of a mattress or other piece of upholstery.

The primary object of my invention is to provide an improved machine for sewing a roll edge upon mattresses and the like.

Another object is to provide an improved sewing mechanism wherein a sewing needle and a shuttle are actuated in timed relation to form a lock stitch from a single thread.

A further object is to provide an improved sewing needle and actuating mechanism therefor to permit the alternate engaging and disengaging of a single thread to form stitches through the edge of a mattress.

Another object is to provide an improved shuttle arranged to dispense a thread to a sewing needle during one portion of the sewing operation and to disengage said thread from the needle and lock the stitch during another portion of the operation whereby a continuous series of locked stitches may be formed from a single sewing thread.

A further object is to provide an improved needle having means for opening the eye thereof at predetermined moments to engage and disengage the thread and to close said eye to prevent disengagement with the thread while the thread is being drawn through the mattress.

A still further object is to provide an improved thread dispensing means whereby thread may be played out and slack taken up in timed relation with the movements of the sewing elements to insure a firm and uniform stitch.

A still further object is to provide an improved machine having means for moving the stitching mechanism along the edge of a

mattress to form successive stitches there-through.

Further objects are to provide for vertical and pivotal adjustment of the stitching mechanism relative to the edge of the mattress whereby the same may be adapted to different thicknesses and grades of work.

I accomplish these and other objects by means of the device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout said specification and drawings and in which:

Fig. 1 is a broken side elevation of my improved mattress stitching machine as mounted upon a mattress supporting table.

Fig. 2 is an elevation showing the machine as viewed from the right hand side of Fig. 1.

Fig. 3 is an elevation of the machine as viewed from the left hand side of Fig. 1.

Fig. 4 is an enlarged side elevation of the head of the machine with the outer cover removed, the moving parts being shown in the starting position, in full lines, and the first advance of the sewing needle shown in dotted lines.

Fig. 5 is a view similar to Fig. 4 showing the roll forming means in operative position and the needle receded after the first advance.

Fig. 6 is a similar view showing the needle advanced the second time.

Fig. 7 is a horizontal section showing the movement of the needle from the starting position as shown in full lines to the first advance as shown in dotted lines.

Fig. 8 is a similar view showing the needle receded after the first advance, and in dotted lines showing the pivotal shifting of the needle prior to the second advance.

Fig. 9 is a similar view showing the needle being advanced the second time.

Fig. 10 is an enlarged detail partly in section of the needle and its mounting.

Fig. 11 is an enlarged detail showing the manner in which the thread is engaged during the first advance of the needle.

Fig. 12 is an enlarged broken transverse sectional detail taken upon the line 12-12 of Fig. 9 in the direction indicated, the

needle being shown in position for the second advance.

Fig. 13 is an enlarged broken transverse section of the head viewed from the right hand side of Fig. 2, the operating elements being shown in the starting position.

Fig. 14 is a similar view, portions being broken away to show the first movement of the shuttle actuating mechanism.

Fig. 15 is a similar view showing the shuttle actuating means in a subsequent position.

Figs. 16 and 17 are broken front elevations of the head showing the actuating gears for the thread dispensing member and the outer shuttle member respectively.

Fig. 18 is an enlarged transverse section through the shuttle housing, the shuttle being shown in the position prior to the second advance of the sewing needle.

Fig. 19 is a similar view showing the shuttle partially rotated after the second advance of the sewing needle.

Fig. 20 is a longitudinal section of the shuttle.

Fig. 21 is a section similar to Fig. 20 showing the thread dispensing member in elevation in a partially rotated position.

Fig. 22 is a side elevation of Fig. 21, parts being broken away and shown in section.

Fig. 23 is an enlarged broken front elevation of a portion of the machine showing the means by which the machine is moved along the edge of the mattress and supporting table.

Fig. 24 is a horizontal section taken upon the line 24—24 of Fig. 23 in the direction indicated.

Fig. 25 is a sectional detail taken upon the line X—X of Fig. 23 in the direction indicated.

Fig. 26 is a horizontal section similar to that shown in Figs. 7, 8 and 9, the position of the machine at the end of the second receding of the needle being shown in full lines and the following movement of the machine and the needle being shown in dotted lines.

Fig. 27 is a broken section of a portion of a mattress showing the manner in which the stitches are formed through the edge to secure the roll.

Referring to the drawings it will be seen that my improved machine consists of a supporting frame 1 carried by suitable castors 2 mounted thereon and engaging a channel track 3 secured upon the sides of a work supporting table 4, said frame 1 being guided by upper guide rollers 6 engaging the channel track 3 and lower guide rollers 7 and 8 engaging opposite sides of a channel guide 9 upon the lower portion of table supporting legs 11.

A frame 12 is slidably secured upon the

frame 1 to permit vertical adjustment relative thereto by means of a screw 10. A head 13 is mounted upon the upper portion of the frame 12, said head extending over the edge of the work supporting table 4, and being pivotally connected as at 15 upon the frame 12 to permit adjustment of the inclination of the head 13 relative to said table.

