H. EMBREE.

MANTLE SEWING MACHINE.

APPLICATION FILED SEPT. 10, 1917.

1,342,669.

Patented June 8, 1920.

10 SHEETS—SHEET 1.

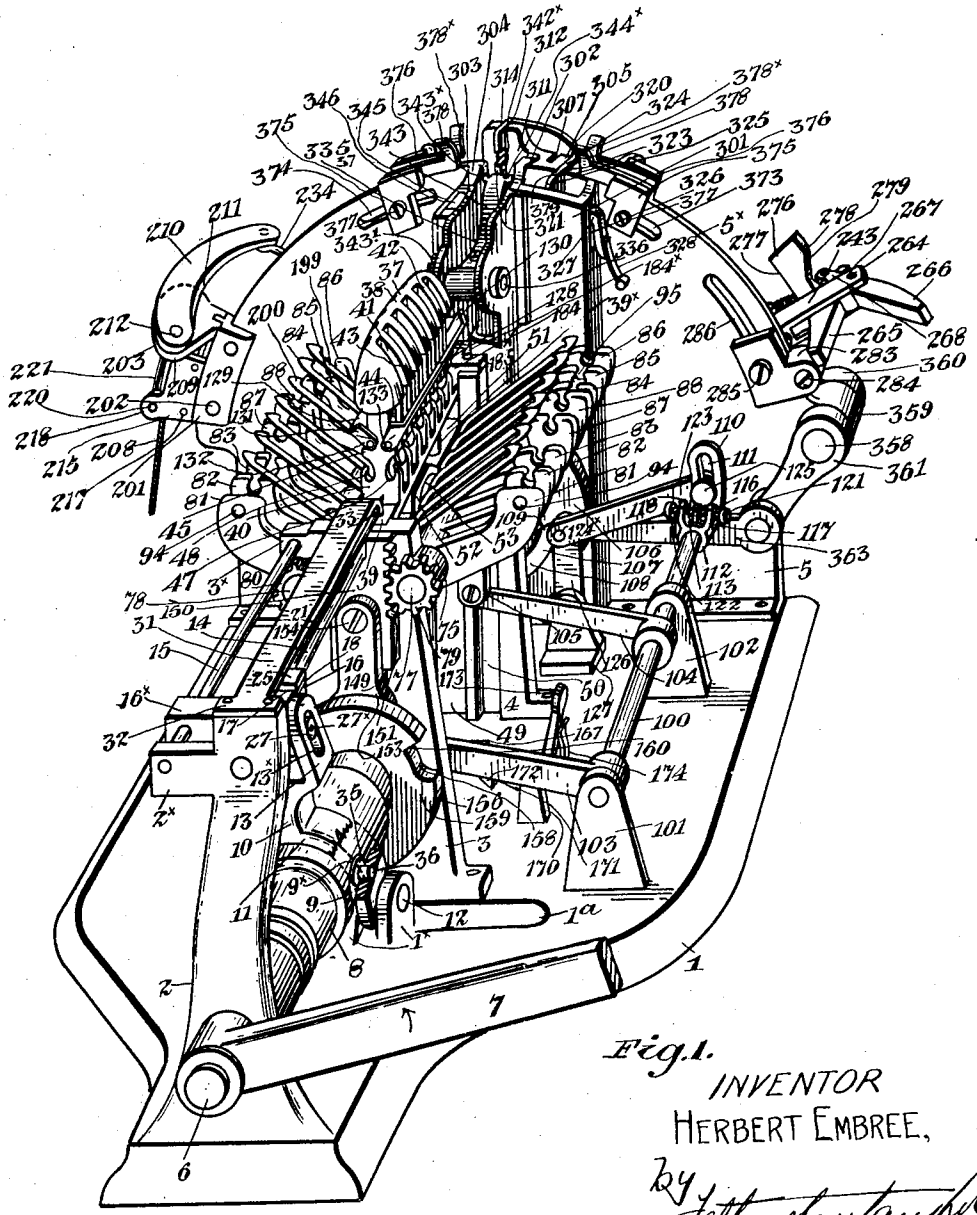


Fig. 1.

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HERBERT EMBREE,

By Fetherstonhaugh & Co

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10 SHEETS—SHEET 2.

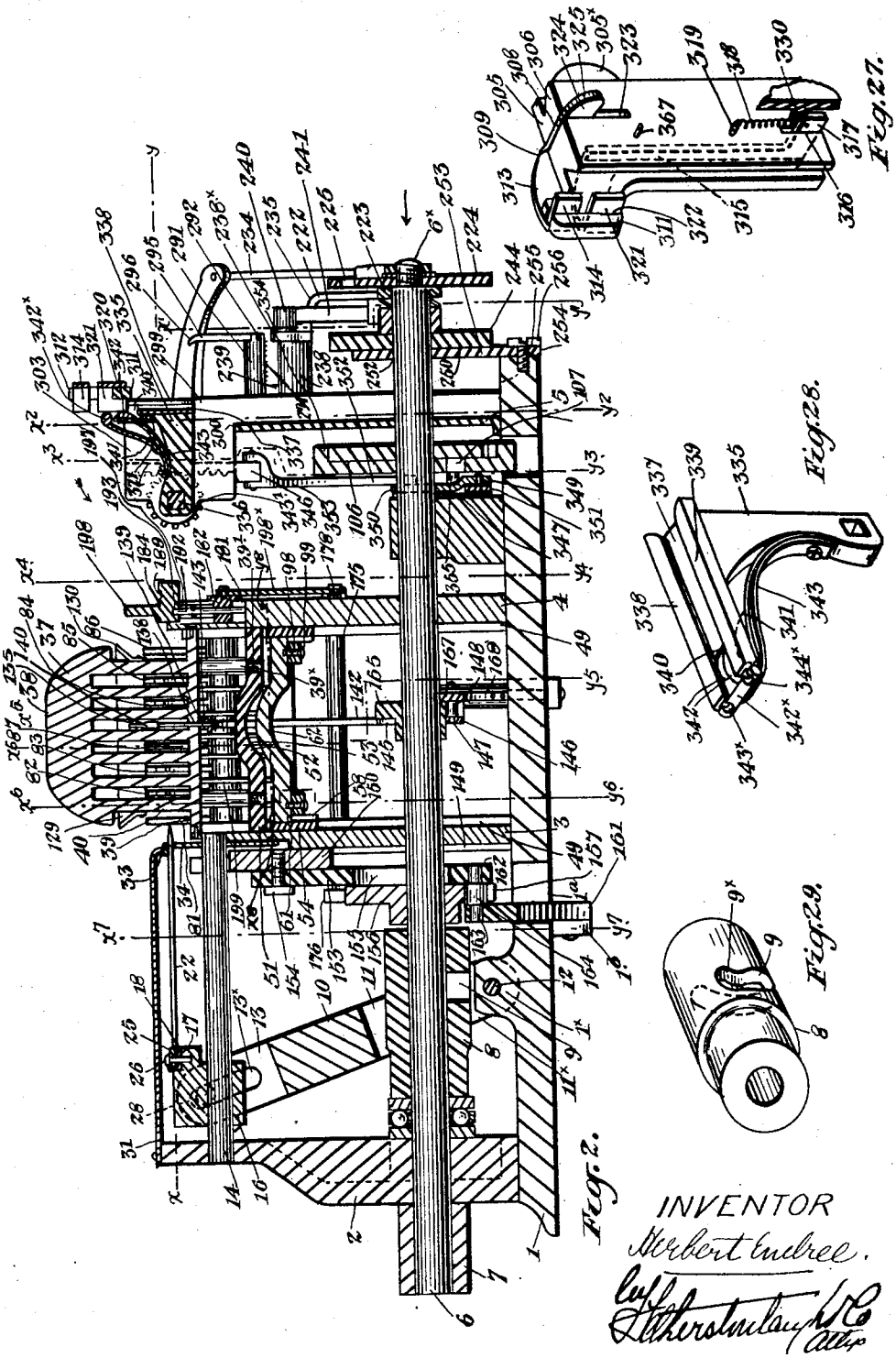


Fig. 2.

Fig. 27.

Fig. 28.

Fig. 29.

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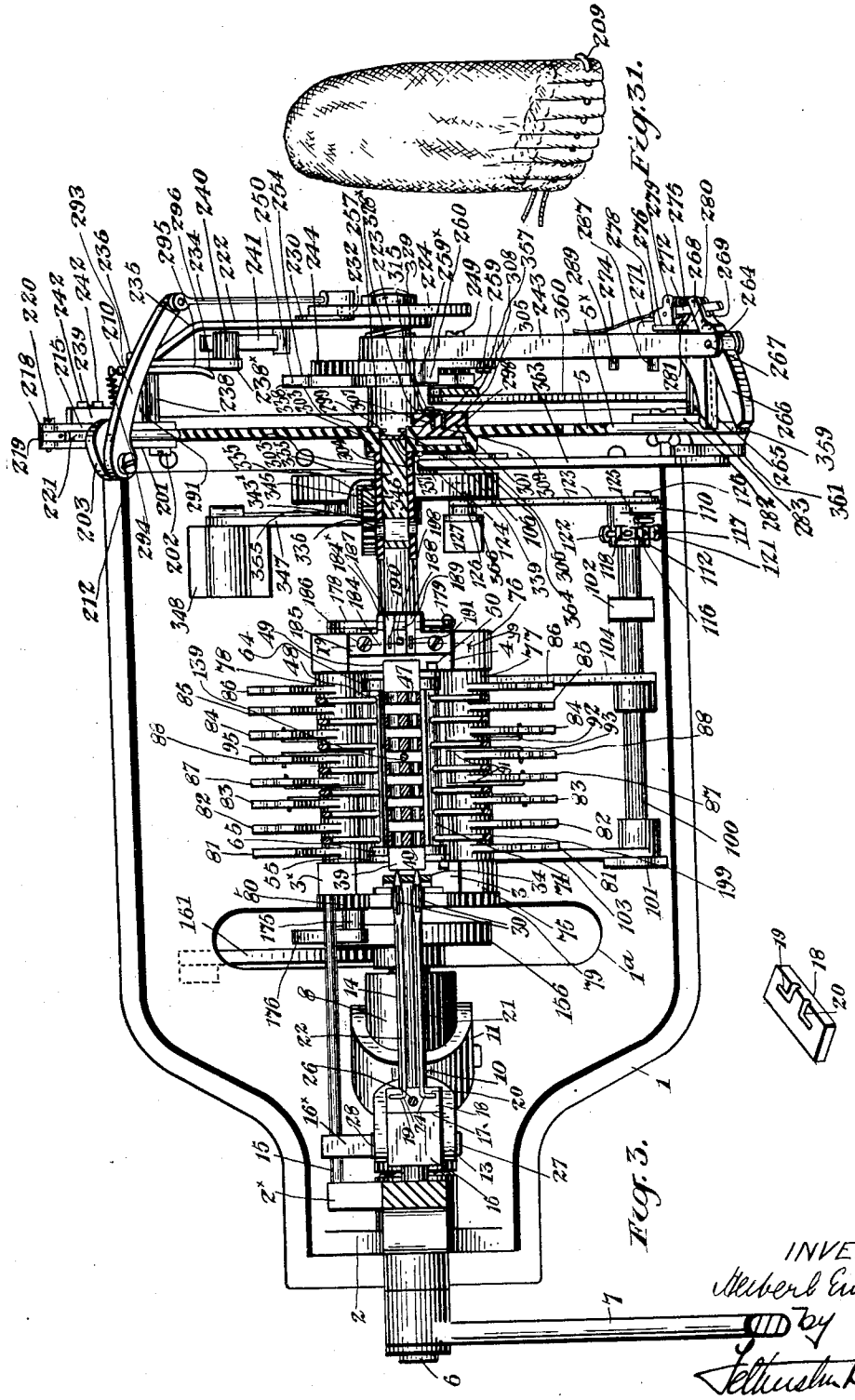


Fig. 3.

Fig. 33.

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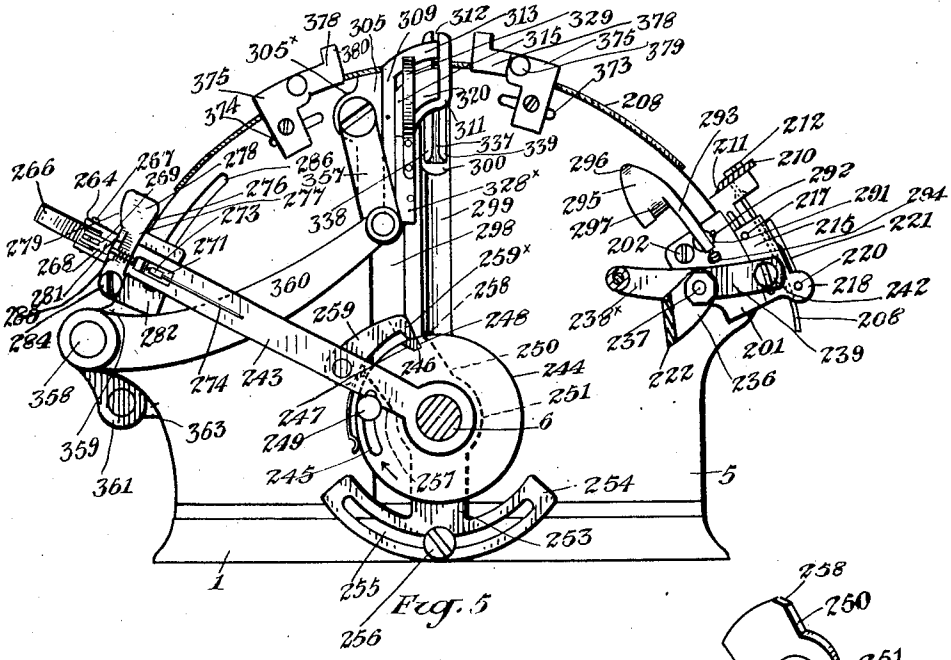


Fig. 5

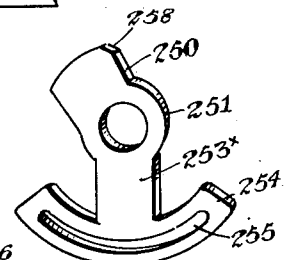


Fig. 36.

Fig. 4.

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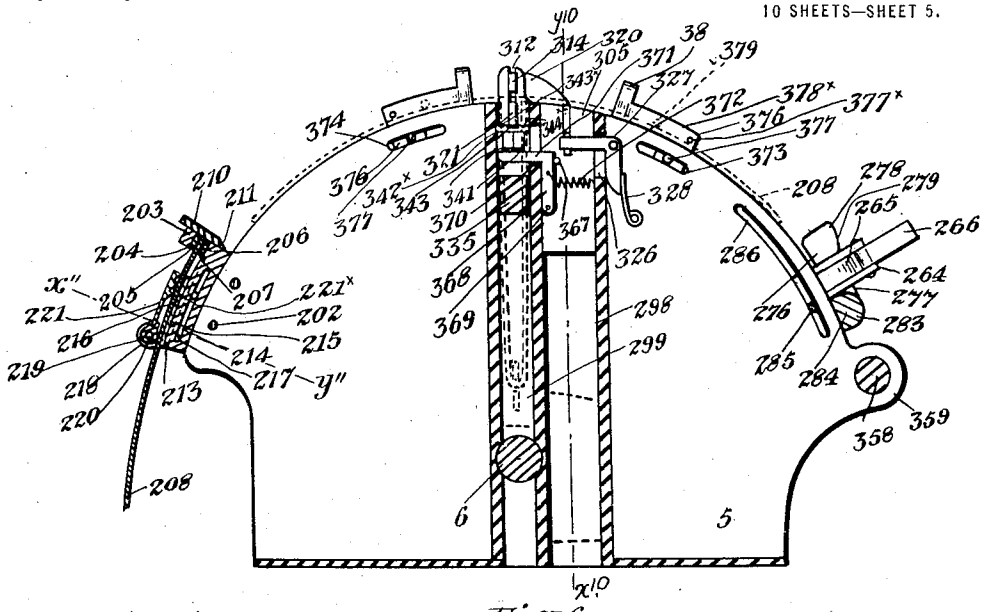


Fig. 6.

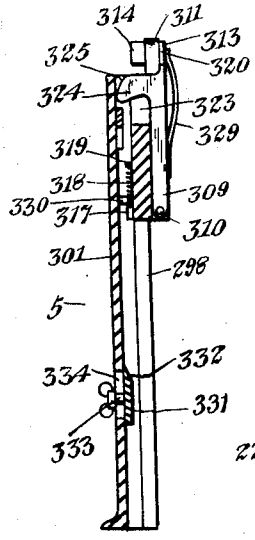


Fig. 23.

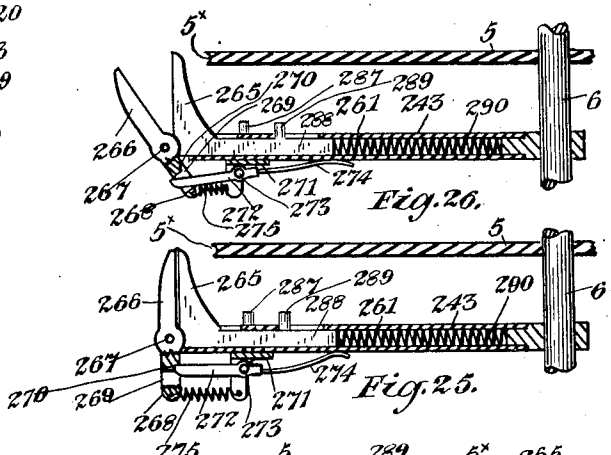


Fig. 26.

Fig. 25.

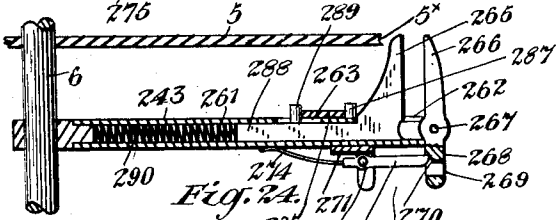


Fig. 24.

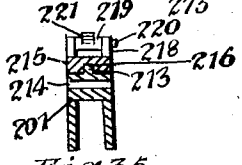


Fig. 35.

INVENTOR

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10 SHEETS—SHEET 6.

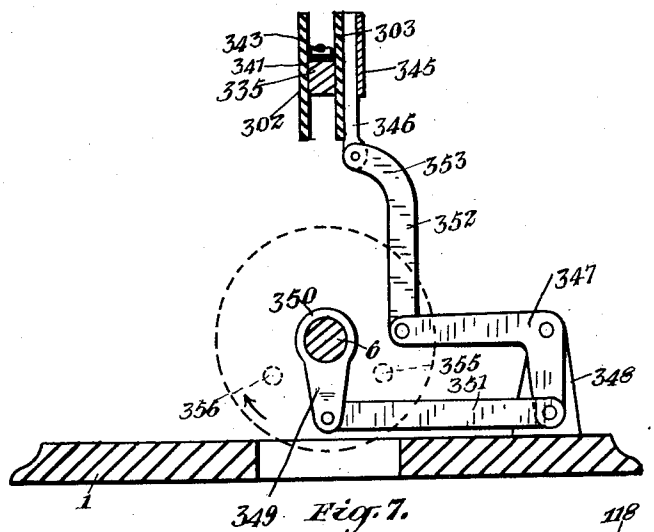


Fig. 7.

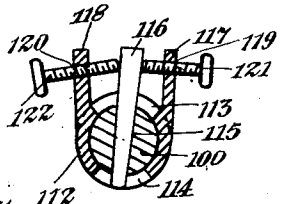


Fig. 30.

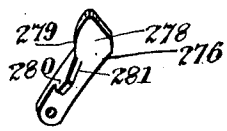


Fig. 37.