Within the head 13 is rotatably mounted a cam 14 upon a shaft 16, said cam 14 being provided with gear teeth 17 upon the periphery thereof. The cam 14 is driven by a pinion 18 mounted upon a shaft 19 and meshing with the teeth 17 of the cam, the pinion 18 being in turn driven by a bevel gear 21 secured upon the upper end of a drive shaft 22 and meshing with a bevel gear 23 secured upon the adjacent end of said pinion 18. The drive shaft 22 is mounted at its upper end within a bearing 24 pivotally supported upon the shaft 19. The lower end of the drive shaft 22 is feathered into a sleeve 26 carried at its lower end within a bearing 27 pivotally mounted upon a shaft 28. A bevel gear 29 secured upon the lower end of the sleeve 26 is driven by a corresponding bevel gear secured upon the shaft 28. The shaft 28 is driven by a motor 32 adjustably secured upon the lower portion of the frame 12 and connected to the shaft 28 by means of a belt 33 mounted over a suitable pulley 34 mounted upon the outer end of the shaft 28. Suitable transmission gears 36 are mounted in connection with the shaft 28 to obtain a variable speed transmission, but as this construction forms no part of the present invention and has been made the subject of a co-pending application Serial Number 575,814, filed July 18, 1922, in which it is fully described, no further description need herein be included.

A roll shaping element 35 is mounted upon the under side of the head 13 adjacent the edge of the table 4 to receive the edge of a mattress M supported thereon, a roll edge being formed upon the edge of the mattress by means of a pair of packing needles 37 slidably mounted within guides 38 pivotally mounted upon the head 13 adjacent the shaper element 35. The packing needles 37 are actuated by means of links 40 connected between the needles 37 and actuating arms 39 secured upon shafts 41. The arm 39 actuating one needle 37 is provided with teeth 42 upon the end remote from the link 40, said teeth 42 meshing with similar teeth upon the corresponding end of the arm 39 actuating the other needle 37. The arms 39 are operated by means of a lever 43 secured upon the toothed portion of one of the arms and carrying a roller 44 engaging a groove 46 upon the cam 14, whereby said arms are moved simultaneously to force the needles

37 downwardly from the normal starting position as shown in Fig. 4 to enter the side and top of the mattress M. The guides 38 are then moved pivotally by means of links 47 actuated by suitable connections engaging the cam thus causing the needles 37 to be moved to the position shown in Fig. 5 thereby causing a portion of the stuffing within the mattress to be gathered and forced into the corner of the mattress within the shaping element 35 to form a roll, the needles 37 being held in the position shown in Fig. 5 until the roll is permanently secured by stitching in a manner hereinafter described. Suitable feed rollers 45 assist in forming and shaping the roll. As the roll forming and shaping means forms no part of the present invention and is fully described in a copending application, Serial No. 575,813, filed July 18, 1922, a detailed description of the construction and operation of the same is omitted herefrom.

When the roll has been formed in the manner above briefly described it is permanently secured by means of stitches made by means of a sewing needle 51 one end of which is removably secured to a block 52 slidably mounted upon a guide 53 pivotally mounted as at 50 upon the head 13 of the machine. The block 52 is provided with an extension 54 upon the outer side thereof which carries a flexible coupling 56 engaging a slot 57 in one end of a lever 58 the other end of which is pivoted upon a shaft 59 secured within the head 13. The lever 58 is actuated to advance and recede the block 52 and the needle 51 along the guide 53 by means of an arm 61 pivotally connected at one end thereof to the lever 58, the other end of said arm 61 being provided with a slot 62 slidably engaging a guide 63 pivotally mounted upon the cam supporting shaft 16. A roller 64 is mounted upon the arm 61 to engage a groove 66 formed in the adjacent side of the cam 14 whereby the desired movement is imparted to the arm 61 and lever 58. The lever 58 is hinged as at 60 to accommodate the transverse movement of the needle.

A second groove 67 is formed in the side of the cam 14 to engage a roller 68 mounted upon one end of a bell crank 69 pivotally mounted upon a shaft 71 secured within the head 13, the other end of said crank 69 being connected by a link 72 to a lever 73 which is in turn connected by a link 74 to a block 76 slidably mounted for transverse movement. The block 76 is secured upon the free end of the pivotally mounted guide 53 and is apertured to receive and form a guide for the needle 51.

The needle is normally held in its extreme receded position while the roller 64 is engaged by that portion of the cam groove 66 which is most remote from the center of the cam. As the cam is rotated from the start-

ing position shown in Fig. 4 of the drawings it will be seen that the needle is maintained in its normal receded position for a considerable portion of the rotation, the contour of the groove then causing the roller 64 to be moved toward the center of the cam thereby causing the arm 61 to be moved along the guide 63 and the lever 58 swung about its pivot 59 to the position shown in dotted lines, continued rotation of the cam causing the several parts to be returned to the normal receded position as shown in Fig. 5.

As the needle approaches the receded position after the above described advance the roller 68 is moved outwardly by the groove 67 thereby moving the bell crank 69 about its pivot which movement is communicated through the link 72, lever 73 and link 74 to the block 76, thereby causing said block to be moved transversely about the pivotal mounting 50 of the guide 53 as shown in dotted lines in Fig. 8 of the drawings.

After the needle has been shifted transversely as just described, a further rotation of the cam causes the needle to be advanced a second time to the position shown in Figs. 6 and 9 of the drawings after which a still further rotation causes the needle to be receded and shifted to the normal starting position. Each advance causes the needle to penetrate through the roll formed within the shaping element 35 by the packing needles 37, the second penetration, however, being at a point slightly spaced from the point of the first penetration, the object of which will hereinafter be more fully explained.