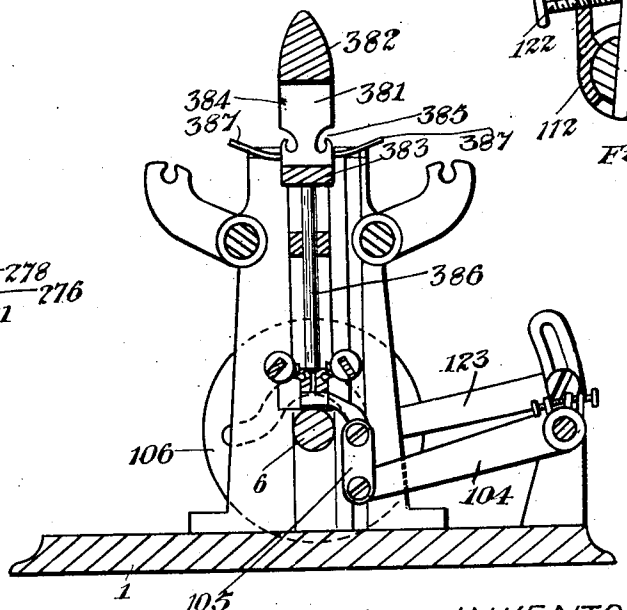


Fig. 32.

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MANTLE SEWING MACHINE.

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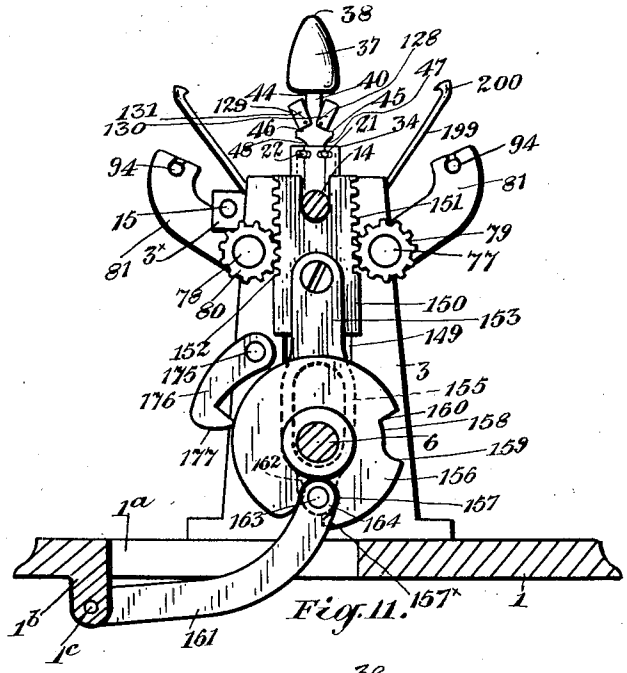


Fig. 11.

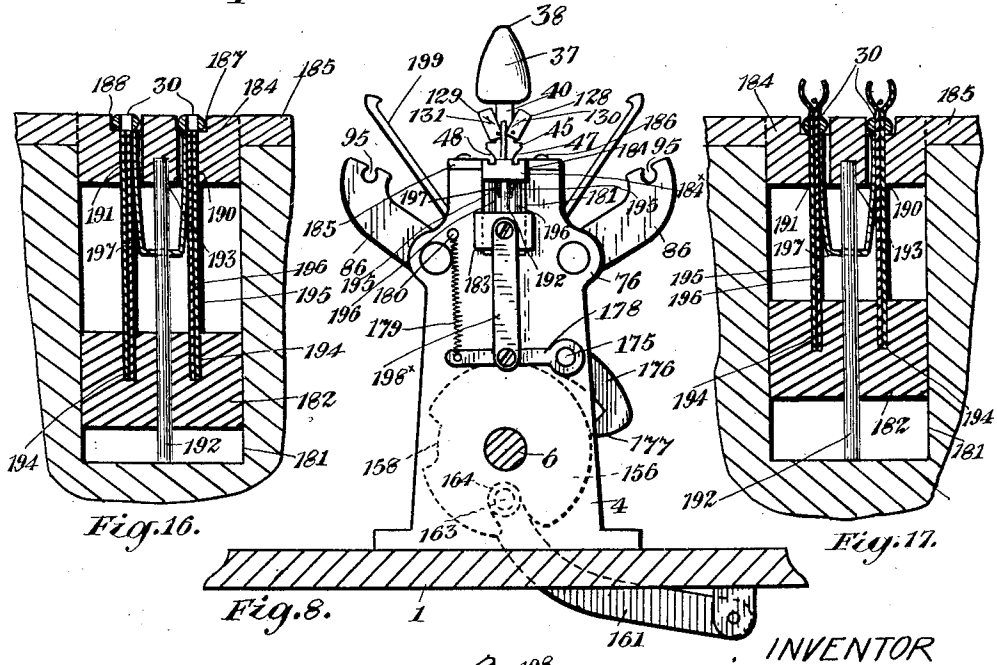


Fig. 8.

Fig. 16.

Fig. 17.

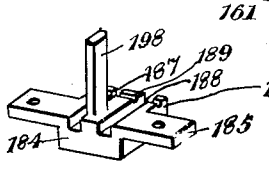


Fig. 34.

INVENTOR

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by Thurston Taylor & Co Attys

H. EMBREE.

MANTLE SEWING MACHINE.

APPLICATION FILED SEPT. 10, 1917.

1,342,669. **Patented June 8, 1920.**

10 SHEETS—SHEET 8.

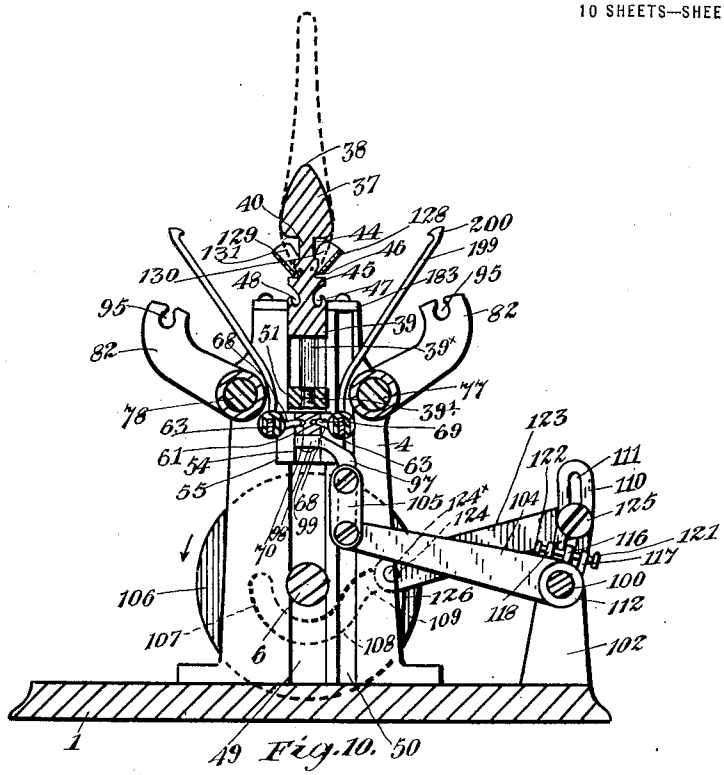


Fig. 10.

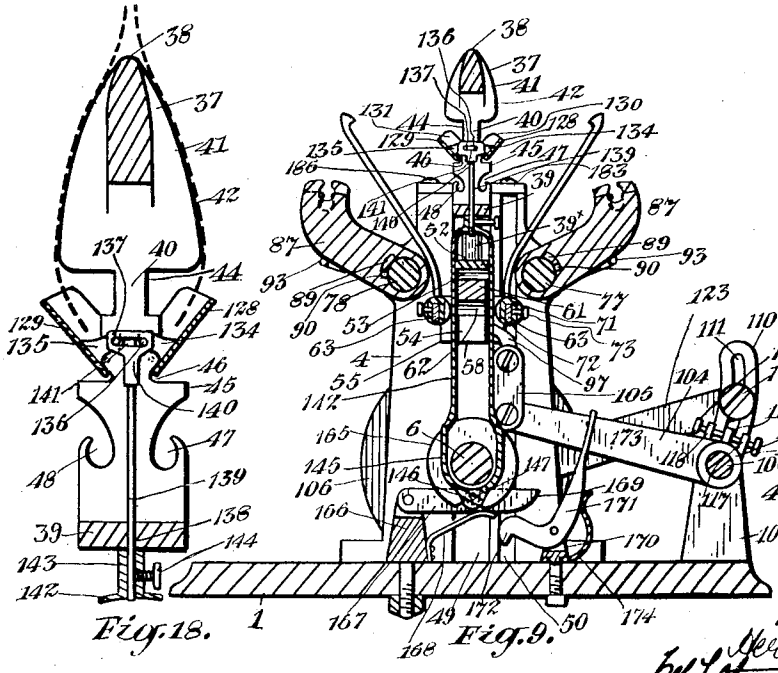


Fig. 18.

Fig. 9.

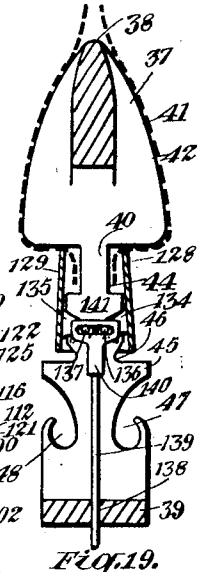


Fig. 19.

INVENTOR

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H. EMBREE.

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APPLICATION FILED SEPT. 10, 1917.

1,342,669.

Patented June 8, 1920.