The needle 51 is provided at its forward end with an eye hereinafter described. The other end of the needle is threaded into a member 201 mounted within the upper portion of the block 52 and removably secured therein by a locking member 202 slidably mounted within an extension 203 of the block 52, said member 202 being normally depressed by a spring 204 to engage a notch 205 formed upon the upper side of the member 201, whereby said member is normally locked in its operative position. The forward end of the member 201 is beveled as at 206 to facilitate the introduction of the member into engagement with the locking member. The rearward end extends outwardly through an aperture 207 in the frame 13 and is knurled as at 208 to permit the member to be readily turned sufficiently to lift the locking member when it is desired to remove the needle.

The member 201 is provided with a longitudinal bore 209 adapted to receive a plunger 211 slidably mounted therein and carrying a rod 212 extending through the forward end of the member 201 and into a longitudinal groove 213 formed upon the lower side of the needle 51, said rod extending to the point of the needle to close the

eye there in a manner hereinafter more fully described. The plunger 211 is normally maintained in its extreme forward position by means of a spring 214 mounted within the bore 209 and retained by a plug 215 threaded into the rearward end of the member 201. An actuating rod 216 is secured upon the plunger parallel to the rod 212 and extending outwardly from the forward end of the member 201 below the needle 51, for reciprocating the plunger and the rod 212 relatively to the needle.

A rocker arm 217 is pivotally mounted upon a lug 218 formed upon the frame 13, said rocker arm having one end thereof forked to engage a pin 219 secured upon the block 76 whereby the rocker arm is oscillated to move the free end 221 into alignment with the actuating rod 216 when the needle is in position for the first advance, and out of said alignment when the needle is moved to its position for the second advance. The free end 221 is preferably forked to span the needle 51 to insure against vertical displacement when the rod 216 is moved thereagainst during the first advance of the needle to open the eye as hereinafter described.

A shuttle designated in general by the numeral 81 is mounted within a shuttle housing 82 formed within the lower portion of the head adjacent the shaper element 35 upon the side opposite the needle 51. The shuttle 81 consists of an inner shuttle member 83 within which is mounted a bobbin 84 upon which is wound a suitable length of sewing thread 86. An outer shuttle member 87 including a gear portion 88 is rotatably mounted upon the inner shuttle member 83. A thread dispensing member 89 provided with a gear portion 91 is mounted upon the inner shuttle member 83 and is adapted for independent rotation relative to both the inner and outer shuttle members. The preferred construction of the shuttle 81 is fully disclosed in Figs. 20 and 21 of the drawings. The members 83, 87 and 89 are held in assembled relation by means of a member 92 threaded between the inner shuttle member 83 and a retaining ring 93, said member 92 being longitudinally apertured to receive the thread 86 and provided with an outwardly extending portion 94 arranged to loosely engage a corresponding opening 96 in the shuttle housing 82, whereby rotation of the inner shuttle member is prevented.

The thread 86 wound upon the bobbin 84 is dispensed therefrom through an aperture 97 between the inner and outer shuttle member, said thread being passed under a spring 98 mounted upon the outer end of the inner shuttle member 83 and arranged to maintain a slight tension upon the thread. The inner shuttle member 83 is provided with

an outwardly disposed lug 99 having an aperture 101 therethrough aligned with an aperture 102 in the outer end of the shuttle member 83 and also aligned with an aperture 103 formed through the retaining ring 93 which aperture 103 communicates with the aperture through the member 92. The thread dispensing member 89 is provided with a pair of inwardly extending lugs 104 arranged to span the lug 99 and having apertures 106 corresponding to the aperture 101 therethrough. The thread 86 is carried from the spring 98 through the aperture 102, the apertures 106 and aperture 101, and thence through the aperture 103 and the member 92 as shown in Fig. 20 of the drawings. From the member 92 the thread is carried past raised portions 107 and 108 formed upon a plate 109 between the shuttle housing 82 and the roll shaper element 35 and thence under a spring 111 to the mattress roll, as best shown in Fig. 11 of the drawings, said spring 111 serving to maintain a slight tension upon the thread.

The thread dispensing member 89 is actuated through the gear portion 91 by means of a gear 112 mounted upon a shaft 113 and carrying a pinion 114 connected thereto, said pinion being driven by a gear 116 mounted upon a shaft 117. The gear 116 has a gear 118 connected thereto which gear 118 is driven by a gear 119, mounted upon a shaft 121. The gear 119 is connected with a gear 122 which is engaged by a rack 123 arranged to be reciprocated by means of a lever 124 to one end of which the rack 123 is pivotally secured. The lever 124 is pivotally mounted upon the cam supporting shaft 16 and is connected by a link 126 and arm 127 pivotally mounted at one end thereof upon a shaft 128 and carrying a roller 129 at the other end which roller engages a groove 131 upon the adjacent side of the cam 14 whereby said arm is oscillated.