10 SHEETS—SHEET 9.

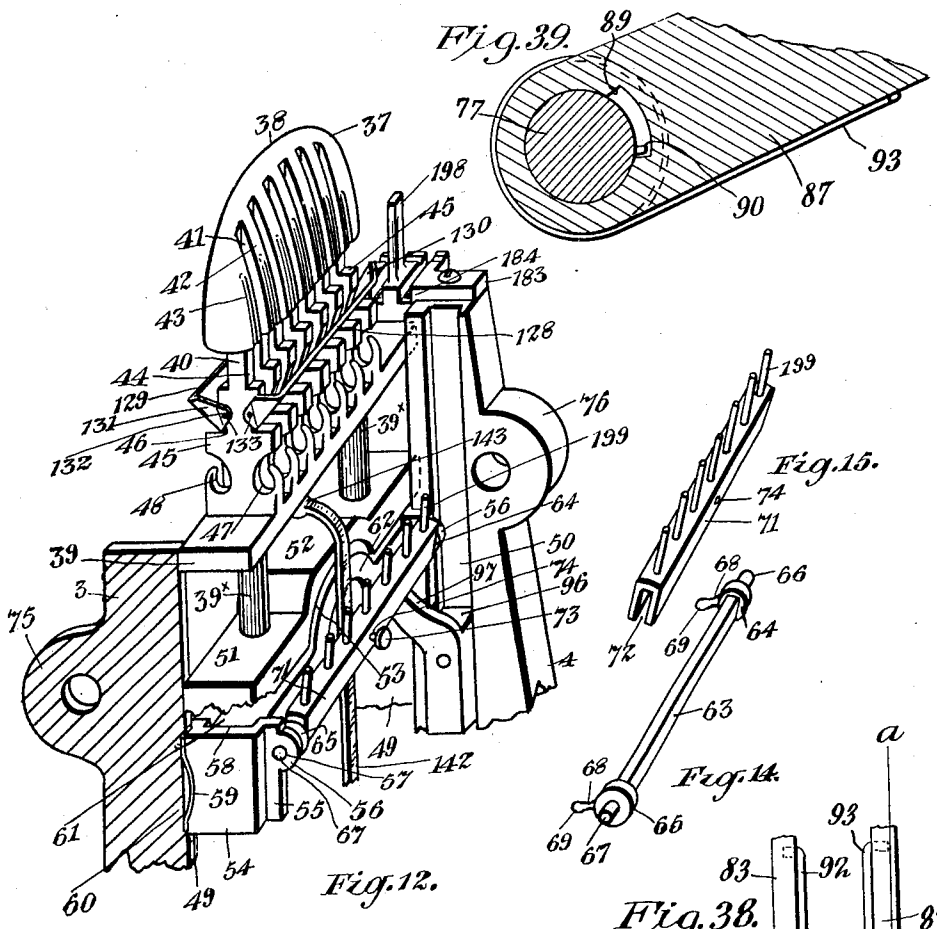


Fig. 12.

Fig. 39.

Fig. 15.

Fig. 14.

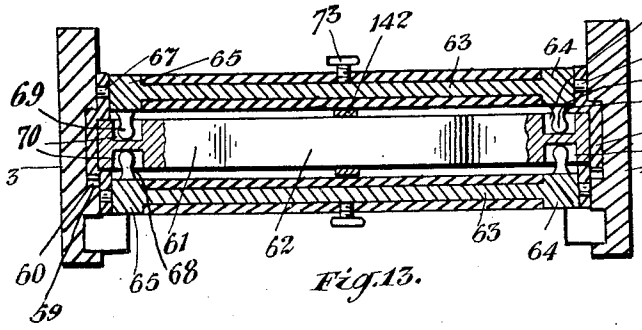


Fig. 13.

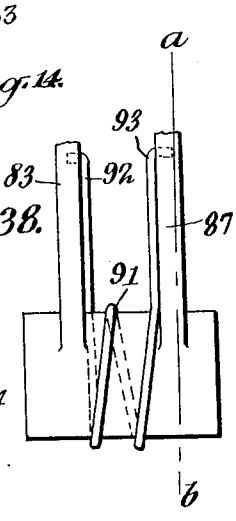


Fig. 38.

INVENTOR

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H. EMBREE.

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APPLICATION FILED SEPT. 10, 1917.

1,342,669.

Patented June 8, 1920.

10 SHEETS—SHEET 10.

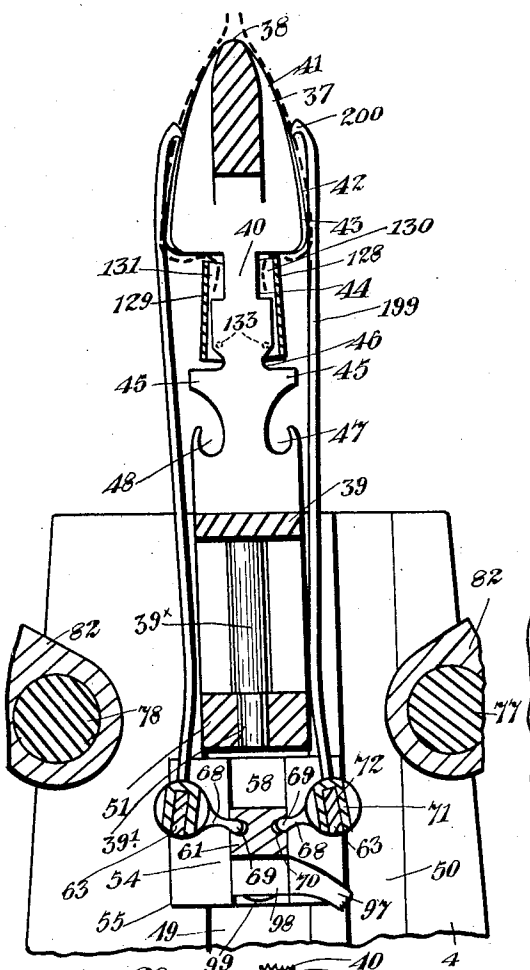


Fig. 20.

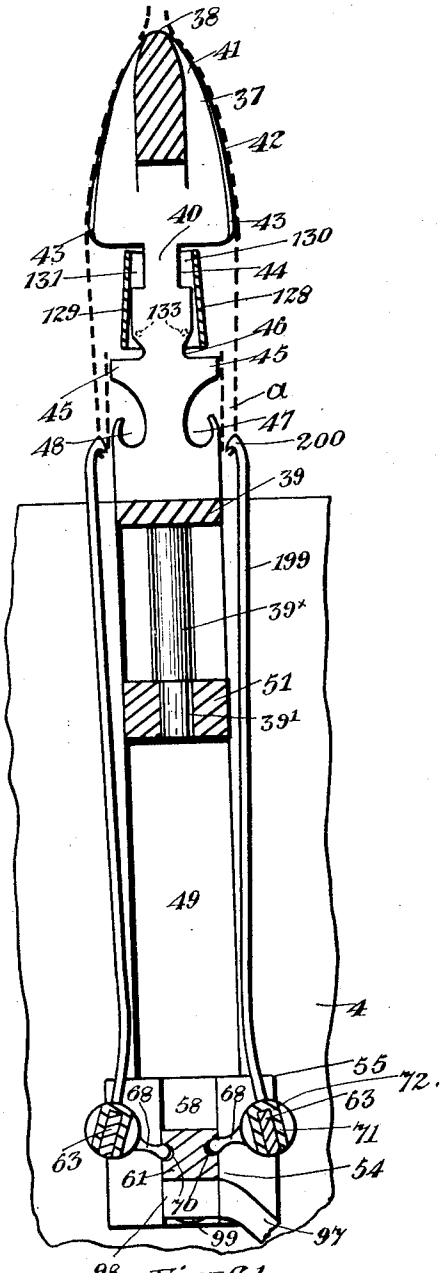


Fig. 21.

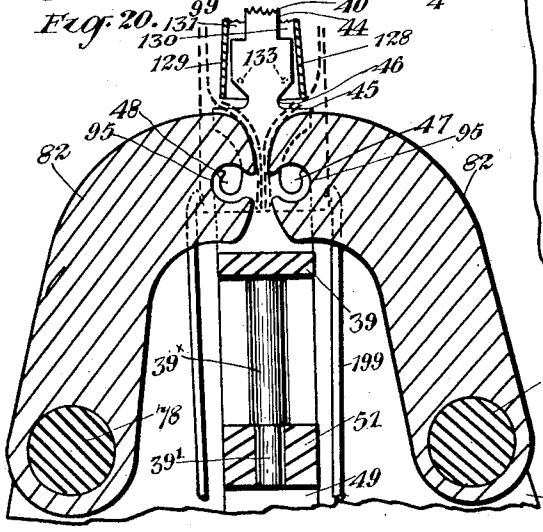


Fig. 22.

INVENTOR

Albert Embree.

by Thurston & Co
Attys.

UNITED STATES PATENT OFFICE.

HERBERT EMBREE, OF HAMILTON, ONTARIO, CANADA.

MANTLE-SEWING MACHINE.

1,342,669. Specification of Letters Patent. Patented June 8, 1920.

Application filed September 10, 1917. Serial No. 190,649.

To all whom it may concern:

Be it known that I, HERBERT EMBREE, residing at the city of Hamilton, in the county of Wentworth, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Mantle-Sewing Machines, of which the following is the specification.

My invention relates to improvements in mantle sewing machines and the object generally is to provide means for quickly and efficiently sewing the thread through the mantle edge by providing automatic means for feeding and severing the thread, carrying the severed thread portion to the sewing needles, threading the ends of such portions into the needles, automatically turning up the mantle edge and plaiting the edge to permit of the passage of the needles therethrough as hereinafter more particularly explained by the following specification.

Figure 1, is a general perspective view of my mantle sewing machine.

Fig. 2, is a longitudinal section.

Fig. 3, is a plan section on line x—y Fig. 2.

Fig. 4, is an end elevation of my machine looking in the direction of arrow Fig. 2.

Fig. 5, is a sectional view on line x'—y' Fig. 2.

Fig. 6, is a sectional view on line x^2—y^2 Fig. 2.

Fig. 7, is a sectional view on line x^3—y^3 Fig. 2.

Fig. 8, is a sectional view on line x^4—y^4 Fig. 2.

Fig. 9, is a sectional view on line x^5—y^5 Fig. 2.

Fig. 10, is a sectional view on line x^6—y^6 Fig. 2.

Fig. 11, is a sectional view on line x^7—y^7 Fig. 2.

Fig. 12, is an enlarged perspective detail of the plaiting head and adjacent parts.

Fig. 13, is an enlarged sectional view on line x^8—y^8 Fig. 2.

Fig. 14, is an enlarged perspective view of the rocking bar member carrying the hem forming hooks.

Fig. 15, is an enlarged perspective detail of the member from which the hem forming hooks extend.