The outer shuttle member 87 is actuated in a similar manner by means of a pair of pinions 132 meshing with the gear portion 88 of said shuttle member. The pinions 132 are driven simultaneously by a gear 133 mounted upon the shaft 117, one of the pinions 132 being mounted upon the shaft 113 and the other upon a shaft 134. The gear 133 has a gear 136 connected thereto, said gear 136 being driven by a gear 137 mounted upon the shaft 121 and having a gear 138 connected thereto. The gear 138 is engaged by a rack 139 meshing therewith and arranged to be reciprocated by means of a lever 141, pivotally mounted upon the shaft 16 and to one end of which the rack is pivotally connected by means of a link 142. The other end of the lever 141 is pivotally connected to an arm 143 by means of a link 144, said arm 143 being pivotally mounted

at one end thereof upon a shaft 146 and provided at the other end thereof with a roller 147 engaging the groove 46 formed in the adjacent side of the cam 14.

5 The outer shuttle member 87 and the thread dispensing member 89 are actuated, by the above described means, in timed relation to the operation of the needle 51 to form stitches through the roll formed upon
10 the edge of the mattress M in the following manner. Assuming the shuttle properly threaded and the machine in operative engagement with the mattress, the roll being formed and temporarily held by the packing needle 37, rotation of the cam 14 from the normal starting position shown in Fig. 4 will by virtue of the groove 66 engaging the roller 64, cause the needle to be first advanced to the position shown in dotted
20 lines in Figs. 4 and 7, and in full lines in Fig. 11 of the drawings. The point of the needle 51 is forced through the mattress roll and thereafter passes between the two raised portions 107 and 108 upon the plate 109, and in so doing the tapered point of the
25 needle passes over and slightly depresses the thread 86 which is maintained taut between the shuttle 81 and the spring 111. Upon the under side of the needle point is formed an angularly disposed opening 151
30 communicating with a slot 152 formed through the needle near the point and constituting the eye of the needle, the inclination of the opening 151 corresponding to the angle at which the thread 86 extends between the shuttle and the spring 111. The opening 151 is normally closed by the forward end of the rod 212, which, as above
35 explained, is disposed within a groove formed in the lower side of the needle and extending past said opening 151. As the needle approaches the end of the forward movement, the plunger actuating rod 216 is moved against the end 221 of the rocker
40 arm 217, and the forward movement of the plunger 211 and the rods 216 and 212 arrested. The forward movement of the needle itself however continues for a short distance, the plunger being moved into the bore 209 against the pressure of the spring 214 and the rod 212 moved along the groove 213 until the end of the rod 212 clears the opening 151 and thus opens the eye of the
45 needle. In this manner, as the needle approaches its extreme forward position, the thread is admitted through the opening 151 into the slot 152. As the needle is now re-
50 ceded by a further rotation of the cam, a loop of the thread will be drawn from the shuttle through the roll of the mattress. As the needle is moved rearwardly, the rod 216 is disengaged from the arm 217 and the plunger moved forward to its normal position within the member 201 by the spring
55 214, the rod 212 being thus moved to again

close the opening 151 and prevent the thread from becoming disengaged from the needle as the thread is drawn through the needle.

Simultaneously with the receding of the needle after picking up the thread, the
70 thread dispensing member 89 is rotated by the action of the cam groove 131 upon the arm 127 and the intermediate connections, to dispense the amount of thread necessary to form the loop, said amount of thread hav-
75 ing been previously taken up by the thread dispensing element from the bobbin 84 as shown in Fig. 21 of the drawings by a rotation of said thread dispensing element in the reverse direction at the end of the pre-
80 vious stitch in a manner hereinafter more fully explained.

As the needle 51 approaches the extreme
85 receded position it is shifted transversely by virtue of engagement of the groove 67 with the roller 68 and its connections with the block 76 to the position shown in dotted lines in Fig. 8 of the drawings. As the
90 needle 51 is shifted the thread 86 carried thereby is moved over the hook 153 which is so positioned as to clear the end of the
95 needle during the shift and having a depressed end 154 arranged to cause the thread to be carried upwardly thereover into engagement with a thread retaining shoulder
100 156 as best shown in Figs. 9 and 12 of the drawings. The movement of the block 76 in shifting the needle to position for the second advance imparts a pivotal move-
105 ment to the rocker arm 217 which is engaged by the pin 219 as above explained, said pivotal movement operating to swing the end 221 out of the path of the needle 51 and the block 52. As the needle 51 is now
110 advanced in the shifted position the thread will be drawn over the hook 153, the thread dispensing member 89 being actuated to continue dispensing the requisite length of thread 86. Upon the second advance of the
115 needle the point is moved to a point closely parallel to the edge of the outer shuttle member 87 as shown in Fig. 9 of the drawings. As the needle 51 approaches the end of the advance movement, the actuating rod 216 is moved into engagement with the block 76 and the plunger 211 and rod 212 receded
120 relative to the needle in such manner as to again open the eye of the needle by uncovering the opening 151 in the manner above described.

The outer shuttle member is provided with a thread engaging hook 157 formed by cutting away a portion of the periphery, the pinions 132 being so spaced as to insure en-
125 gagement of one pinion with the gear portion 91 while the cut away portion passes the other pinion. The hook 157 is normally positioned immediately above the level of the needle when advanced in the shifted position above described. At the instant the
130

needle 51 reaches its extreme advanced position and the opening 151 is fully uncovered the outer shuttle member 87 is actuated by its connections to the cam groove 46 to move the hook 157 downwardly past the needle and into engagement with one portion of the loop of thread 86 carried thereby. Simultaneously with the downward movement of the shuttle member 87, the needle 51 is moved rearwardly, the two movements being so timed as to cause the thread 86 as it is engaged by the hook 157 to be moved outwardly through the opening 151 and thus become disengaged from the needle. The rotation of the outer shuttle member 87 is continued, the portion of the loop of thread engaged by the hook 157 being thereby carried entirely around the shuttle as shown in Fig. 19 of the drawings, the space between the shuttle and the shuttle housing 82 being insufficient to admit the other portion of the loop, not entering the cut away portion forming the hook. The space between the extension 94 and the recess 96 in the housing 82 is sufficient to permit the loop to pass therethrough, the thread thus being looped over that portion of said thread extending from the shuttle to the mattress. Thread is dispensed by the member 89 until the loop passing over the shuttle has passed the center thereof after which the direction of rotation is reversed by action of the cam groove 131 and the slack thread caused as the loop slips past the shuttle; is taken up and the stitch drawn tight.

The stitch formed is illustrated in Figs. 26 and 27 of the drawings. It will be noted that the loop carried through the mattress upon the return movement of the needle after the first advance is given a half twist as it is moved over the hook 153 so that when the loop is carried through the mattress the second time and carried around the shuttle a knot is formed. The twisting of the loop is due to the resistance offered by the hook 153 to movement thereover and to the adjustment of the relative tension at opposite ends of the loop. This feature of my invention is important for the reason that by forming each stitch into a knot as shown each stitch is effectually locked and the breakage of the single thread at any point will not effect the other stitches.

As the stitch is being completed, the packing needles 37 are actuated by the cam 14 to disengage the mattress roll and are brought back to the normal starting position. Immediately thereafter the entire machine is advanced along the edge to the mattress into position for making a succeeding stitch.

The forward movement of the machine is accomplished briefly as follows: A sector gear 161 pivotally mounted upon the shaft 146 is arranged to be oscillated by a link 162 connected to one end of a lever 163 piv-

otally connected at the other end thereof to a crank 164 and arranged to be moved by said crank about an adjustable pivot 166. The crank 164 is secured upon a shaft 167 which is oscillated by means of an arm 168 engaging the groove 46 by means of a suitable roller.

A forked member 169 pivotally mounted upon a shaft 171 is arranged to be moved through a short arc by means of a link 172 pivotally connecting one portion of the fork to one of the levers 39 by which the packing needles 37 are operated. The movement of said lever 39 in moving its packing needle to disengage the mattress M causes the forked member 169 to be sufficiently elevated to bring a gear 173 into mesh with the sector 161, said gears 173 being mounted upon a shaft 174 carried between the arms of the member 169. A bevel gear 176 is secured in connection with the gear 173, said bevel gear 176 meshing with a corresponding bevel gear 177 secured upon the upper end of a shaft 178. The upper end of the shaft 178 is received within a pivotally mounted bearing 179 carried by the shaft 174. The lower end of the shaft is feathered into a sleeve 181 connected by means of a universal joint 182 to an elongated pinion 183 meshing with a gear 184 mounted upon the supporting frame 1. The gear 184 meshes with a rack 186 secured along the edge of the work supporting table 4 whereby the entire machine is moved relatively to the table and a mattress supported thereon when the sector 161 is actuated in the manner above described. The distance moved by the machine during each revolution of the cam 14 is varied by raising or lowering the pivot 166 to vary the throw at the upper end of the lever 163. When the cam 14 is further rotated to the point where the members 39 are actuated to again move the packing needles 37 into the mattress, the forked member 169 will be lowered to move the gear 173 out of engagement with the sector and into engagement with a rack 187 whereby the machine is locked against further movement. The forward movement of the machine relative to the mattress together with the reverse movement of the thread dispensing member 89 causes the stitch to be drawn tight and the thread 86 to be drawn into position to be engaged by the needle for making the next stitch through the mattress roll, the needle 51 being shifted back to the normal starting position during the forward movement of the machine as shown in dotted lines in Fig. 26 of the drawings.

The feathered connection provided upon the shafts 22 and 178 is provided for the purpose of admitting vertical adjustment of the frame 12 carrying the head 13 relative to the supporting frame 1 by means

of the screw 10, in this manner permitting the machine to be moved into proper position for sewing the roll upon mattresses or upholstery of different thicknesses. The pivotal connection of the head upon the frame 12 permits the head and the stitching mechanism included therein to be inclined at different angles relative to the work whereby the roll may be formed upon the top or upon the side of the mattress as desired. The sliding and pivotal mountings of the shafts 22 and 178 permits of these adjustments without interfering in any manner with the connections between the cam and the driving connections thereto.