Fig. 16, is an enlarged sectional detail on line x^9—y^9 of Fig. 3 showing the parts in the position they assume when the thread is being drawn through the eye of a needle.

Fig. 17, is a similar view to Fig. 16 showing the parts in the position they assume prior to gripping the thread and passing it through the eye of a needle.

Fig. 18, is an enlarged sectional view through the plaiting head showing the initial position of the mantle by dotted lines.

Fig. 19, is a similar view to Fig. 18 showing the parts in the position they assume prior to forming the hem of the mantle.

Fig. 20, is a sectional detail showing the position of the hem forming hooks when engaging the mantle immediately prior to forming the hem.

Fig. 21, is a similar view to Fig. 20 showing the position of the needles after having completed the formation of the hem.

Fig. 22, is a sectional detail showing the position of the mantle, hem forming hooks and plait forming arms in the position they assume when they form a plait.

Fig. 23, is a sectional detail on line x^{10}—y^{10} Fig. 6.

Fig. 24, is a sectional view through the thread gripping arm showing the parts in the position they assume when ready to grip the thread.

Fig. 25, is a similar view to Fig. 24, showing the parts in the position they assume when gripping the thread.

Fig. 26, is a similar view to Figs. 24 and 25 showing the parts in the position they assume after having released the thread.

Fig. 27, is an enlarged perspective detail of the thread looping device.

Fig. 28, is an enlarged perspective detail of the thread carrier.

Fig. 29, is an enlarged perspective detail of the main operating cam.

Fig. 30, is an enlarged sectional detail of the means for adjusting the width of the hem.

Fig. 31, is a perspective detail of a mantle as threaded by my machine.

Fig. 32, is a sectional view similar to Fig. 10 showing an alternative form of head used when sewing up inverted mantles, and those parts removed which are only used for the sewing of upright mantles.

Fig. 33, is a detail of the plate used for securing the needle ends in position.

Fig. 34, is an enlarged detail of the block 184.

Fig. 35, is a sectional detail on line x^{11}—y^{11} Fig. 6.

Fig. 36, is a detail of the cam plate 250.

Fig. 37, is a perspective detail of the cam plate 276.

Fig. 38 is a plan detail of a finger 83 on one of the spring-held fingers 87 adjacent thereto.

Fig. 39 is an enlarged sectional detail on line *a—b* Fig. 38.

In the drawings like letters of reference indicate corresponding parts in the various figures.

1 indicates the base of my machine. 2, 3 and 4 indicate standards secured by the base 1 and extending upwardly therefrom. 5 indicates a standard plate extending upwardly from the base 1 in proximity to the opposite end thereof to the standard 2. 6 indicates the main shaft which is journaled in the standards 2, 3 and 4 and standard plate 5. 7 indicates an operating lever secured to the outer end of the shaft 6 against the standard 2. 8 indicates a cam sleeve secured to the shaft 6 and provided with a cam groove 9, the main body of which is spiral and provided at one end with an offset portion 9^x. 1^x indicates lugs extending upwardly from the base plate 1 beneath the cam sleeve 8. 10 indicates a lever provided at its lower end with a semi-circularly forked portion 11, the arms 11^x of which are swung upon the cross pin 12 secured in the lugs 1^x. The upper end of the lever is provided with a forked portion 13 provided with longitudinal slots 13^x for a purpose which will hereinafter appear. 2^x indicates a lateral lug extension to the standard 2 and 3^x indicates a lateral lug extension to the standard 3. 14 indicates a rod secured at one end in proximity to the upper end of the standard 2 and at the opposite end in proximity to the standard 3. 15 indicates a supplemental rod extending parallel to the rod 14 and secured at one end in the lug extension 2^x and at the opposite end in the lug extension 3^x. 16 indicates a block slidably held upon the rod 14 and provided with a lateral extension 16^x slidably held upon the rod 15. The front portion of the upper face of the block 16 is provided with a recessed portion 17 in which fits a steel plate 18 having oppositely set L-shaped grooves 19 and 20. 21 and 22 indicate needles provided with outturned ends 24, which fit into the L-shaped grooves 19 and 20. 25 indicates a plate superimposed upon the plate 18, the plates 25 and 18 being secured together and to the block 16 by a screw 26 passing therethrough. 27 and 28 indicate rollers carried by the block 16, one of such rollers being journaled on a suitable pin 27^x and the roller 29 being journaled on a reduced portion of the block extension 16^x. The rollers 27 and 28 extend into slots 13^x to co-act with the forked lever 10. The needles 21 and 22 are provided with the usual eyes 30. 31 indicates a spring finger provided at one end with a T-shaped portion 32 suitably secured to the upper end of the standard 2. The spring finger 31 extends over and parallel to the needles 21 and 22 and is provided at its opposite end with a hook 33 bearing upon the needles 21 and 22 intermediately of the length of the eyes 30 thereof. The points of the needles project through perforations formed in the plate 34, such plate being provided with splits passing diametrically of such perforations to allow of the spreading of the plate as the enlarged portion of the eye of the needle passes through the perforation.

I do not show or describe this plate any further in detail as it does not form any part of the present invention.

35 indicates a roller journaled on a pin 36. The roller 35 extends into a spiral groove 9 to co-act therewith. By turning the lever 7 in the direction of arrow the cam sleeve 8 is rotated, the groove 9 thereof engaging the roller 35 and thereby swinging the lever 11 on its pivot formed by the cross pin 12. By this means the upper end of the lever 10 is swung inwardly carrying with it the block 16 which is connected thereto by means of the rollers 27^x engaging the slots 13^x. By this means the needles 21 and 22 are carried forward to perform their operation.

I will now describe the plaiting head and adjacent parts co-acting therewith.

37 indicates the main portion of the plaiting head, the upper portion of which has inwardly curved side and end faces converging to an edge portion 38. 39 indicates a cross bar portion forming the lower portion of the head. The cross bar portion 39 is connected to the portion 37 of the head by a series of vertical portions 40 suitably spaced apart. 41 indicates vertical recesses formed in the head portion 37 and in vertical alinement with the interspaces between the portions 40, the portion 42 intervening between the recess portion 41 being provided with grooves 43 for a purpose which will hereinafter appear. The upper portions of the portions 40 are also provided with recesses 44 in proximity to the upper end of each vertical edge. 45 indicate lateral extensions extending in opposite directions from each vertical portion 40. 46 indicate ratchet-shaped recesses formed in the portions 40 immediately above the lateral projections 45. Each of the portions 40 is also provided with open eye portions 47 and 48 formed in each vertical edge of each vertical portion 40 and through the main portion of which the needle passes when operated by the main operating lever 7 as hereinbefore described. The bar portion 39 extends beyond each end of the vertical series of plaiting head portions 40. The inner opposing

faces of the standards 3 and 4 are each provided with vertical grooves 49 and 50. The projecting end portions of the portion 39 of the plaiting head are suitably secured in the upper ends of the vertical groove 49. 51 indicates a cross bar which is preferably provided with a central enlargement 52 having its arc-shape recess 53 formed in its lower face. The ends of the cross bar 51 are also secured in the vertical grooves 49 intermediately of their height. 39× indicate depending studs suitably secured at their upper ends in the cross bar 39 extending from the plaiting head and provided at their lower ends with reduced threaded portions 39′ screwed into correspondingly threaded orifices formed in the cross bar 51. 54 indicate blocks slidably held in the grooves 49. 55 indicate vertical rib extensions extending from each side of the blocks 54 and bearing against the inner faces of the standards 3 and 4, such ribs also being provided with lug-like portions 56 in proximity to the upper ends of the blocks and in which are formed journal orifices 57. The inner face of each block 54 is provided with a vertical groove 58. 59 indicates a recess formed in a vertical edge of each block 54.

60 indicates a spring finger secured in each groove 49 opposite to the recess 59 and provided with a curved portion fitting into such recess. By means of the spring 60 the downward movement of the block 54 in the groove 49 is retarded. 61 indicates a movable cross bar located beneath the cross bar 51 and extending at its ends into the vertical grooves 58 of the blocks 54. 62 indicates an arc-shaped portion formed centrally in the cross bar 61 and designed to fit normally in the arc-shaped recess 53 of the cross bar 51. 63 indicates a rectangular bar portion provided at the ends with cylindrical portions 64 and 65 from which extend pintles 66 and 67. 68 indicate arms extending radially from the cylindrical portions 64 and 65 and provided at their ends with ball portions 69. 70 indicate recesses formed in the bar 61 and into which the ball ends 69 of the arms 68 extend. 71 indicates a bar provided with a longitudinal groove 72 into which the bar 63 is designed to fit. 73 indicates a set screw engaging an orifice 74 of the bar 71 and designed to bear at its inner end against the bar 63 so as to secure the bar 71 upon the bar 63. 75 indicate bearing lugs extending from each side of the standard 3 in proximity to the upper end thereof. 76 indicate similar bearing lugs extending from each side of the standard 4 in proximity to its upper end. 77 and 78 indicate rocking shafts which are journaled in the bearing lugs 75 and 76. 79 and 80 indicate gear wheels secured to the rocking shafts 77 and 78 to the outside of the bearing 75.

81, 82, 83, 84, 85 and 86 indicate a series of arms rigidly secured to each of the rocking shafts 77 and 78. 87 and 88 indicate a pair of arms located on each rocking shaft 77 and 78 substantially centrally between the standards 3 and 4, that is to say, in such a position that the arms 81, 82 and 83 are located on one side of the arms 87 and 88 and the arms 84, 85 and 86 on the opposite side. The arms 87 and 88 are provided with segmental arc-shape groove portions 89 into which a pin or other projecting member 90 extends from the rocking shafts 77 and 78. 91 indicate springs wound around the shafts 77 and 78 and provided with finger portions 92 and 93, the portion 92 bearing against a rigidly secured arm, such as 84 and the finger 93 bearing against an adjacent free arm, such as 88 thereby holding the free arm in such a position that the end of the recess 89 bears against the pin 90. Each of the arms 81, 82, 83, 84, 85, 86, 87 and 88 are provided with upwardly curved outer ends, the ends of the arms 87 and 88 extending slightly above in their normal position the ends of the remaining arms. The upper ends of the arms 81 are provided with eyes 94. All the remaining arms are provided with open eyes 95. The eyes of the arms 81, 82, 83, 84, 85 and 86 are always in horizontal alinement, the eyes of the arms 87 and 88 being normally slightly above the horizontal level of the eyes of the remaining arms but radially the same distance from the center of swing formed by the rocking shafts 77 and 78. It will also be understood that the radial distance between the eyes 94 and 95 is the same as the distance between the center of the eye portions 47 and 48 and the center of the shafts 77 and 78. It will, therefore, be seen that when the arms 81, 82, 83, 84, 85, 86, 87 and 88 are swung inwardly the eyes 94 and 95 of one set of arms and eyes 47 are in horizontal alinement and the eyes 94 and 95 of the other set of arms and eyes 48 are in horizontal alinement.