From the above description it will be readily seen that I have provided a new and improved machine affording a wide adjustability to conform to the requirements of different characters and grades of work, and in which the working parts are all positively driven by a single cam to form and secure a roll by means of a single thread lock stitch such as shown in Fig. 27 of the drawings.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a mattress stitching machine, the combination with a roll forming means arranged to form a roll upon the edge of a mattress, of thread dispensing means mounted upon the machine in a position adjacent the roll; a sewing needle slidably and pivotally mounted upon the machine; means for advancing said needle in one pivotal position to pass through the roll and pick up a thread from the thread dispensing means and for receding said needle to draw a loop of the thread through the roll; means for moving the needle pivotally to be advanced and receded through the roll at a point slightly spaced from the point of penetration of the previous advance, the thread being carried through the roll by the second advance and released by the second return of the needle; and means for actuating the thread dispensing means to engage the thread during the second advance of the needle and to loop the same to lock the stitch formed through the roll.

2. In a mattress stitching machine, the combination with roll forming means arranged to form a roll upon the edge of a mattress, of thread dispensing means mounted upon the machine in a position adjacent the roll; a sewing needle slidably and pivotally mounted upon the machine; means for advancing said needle in one pivotal position to pass through the roll and pick up a thread from the thread dispensing means; and for receding said needle to draw a loop of the thread through the roll; means for moving the needle pivotally to be advanced and receded through the roll at a

point slightly spaced from the point of penetration of the first advance, the thread being carried through the roll by the second advance and released prior to the second return of the needle; means for twisting the loop carried by the needle between the first and second advances; and means for actuating the thread dispensing means to engage the thread at the end of the second advance of the needle to carry the twisted loop over the dispensed thread to form a knot adapted to lock the stitch formed through the roll.

3. In a mattress stitching machine, the combination with roll forming means arranged to form a roll upon the edge of a mattress; of thread dispensing means mounted adjacent the roll; a needle mounted upon the machine; means for reciprocating the needle to draw a loop of thread from the dispensing means through one point of the roll; means for shifting the needle transversely; means for imparting a twist to the loop during said transverse movement of the needle; means for reciprocating the needle to deliver the twisted loop through a different point of the roll to the dispensing means; and means for actuating the dispensing means to engage the loop and carry the same over the dispensed thread to form a knot enclosing the material of the roll between successive points of penetration for each separate loop stitch formed by the needle.

4. In a stitching machine, the combination with a thread dispensing means and a needle arranged to be reciprocated to penetrate material to be stitched to draw a loop of thread from the dispensing means through one point of the material and return said loop through a point spaced therefrom, of means for imparting a twist to the loop; and means for carrying said twisted loop over the thread dispensing means to form a knot enclosing the material between adjacent points of penetration for each separate loop stitch formed by the needle.

5. In a stitching mechanism, the combination with thread dispensing means and a needle arranged to be reciprocated to penetrate material to be stitched to draw a loop of thread from the dispensing means through one point of the material and to return said loop through a second point of the material, of a hook arranged to engage the loop and impart a twist thereto as the needle is moved from the first to the second point of penetration; and means for carrying the loop over the thread dispensing means after the return of the loop through the material to form a knot enclosing the material between the first and second points of penetration for each separate loop stitch formed.

6. In a mattress stitching machine, the combination with roll forming means arranged to form a roll upon the edge of a

mattress, of a slidably mounted needle arranged to be advanced and receded through the mattress; means for moving the needle pivotally between successive advances to penetrate the roll at spaced points for each position of the machine; a thread dispensing shuttle mounted upon the machine adjacent the roll; and means for actuating the shuttle in timed relation to the needle to dispense a thread thereto during the first advance of said needle and to take up said thread during the second advance of the needle for each position of the machine to form a lock stitch through the roll.

7. In a mattress stitching machine, the combination with roll forming means arranged to form a roll upon the edge of a mattress, of a thread dispensing shuttle mounted upon the machine adjacent the roll; a slidably mounted sewing needle arranged to be advanced through the roll to pick up a thread from the shuttle; means for moving the needle to penetrate the roll at a different point when advanced a second time to deliver said thread to the shuttle; and means for moving said shuttle to lock the stitch so formed through the roll, the loop carried by the needle being carried under the portion of thread extending from the preceding stitch and over the shuttle to form a simple knot embracing the portion of the mattress between the points of penetration.

8. In a mattress stitching machine, the combination with a roll forming means arranged to form a roll upon the edge of a mattress, of a thread dispensing shuttle rotatably mounted upon the machine adjacent the roll; a sewing needle slidably and pivotally mounted upon the machine and arranged to be advanced and receded through the roll; means for moving the needle pivotally between successive advancements whereby said needle is caused to penetrate the roll at spaced points for each position of the machine; and means for rotating the shuttle in timed relation to the movements of the needle to dispense thread thereto when the needle is advanced and receded a first time, and to pick up and disengage said thread from the needle when said needle is advanced a second time for each position of the machine, said thread being carried by the shuttle to lock the stitch so formed through the roll.

9. In a mattress stitching machine, a needle mounted for longitudinal and transverse movement relative to the machine whereby said needle may be advanced and receded to penetrate the edge of a mattress at spaced points, said needle being slotted adjacent the point thereof and having an opening communicating with the slot to admit a thread thereinto when the needle is advanced a first time, and to permit the

removal of the thread from the slot when the needle is advanced a second time for each position of the machine relative to the mattress; and means for normally closing said opening while the needle is being moved through the mattress.