96 indicates a block slidably held in each vertical groove 50. 97 indicates an arm extending from each block 96 and provided at its inner end with a head 98 secured by a screw 99 to the lower end of the cross bar 61 in proximity to each end thereof. 100 indicates a counter shaft held in bearing standards 101 and 102 extending from the base 1. 103 and 104 indicate arms rigidly secured to the counter shaft 100, the opposite ends of the arms extending inwardly in proximity to the inner face of each standard 3 and 4. 105 indicates a link connecting the extreme inner end of each arm 103 and 104 to the corresponding slide block 96. 106 indicates a cam secured to the main shaft 6. 107 indicates a cam groove formed in one face of the cam 106, the major portion 108 being concentric to the center of the main shaft and being provided at its inner end

with an outturned portion 109. 110 indicates an arm provided with an arc-shape slot 111 and sleeve-like portion 112, which is mounted upon the counter shaft 100. The sleeve 112 is provided with opposing diametrically opposite slots 113 and 114 (see Fig. 30). 115 indicates an orifice extending diametrically through the shaft 100. 116 indicates a key which is driven through the orifice 115 so as to project at its ends through the slots 113 and 114. The upper end of the key 116 projects radially beyond the end of the sleeve 112. 117 and 118 indicate lugs extending upwardly from the sleeve 112 and provided with threaded orifices 119 and 120 in which are screwed set screws 121 and 122 so as to bear at their inner ends against the projecting ends of the key 116. 123 indicates a link member provided at one end with a roller 124 fitting into the cam groove 107. The opposite end of the link 123 is secured in position against the arm 110 by means of a set screw 125 passing through the slot 111, the head of the set screw bearing against the face of the arm 110 and the extreme end of the shank of the set screw passing through the link 123 being provided with a nut 126 which bears against the face of the link.

It will, of course, be understood that the set screw 125 is provided with a shoulder fitting into the slot 111 so as to bear against the inner face of the link 123 to space the link from the face of the arm 110 as is common practice in this form of connection and thereby prevent it binding.

126 indicates a supplemental link which is swung at its lower end upon a bracket 127 and swingably connected at its upper end upon the journal pin 124^{x} of the roller 124. 128 and 129 indicate plates which are each provided with inturned portions 130 and 131, each terminating in lugs 132, which are pivotally connected by pins 133 to the ends of the plaiting head 38. The plates 128 and 129 normally extend outwardly at an angle from the plaiting head. The inturned portions 130 and 131 are also flared outwardly at a corresponding angle to the head, the lower edge of each plate fitting into a corresponding ratchet recess 45 when in the normal position. The plate 128 is provided intermediately of its length with an inwardly extending lug 134. The plate 129 is provided with a corresponding lug 135 opposing the lug 134. 136 and 137 indicate pins extending laterally from the lugs 134 and 135. It will, of course, be understood that the lugs 134 and 135 extend inwardly into the interspace between two of the vertical portions 40 of the head. 138 indicates a vertical bearing orifice formed in the cross bar portion 39 of the plaiting head. 139 indicates a rod slidably held in a bearing orifice 138. 140 indicates a head formed at the upper end of the rod 139 and provided with a cross slot 141 into the ends of which the pins 136 and 137 extend in their normal position. 142 indicates a loop-like member, the upper end of the loop being provided with a sleeve-like portion 143 into which the lower end of the rod 139 is secured by means of a set screw 144. The sides of the loop member 142 extend downward at each side of the bar portions 51 and 61. The loop member is provided at its lower end with an enlarged loop portion 145 extending around the main shaft 6, the lower end being provided with a lug portion 146 from which extends a pin 147 on which a roller 148 is mounted. The outer face of the standard 3 is provided with a vertical grooved guideway 149. 150 indicates a slide bar provided with a portion 151 extending into the groove 149. The lateral edges of the bar 150 are provided with gear racks 151 and 152, which are in mesh with the gears 79 and 80 hereinbefore described. 153 indicates a link connected by a screw 154 to the block 150. The lower end of the link is provided with a slotted portion 155 which extends at its lower end around the lower peripheral portion of the main shaft 6. 156 indicates a cam secured to the shaft 6, such cam being provided with a cam recess 157 extending inwardly from its periphery. 158 indicates a cam recess also formed in the periphery of the cam 156 and provided at one end with an inclined portion 159 and at the opposite end with a steep portion forming a shoulder 160. 161 indicates a lever arm extending through a slot 1^{a} formed in the base 1. The lower end of the lever 161 is pivotally supported on a depending lug 1^{b} by a pin 1^{c}. The lower end of the link 153 is provided with a lug extension 162. 163 indicates a pin extending through the upper end of the lever arm 161 and through a lug 162. 164 indicates a roller mounted upon the pin 163 and co-acting with the periphery of the cam 156. 165 indicates a cam also mounted upon the shaft 6 intermediately between the standards 3 and 4, such cam being similar in form to the cam 156 with the exception that it is smaller in diameter and the cam recess 158 formed in the cam 156 is dispensed with.

166 indicates a standard piece suitably secured to the base 1 and provided with a jawed upper end. 167 indicates a latch piece pivotally secured at one end within the jaw of the standard piece 166. The latch piece 167 extends at right angles to the shaft 6 immediately beneath the same and is held in its upper position by a leaf spring 168 and the pin 147 supporting the roller 148 hereinbefore described extends at its opposite end into the latch piece 167. The free end of the latch piece 167 is provided with a curved edge 169. 170 indicates a supplemental standard piece also suitably secured in the

base 1 and provided with a jawed upper end. 171 indicates a substantially bell-crank shape locking piece pivotally secured within the jaw 170. The inner end of the locking piece 171 is provided with a hook portion 172 designed to be carried into engagement with the end of the latch piece 167. The opposite end of the locking lever 171 is provided with a finger piece 173. 174 indicates a spring bearing against the lower face of the locking piece in proximity to the portion 173 so as to normally hold the locking piece in the upper position or the position shown in Fig. 9.

175 indicates a rocking shaft journaled in the standards 3 and 4. One end of the rocking shaft 175 extends beyond the standard 3. 176 indicates a gravity dog secured to the end of the rocking shaft 175, the end of the dog normally resting upon the periphery of the cam 156. It will be noted that the end of the gravity dog 176 is curved at 177 for a purpose which will hereinafter appear. 178 indicates an arm which is secured to the opposite end of the rocking shaft 175. 179 indicates a tension spring connecting the free end of the arm 178 to a suitably located pin 180. 181 indicates a vertically extending recess formed in the center of the standard 4 and extending from the top thereof. 182 indicates a block slidably held in the recess 181 and provided with flange extensions 183 bearing against the outer face of the standard 4. 184 indicates a block secured in a stationary position within the upper end of the recess 181 by means of the laterally extending flanges 185, which are secured to the top of the standard by screws 186. The block 184 is provided with a forward extension 184×. 187 and 188 indicate grooves formed in the upper face of the block and extending parallel with the longitudinal axis of the machine. The grooves 187 and 188 are in a line with the needles 21 and 22, the eyes of the needles passing thereinto at the end of the forward movement of the needles.

189 indicates a groove formed in the block extension 184 and extending at right angles to the grooves 187 and 188. 190 and 191 indicate slots formed in the block 184 and extending around the base of the grooves 187. 192 indicates a rod fitting at its upper end into a recess 193 formed in the center of the lower face of the block 184. The lower end of the rod 192 bears against the lower end of the recess 181 and passes freely through the block 182. 194 indicate recesses formed in the block 182 at each side of the rod 192. 195 and 196 indicate ribbon fingers secured at their lower ends in the recesses 194, the fingers 195 and 196 being secured in each recess and extending upwardly into each slot 190 and 191 in the position shown in Fig. 16. 197 indicate spring fingers carried by the rod 192 so as to extend upwardly in each slot 190 and 191 to press outwardly against the ribbon fingers 195 and 196. The upper ends of the ribbon fingers 195 and 196 are in such a position that when the eyes of the needles pass into the grooves 187 and 188 an eye of a needle is directly above each slot 190 and 191 and, therefore, directly over the upper ends of the ribbon fingers 195 and 196, which are operated as hereinafter described to pass upwardly through the eyes of the needles. 198 indicates a post which extends upwardly from the block 184 for a purpose which will hereinafter appear.

It will be noted on referring to Fig. 17 that the upper ends of the ribbon fingers 195 and 196 spread outwardly when free from compression of the spring 197 so as to form a receiving notch for the cord, which they are designed to draw through the eye of a needle.

198× indicates a link pivotally connected at one end to the arm 178 and at the opposite end to the block 182. 199 indicates a series of fingers extending from the bar 71, such fingers curving slightly outwardly over the rocking shafts 77 and 78 and extending upwardly in an inclined direction and terminating in hooks 200.

I will now describe the mechanism by which the cord is fed and cut into short portions and the ends of such portions carried so as to be gripped by the ribbon fingers 195 and 196 hereinbefore described. The standard plate 5 hereinbefore referred to is provided with an arc-shape upper edge having a peripheral groove 5×. 201 indicates a bracket which is secured by screws 202 to the face of the standard plate 5 so as to extend over the edge thereof. 203 indicates a head formed rigid with the bracket 201, such head being provided with a bore 204. 205 indicates a piece of hardened steel which is forced into the bore and provided with a perforation 206 having a flared outer end 207. 208 indicates the cord, the body of which is wound upon a suitable reel and the end threaded into the perforation 206 as indicated in Fig. 6. The head 204 is provided with a lateral extension 209. 210 indicates a cutting knife which is arc-shape in form and provided with a cutting edge 211. 212 indicates a pin by which one end of the knife is pivotally connected to the lug extension 209. 213 indicates a rib. It may be stated that the upper edge of the standard 5, the upper edge of the bracket 201 and the upper edge of the rib 213 are all concentric with the center of the shaft 6. 214 indicates a concentric slot formed in the rib 213. 215 indicates a slide piece provided with an arc-shape groove 216 designed to fit the arc-shape rib 213. 217 in-

dicate pins extending through the slide piece 215 and through the arc-shape slot 214. The lower end of the slide piece 215 is provided with opposing lugs 218. 219 indicates a sleeve interposed between the lugs 218. 220 indicates a set screw extending through such sleeve piece and through the lugs 218. 221 indicates a spring finger secured at one end to the sleeve 219 and provided at its opposite end with a forwardly presented ratchet rack 221^x designed to be held in engagement with the cord 208. 222 indicates an arm provided with a collar-like end 223 swung upon the main shaft 6.

On referring to Fig. 2 it will be seen that the corresponding end of the main shaft is provided with a reduced threaded portion 6^x. 224 indicates a cam secured on such reduced portion, such cam being provided with a cam way 225, the portion 226 of which is concentric and the portion 227 extending inwardly in an arc-shape direction toward the center of the cam. 229 indicates a depending lug extending from the arm 222. 230 indicates a link pivoted at one end by the screw 231 to the lug 229, and extending at its opposite end to the inner face of the cam 224. 232 indicates a roller mounted upon a pin 233 extending from the link 230, such roller co-acting with the cam way 225. 234 indicates a pitman connected at one end to the pin 233 and at the opposite end to the free end of the cutting knife 210. It will thus be seen that when the pitman is drawn by the roller into the eccentric portion of the cam way 225 that the knife 210 is drawn inwardly to sever the cord extending through the perforation 206.

It will be noted on referring to Figs. 4 and 2 that the upper end of the arm 222 is curved inwardly at 235 and is provided with a lug-like extension 236. 237 indicates a pin extending through such extension into the bracket 201. 238 indicates a sleeve mounted upon such pin and provided at its outer end with an inwardly extending arm 238^x and at its opposite end with an outwardly extending arm 239. 240 indicates a roller carried by the inner end of the inwardly extending arm 238^x and 241 indicates a leaf spring carried by the arm 222 and bearing upwardly against the roller 240. 242 indicates a screw extending through the outer end of the outwardly extending arm 239 into the slide piece 215. 243 indicates an arm swung upon the main shaft 6. 244 indicates a disk secured to the main shaft 6, such disk being provided with a circumferentially extending slot 245 and a notch 246, one side 247 of the notch being inclined and the other side 248 substantially at right angles to the bottom of the notch. 249 indicates a stud adjustably secured in the slot 245. 250 indicates a cam plate. The cam plate 250 comprises a central portion 251 having a central opening 252 through which the shaft 6 freely extends. 253 indicates a portion depending from the central portion 251 and terminating in an enlarged portion 254 provided with a concentric slot 255. 256 indicates a screw having an enlarged head, the shank of the screw extending into the base plate 1 and the head bearing against the outer face of the enlargement 254 thereby securing such enlargement in a stationary position against the end of the base plate. 257 indicates a cam piece extending upwardly from the central portion 251, the upper edge of such cam piece being concentric with the center of the shaft 6 and flush with the outer periphery of the disk 244, the upper corner of such cam 6 being preferably chamfered off at 258. 259 indicates a gravity dog carried by the arm 243, the depending portion 259^x of which is provided with a lateral extension 260, which extension is designed to be brought into engagement with the upper peripheral edge of the cam plate 257 so as to carry the depending portion 259^x out of the notch 246. The arm 243 is provided with a hollow portion 261, such hollow portion being provided with longitudinally alined slots 262 and 263. The upper end of the arm 243 is provided with a jaw portion 264. 265 and 266 indicate gripping jaw members. The member 266 is mounted on a cross pin 267 passing through the jaws 264. 268 indicates a tail piece formed integral with the jaw portion 266, such tail piece being provided with a slot 269 provided with an enlargement at its lower inner end forming a shoulder 270. 271 indicates a bracket carried by the arm 243. 272 indicates a finger pivotally connected at 273, the end of such finger extending below the pivot point being provided with a spring finger extension 274 designed to bear against the arm 243. The upper end of the finger 272 fits into the slotted enlargement forming the shoulder 270. 275 indicates a tension spring connected at one end to the extreme end of the tail piece 268 and at the opposite end to the jaw 273. 276 indicates a cam plate comprising a bar portion 277 formed concentric with the center of the shaft 6 and having at its inner end a radial enlargement 278 having an inclined inner edge portion 279 and a lateral extension 280 provided with an inclined portion 281. 282 indicates a bracket provided with a sleeve-like portion 283 extending at right angles to the edge of the plate 5 and to the outer end of which a cam plate 276 is secured by means of a screw 284 extending through the portion 283 and cam plate 276. The bracket 282 is

adjustably secured to the plate 5 by means of a set screw 285 extending through the bracket 282 and an arc-shaped slot 286.

It will be understood that as the arm 243 swings into the position shown in Figs. 4 and 5 that the cam plate 276 passes between the arm and the finger 272 carrying the finger 272 into engagement with the inclined portion 281 forcing such finger outwardly against the pressure of the spring 274 so as to carry the opposite end of the finger clear of the shoulder 270 allowing the jaw member 266 to be drawn downwardly by means of the tension spring 275, the finger 272 passing through the slot 269. As the arm 243 swings in the opposite direction or toward a vertical position the tail piece of the jaw 266 engages with the inclined portion 279 of the cam plate enlargement 278 thereby carrying the tail piece upward and restoring the jaw member 266 to its normal position, the finger 272 being simultaneously carried again into engagement with the shoulder 270 by means of the spring 274.

287 indicates a pin extending inwardly from the arm 243, such pin being located at the lower end of the slot 262. The jaw member 265 is provided with a shank 288, which fits into the hollow portion of the arm 243. 289 indicates a pin extending outwardly from the shank 288 through the slot 263 and, therefore, in longitudinal alinement with the pin 287. 290 indicates a compression spring extending between the bottom of the hollow member 243 and the lower end of the shank 288. 291 indicates a stud extending outwardly from the bracket 201, the outer end of the stud being formed into a jaw through which extends a pin 292. 293 indicates an arm swung upon a pin 292. 294 indicates a tension spring connected at one end to the lower end of the arm 293, and at the opposite end by suitable means to the bracket 201. The upper end of the arm 293 is provided with an enlargement 295, which is spear-shape in form, the tip of the spear being slightly bent inwardly at 296. It will be noticed that the arm 293 forming the shank of the spear is located at one side of the head and immediately below the center portion of the head is formed a channel portion 297. As the arm 243 is swung over to the opposite angular position to that shown in the drawing the inturned tip of the spear head engages the inner face of the arm 243 and is slightly forced inwardly and passes between the pins 289 and 287, such pins engaging the upper and lower edges of the spear head and being gradually spread apart thereby or, in other words, the pin 289 is forced downwardly in the slot 263 carrying the jaw member 265 away from the jaw member 266. When the pin 289 has passed the lower end of the spear head the jaw member 265 is forced outwardly by the compression spring 290 thereby carrying the pin 289 toward the pin 287 and into circumferential alinement with the bevel portion 297 of the spear head so that when the arm 243 is again swung back toward the position shown in the drawing the pin 289 engages such bevel portion forcing the head 295 inwardly against the tension of the spring 294 thereby allowing the pin to pass.

298 and 299 indicate vertical ways formed in the back of the plate 5. The upper end of the way 299 is provided with an opening 300 for a purpose which will hereinafter appear. The way 298 is dove-tail in form and provided with a vertical casing 301 extending vertically of the front face of the plate 5. 302 and 303 indicate standard plates extending inwardly from the plate 5, the plate 303 being carried by an inward extension 304 and the plate 302 by the wall of the casing 301. 305 indicates a slide provided with a dove-tail portion 306 slidably held within the way 298. 307 and 308 indicate vertical grooves formed in the slide 305 and extending from the top to the bottom of the same. 309 indicates a bar piece fitting within the vertical groove 308 and pivotally secured therein at its lower end by a pin 310. The slide piece 305 is provided at one side with an upward extension 311 provided with a vertical slot 312 open at its upper end. The piece 309 is provided at its upper end with a lateral extension 313 terminating in a forwardly extending portion 314 passing through the open end of the open ended slot 312. 315 indicates a piece slidably held in the groove 307 and 316 indicates a notch formed in the lower end of the slide piece, such notch forming a lateral extension of the vertical groove 307. 317 indicates a portion extending forwardly from the lower end of the piece 315 so as to protrude through the notch 316. 318 indicates a tension spring connecting the portion 317 with a stationary pin 319. 320 indicates a lateral extension to the upper end of the piece 315, such lateral extension terminating in a forward extension 321, such forward extension being provided with an upwardly extending notch 322 at its lower end. 323 indicates a saw cut formed in the upper end of the slide piece 305 and forming a lateral extension to the groove 307. 324 indicates a tongue extending forwardly through the saw cut 323, such tongue being provided with an inclined upper edge 325. 326 indicates a vertical slot formed in the side of the casing 301. 327 indicates a bell crank piece pivotally mounted on the plate 5 to the outside of the casing 301 in such a position that the horizontal arm of the bell crank protrudes through the upper end of the slot 326 into the casing 301, the lower end of the vertical

portion of the bell crank 327 bearing against the lower end of the slot 326 being held thereagainst by a compression spring 328.

It will thus be seen that as the slide piece 305 passes upwardly the inclined portion 325 of the tongue 324 engages the horizontally extending portion of the bell crank 327, which is held rigid from upward movement and thereby forces the pivoted piece 309 outwardly from the slide piece at its upper end and thereby carrying the inward extension 313 out of the path of the cord which is being fed on to the top edge of the plate 5.