10. In a mattress stitching machine, a needle mounted for longitudinal and transverse movement relative to the machine whereby said needle may be advanced and receded to penetrate the edge of a mattress at spaced points, said needle being slotted adjacent the point thereof and having an opening communicating with the slot to admit a thread thereinto when the needle is advanced a first time, and to permit the removal of the thread from the slot when the needle is advanced a second time for each position of the machine relative to the mattress; and means slidably mounted upon the needle and arranged to normally close said opening while the needle is being moved through the mattress.

11. In a mattress stitching machine, a needle mounted for longitudinal and transverse movement relative to the machine whereby said needle may be advanced and receded to penetrate the edge of a mattress at spaced points, said needle being slotted adjacent the point thereof and having an opening communicating with the slot to admit a thread thereinto when the needle is advanced a first time, and to permit the removal of the thread from the slot when the needle is advanced a second time for each position of the machine relative to the mattress; and means for normally closing said opening said means being arranged to be actuated at the end of each forward movement of the needle to open the opening into the thread receiving slot.

12. In a mattress stitching machine, a needle mounted for longitudinal and transverse movement relative to the machine whereby said needle may be advanced and receded to penetrate the edge of a mattress at spaced points, said needle being slotted adjacent the point thereof and having an opening communicating with the slot to admit a thread thereinto when the needle is advanced a first time, and to permit the removal of the thread from the slot when the needle is advanced a second time for each position of the machine relative to the mattress; a member slidably mounted within the needle and arranged to normally close the opening into the slot; and means for actuating said member to open the slot at the end of each forward movement of the needle to permit movement of the thread there-through.

13. In a mattress stitching machine, a needle mounted for longitudinal and transverse movement relative to the machine whereby said needle may be advanced and

receded to penetrate the edge of a mattress at spaced points, said needle being slotted adjacent the point thereof and having an opening communicating with the slot to admit a thread thereinto when the needle is advanced a first time, and to permit the removal of the thread from the slot when the needle is advanced a second time for each position of the machine relative to the mattress; a plunger slidably mounted within the needle and arranged to normally close the opening into the slot; an actuating member connected to said plunger; and stops arranged to engage the plunger actuating member at the end of each forward movement of the needle to recede the plunger within the needle to permit movement of the thread through the slot opening.

14. In a mattress stitching machine, adapted for intermittent movement relative to a mattress, the combination with means for forming a roll upon the edge of the mattress, of a sewing needle adapted to penetrate the roll; a thread dispensing shuttle mounted upon the machine adjacent the roll; a cam; means connecting the cam with the needle for advancing and receding said needle longitudinally; means connecting the needle and the cam for moving said needle transversely between successive longitudinal advancements to cause said needle to penetrate the roll at spaced points for each position of the machine relative to the mattress; and means connecting the shuttle and the cam for actuating said shuttle in timed relation to the movements of the needle to dispense a thread thereto during a first advance of the needle and to disengage said thread from said needle during a second advance to form a single thread lock stitch through the roll.

15. In a mattress stitching machine, a sewing needle; a shuttle arranged to dispense a thread to the needle to make a stitch through the edge of a mattress; and means for actuating said shuttle to disengage said thread from the needle and carry a loop of said thread around the shuttle to lock the stitch, a half twist being imparted to the loop to form each stitch into a simple knot embracing a portion of the mattress.

16. In a mattress stitching machine, a sewing needle; a shuttle arranged to dispense a thread to the needle to make a stitch through the edge of a mattress; means for actuating said shuttle to disengage said thread from the needle and carry a loop of said thread around the shuttle to lock the stitch; and means mounted upon the shuttle and operating in conjunction therewith for dispensing and taking up slack thread during the making of each stitch.

17. In a mattress stitching machine, a sewing needle; a shuttle arranged to dispense a thread to the needle to make a stitch

through the edge of a mattress; means for actuating said shuttle to disengage said thread from the needle to carry a loop of said thread around the shuttle to lock the stitch; and independently rotatable means mounted upon the shuttle and actuated in timed relation therewith for dispensing and taking up slack thread during the making of each stitch.

18. In a mattress stitching machine, a sewing needle; a shuttle arranged to dispense a thread to the needle to make a stitch through the edge of a mattress; means for actuating said shuttle to disengage said thread from the needle to carry a loop of said thread around the shuttle to lock the stitch; a thread dispensing member rotatably mounted upon the shuttle; and means for rotating said member in one direction to dispense thread to the needle during the making of each stitch, and in the opposite direction to take up slack after the formation of the locking loop.

19. In a mattress stitching machine, a sewing needle; a shuttle arranged to dispense a thread to the needle to make a stitch through the edge of a mattress; means for actuating said shuttle to disengage said thread from the needle and carry a loop of said thread around the shuttle to lock the stitch; and independently rotatable means for taking up the slack in the thread after the formation of said loop.

20. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; an outer shuttle member rotatably mounted upon the inner member; a thread carrying member rotatably mounted upon the inner shuttle member; and means for independently rotating the outer shuttle member and the thread carrying member, to dispense thread to the needle and to take up slack to form successive stitches.

21. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; an outer shuttle member rotatably mounted upon the inner member; a thread carrying member rotatably mounted upon the inner shuttle member; means for rotating the outer shuttle member to pick up the thread after the formation of a stitch and carry a loop of said thread around the shuttle to lock the said stitch; and means for rotating the thread carrying member in timed relation to the movements of the needle to dispense and take up thread therefrom.

22. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member arranged to receive thread; an outer shuttle member ro-

- tatably mounted upon the inner member and provided with a gear portion; a thread carrying member rotatably mounted upon the inner shuttle member and provided with
- 5 a gear portion; a train of gears arranged in meshing relation with the gear portion of the outer shuttle member; a gear train arranged in meshing relation with the gear portion of the thread carrying member; and
- 10 reciprocating racks arranged in connection with the train of gears for independently rotating the outer shuttle member and the thread carrying member in timed relation to the movements of the needle.
- 15 23. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said inner shuttle member
- 20 and arranged to carry a thread to be dispensed to the needle for sewing; an outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the
- 25 thread when said thread is moved adjacent thereto by the needle after the making of a stitch; and means for rotating said outer shuttle member to carry a loop of said thread around the shuttle to lock the stitch.
- 30 24. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said shuttle member and ar-
- 35 ranged to carry a thread to be dispensed to the needle for sewing; an outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the thread
- 40 when said thread is moved adjacent thereto by the needle after the making of a stitch; and a rack and gears operatively connected with said outer shuttle member for rotating the same to carry a loop of the thread around the shuttle to lock the stitch.
- 45 25. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said shuttle member and arranged to carry a thread for sewing; an
- 50 outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the thread when said thread is moved adjacent thereto by the needle after the making
- 55 of a stitch; a rack and gears operatively connected with said outer shuttle member for rotating the same to carry a loop of the thread around the shuttle to lock the stitch; and means for dispensing and taking up the thread during the making and locking of each stitch.
- 60 26. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said shuttle member and arranged to carry a thread to be dispensed to the needle for sewing; an outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the thread when said thread is moved adjacent thereto by the needle after the making of a stitch; a rack and gears operatively connected with said outer shuttle member for rotating the same to carry a loop of the thread around the shuttle to lock the stitch; a thread dispensing member rotatably mounted upon the shuttle; and means for rotating said thread dispensing member alternately in opposite directions to dispense and take up thread during the making and locking of each stitch.
- 65 27. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said inner shuttle member and arranged to carry a thread to be dispensed to the needle for sewing; an outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the thread when said thread is moved adjacent thereto by the needle after the making of a stitch; a rack and gears operatively connected with said outer shuttle member for rotating the same to carry a loop of the thread around the shuttle to lock the stitch; a thread dispensing member rotatably mounted upon the shuttle; and means for rotating said thread dispensing member alternately in opposite directions to dispense and take up thread during the making and locking of each stitch.
- 70 28. In a mattress stitching machine, the combination with a sewing needle and actuating means therefor, of a shuttle comprising an inner shuttle member; a bobbin mounted within said shuttle member and arranged to carry a thread to be dispensed to the needle for sewing; an outer shuttle member rotatably mounted upon the inner shuttle member; means formed upon the outer shuttle member for engaging the thread when said thread is moved adjacent thereto by the needle after the making of a stitch; a rack and gears operatively connected with said outer shuttle member for rotating the same to carry a loop of the thread around the shuttle to lock the stitch; a thread dispensing member rotatably mounted upon the inner shuttle member adjacent the outer shuttle member; and a rack and gears operatively connected with said thread dispensing member to rotate the same alternately in opposite directions to
- 75 80 85 90 95 100 105 110 115 120 125

dispense and take up thread during the making of each stitch.

29. A mattress stitching mechanism comprising means for forming a roll upon the edge of a mattress; stitching mechanism operating in conjunction with the roll forming mechanism for permanently securing said roll, said mechanism comprising a sewing needle arranged to penetrate the edge of the mattress at spaced points for each stitch, and a shuttle arranged to dispense a loop of thread to the needle during one penetration and to pick up said thread from the needle after the succeeding penetration, said loop being carried under the portion of the thread extending from the preceding stitch to give a half twist and then carried around the shuttle to form a knot to embrace the portion of the mattress between the points.

30. A mattress stitching mechanism comprising means for forming a roll upon the edge of a mattress; stitching mechanism operating in conjunction with the roll forming mechanism for permanently securing said roll, said mechanism comprising a sewing needle arranged to penetrate the edge of the mattress at spaced points for each stitch, and a shuttle arranged to dispense a loop of thread to the needle during one penetration and to pick up said thread from the needle after the succeeding penetration, said loop being carried under the portion of

the thread extending from the preceding stitch to give a half twist and then carried around the shuttle to form a knot to embrace the portion of the mattress between the points; and means for moving the machine relative to the mattress between stitches.

31. A mattress stitching mechanism comprising means for forming a roll upon the edge of a mattress; stitching mechanism operating in conjunction with the roll forming mechanism for permanently securing said roll, said mechanism comprising a sewing needle arranged to penetrate the edge of the mattress at spaced points for each stitch, and a shuttle arranged to dispense a loop of thread to the needle during one penetration and to pick up said thread from the needle after the succeeding penetration, said loop being carried under the portion of the thread extending from the preceding stitch to give a half twist and then carried around the shuttle to form a knot to embrace the portion of the mattress between the points; and means for moving the machine relative to the mattress between stitches; and means for adjusting the forming and stitching mechanism relative to the mattress.

In witness whereof I hereunto set my signature.

JOSEPH W. DROLL.