328× indicates a plate which is secured to the outer face of the slide piece 305 and extends over the outer edge of the vertically movable piece 315 thereby holding such piece in place. 329 indicates a leaf spring which is carried by the plate 328× and bears at its upper end against a laterally extending portion 313 of the pivot piece 309. It will thus be seen that when the tongue 325 has passed in its upward vertical movement the horizontal arm of the bell crank 327 that the pivot piece is forced back to its normal position carrying the extension 313 into a position over the cord carried by the upper edge of the plate 5. 330 indicates a projection extending inwardly from the casing 301 into the guideway 298 so as to be vertically in the path of the inward extension 317. As the slide piece passes to its uppermost position the extension 317 engages with the projection 330 thereby forcing the piece 315 downwardly against the action of the spring 318 and carrying the inward extension 321 away from the inward extension 313 into the position shown in Fig. 27. 331 indicates a block provided with an inclined upper edge 332, such block being preferably adjustably held in position by a set screw 333 passing through a vertical slot 334 formed in the wall of the casing 301.

It will thus be seen that as the slide passes downwardly to its lowermost position the tongue 324 engages with the inclined portion 332 of the block 331 thereby again swinging the pivot piece 309 away from the guide piece 305 against the tension of the spring 329 so as to again carry the inward extension 313 out of the path of the cord. 335 indicates a cord carrier. 336 indicates an arbor journaled in the opposing plates 302 and 303, the central portion of the arbor being preferably rectangular and extending through a correspondingly formed orifice in the carrier 335. 337 indicates a guide secured to the upper end of the carrier 335 and provided with opposing guides 338 and 339. The base of the guide 337 is cut away at 340. 341 indicate a pair of spring fingers secured to the shank of the carrier 335 and extending upwardly beneath the cutaway portion 340. Each of the spring fingers 341 carries a curved portion 342 at their upper end normally bearing against the upper walls of the guides 338 and 339. 343 indicates a spring finger also secured to the shank of the carrier 335. The spring finger 343 extends upwardly beneath the spring fingers 341 and past the end thereof and is provided with a cross bar 342× provided with open eyes 343× and 344× through which the ends of the cord portions are drawn as hereinafter described. 343′ indicates a pinion mounted upon one end of the arbor 336. 345 indicates a vertical guideway carried by the plate 303. 346 indicates a rack bar slidably held in the guideway 345 and in engagement with the pinion 343. 347 indicates a bell crank lever mounted upon a standard 348 carried by the base 1. 349 indicates an arm provided with an annular upper end 350 swung upon the shaft 6. 351 indicates a link connecting the depending end of the arm 349 to the lower end of the depending portion of the bell crank 347. 352 indicates a link pivotally connected at its lower end to the horizontal end of the bell crank 347 and provided at its upper end with a curved portion 353 pivotally connected at its extreme end to the lower end of the rack bar 345. 354 indicates a cam secured to the shaft 6 from the inner face of which extend pins 355 and 356.

It will thus be seen that when the operating lever 7 is swung in the direction of arrow that the pin 356 is carried into engagement with the arm 349 thereby drawing the arm in the direction of arrow and tilting the bell crank 347 on its pivot and raising the link 352 and rack 345 in mesh with the pinion 343 thereby swinging the carrier in the direction of arrow (see Fig. 2). When the lever 7 is swung in the opposite direction, of course, the pin 355 engages the arm 349 to perform the reverse operation, that is to say, swing the carrier in the opposite direction of arrow back to its normal position.

I will now describe the mechanism by which the guide piece 305 is raised and lowered in the guide way. The guide piece 305 is provided with a lug extension 305×. 357 indicates a link pivotally connected at one end to the lug extension 305×. 358 indicates an arbor journaled in a lug extension 359 of the plate 5. To one end of the arbor 358 is secured an arm 360, to the inner end of which is pivotally connected the lower end of the link 357 above described. 361 indicates an arm secured to the opposite end of the arbor 358. 362 indicates a cam way formed in the cam 354. 363 indicates a link pivotally connected at one end to the arm 361 and at the opposite end to a link 364, which is pivotally connected at 365 to the base 1 of the machine. The pivot pin connecting the links 363 and 364 together carries a roller

366, which co-acts with the cam groove 362. It will thus be seen that when the cam 354 is turned in the direction of arrow (see Fig. 4) that the cam roller 366 is carried outwardly toward the periphery of the cam and that, therefore, the arm 361 is carried in the direction of arrow carrying the arm 360 downwardly and thereby drawing the guide piece connected to the arm by the link 357 downward. 367 indicates a pin carried by the guide piece 305. 368 indicates an arm swung upon a pin 369 carried by the casing 301. 370 indicates a slot formed on the wall intervening between the casing and guide 298. 371 indicates a horizontal extension to the arm 368. 372 indicates a tension spring connecting the arm 368 to the opposite wall of the casing 301. It will thus be seen that when the slide piece 305 is carried vertically downward that the pin passes clear of the arm 368 allowing the arm to be swung on the pin 369 to carry the lateral extension 371 thereof through the slot 370 and thereby free the carrier 335 to swing in the direction of arrow as above described. 373 and 374 indicate slots formed in the plate 5 in proximity to the outer edge thereof. 375 and 376 indicate brackets secured to the sides of the plate by set screws 377 extending through the slots 373 and 374. 378 indicate spring fingers secured to the bracket 375. 378× indicates a spring finger secured to the bracket 376 by a rivet 377×. 379 indicates a set screw extending through the bracket and bearing against the outer face of the spring finger so as to adjust the tension of the finger upon the cord. The fingers 378 and 378× may be provided with out-turned lip extensions 380 so as to allow of the ready entrance of the cord therebetween.

In Fig. 31 I have shown a detail view of a mantle showing the cord 209 threaded therethrough.

Having described the principal parts involved in my invention I will briefly describe the operation of the same.

Before operating my machine a mantle is passed over the upper end of the plaiter 37, the lower edge of such mantle being passed downwardly to between the outwardly flaring plates 128 and 129 or into the position shown in Fig. 18.

When the lever 7 is thrown in the direction of arrow the shaft 6 and cam 8 carried thereby are rotated in a similar direction. During the initial movement of the cam 8 the roller 35 travels through the concentric portion of the cam groove before it enters the spiral portion. During this movement of the roller the needles 21 and 22 are held stationary.

During the initial movement of the lever 7 as above described the cam 106 is rotated in the direction of arrow (see Fig. 10) thereby drawing upon the link 123 and slotted arm 110. This operation rocks the countershaft 100 inwardly thereby swinging the arms 103 and 104 downward drawing the links 105 downward and the blocks 96 downward in the guideway 50. The downward movement of the blocks 96 draws the cross bar 61 downward in the vertical grooves 58 of the blocks 54 thereby rocking the bars 63 inwardly and securing the hooks 200 into the grooves 43 and into engagement with the mantle. Simultaneously with this operation the cam 156 is rotated in the direction of arrow thereby forcing the roller 157 downward and thereby carrying the slotted link member 149 and rack 150 connected thereto in the same direction thereby rotating the pinions 79 and 80 to swing the two sets of arms 81, 82, 83, 84, 85, 86, 87 and 88 inward toward each other into the position shown in Fig. 22 and into engagement with the mantle in proximity to the lower edge of the infold *a* forming the hem and thereby forming the plaits.

As this operation is performed the cam 165 is also rotated to draw down the loop member 142, which pulls upon the rod 139 carrying down the slotted head thereof in engagement with the pins 136 and 137 thereby tilting the plates 128 and 129 inward into the position shown in Fig. 19.

As the bar 61 is drawn down it pulls upon the pawl heads 69 of the bars 63 which are carried by the blocks 54 thereby exerting a pull on the blocks so as to overcome the spring 59 drawing the block past the spring and thereby carrying the bars 63 and hooks 200 carried thereby downward or from the position shown in Fig. 20 to the position shown in Fig. 21. By this downward movement the sides of the mantle are drawn down past the lower edge of the mantle so as to form an upward inwardly extending hem as shown at *a* in Fig. 21. Also simultaneously with the above operation the cam way 225 (see Fig. 4) is carried in the direction of arrow thereby carrying the roller 232 into the concentric portion of the cam way and thereby raising the knife 210 into position ready for cutting. During this operation the pin 249 engages the arm 243 swinging it upward and past a vertical position until brought into engagement with the roller 240 thereby depressing the corresponding end of the arm 238 against the pressure of the spring 241 thereby carrying the oppositely extending arm 239 in an upward direction to carry the slide piece 215 circumferentially of the plate 5 and thereby feeding the cord 208 which is gripped by the spring ratchet finger 221 through the perforation 206 into position to be gripped between the jaws 265 and 266.

As has been before described when the arm 243 approaches this position the head 295 enters between the pins 289 and 287

spreading them apart and drawing the jaw 265 away from the jaw 266 thereby allowing the fed end of the cord protruding through the head 203 beneath the knife 210 to pass between the jaws 265 and 266. As the pin 289 passes the base of the head 295 such pin is released and the jaw member 265 is forced by the spring 261 against the jaw member 266 to grip the cord therebetween. By the upward movement of the lever 7 in the direction of arrow the cam 354 is rotated carrying the roller 366 outwardly in the cam groove 362 toward the periphery of the cam thereby forcing the link 363 longitudinally outward and swinging the arm 361 in the direction of arrow. The outward swing of the arm 361, which is carried by the arbor 358, serves to carry the arm 360 also carried by the arbor 358 downward drawing upon the link 357 and carrying the guide piece 305 downward to the dotted position shown in Fig. 6.

It will, of course, be understood that this initial downward movement of the slide piece 305 is an idle movement as the cord has not yet been fed to the machine into engagement therewith. By the same movement also the pin 356 is carried into engagement with the arm 349 swinging the arm 349 in the direction of arrow and drawing upon the link 351 tilting the bell crank 347 on its pivot raising the link 352 and rack 345 in engagement with the pinion 343 thereby swinging the carrier 335 in the direction of arrow in an idle movement.

As has been before described the plaiting arms 81, 82, 83, 84, 85, and 86 are rigidly held upon their supporting shafts, the arms 87 and 88 being resiliently held by the spring fingers 92 and 93. It will also be noticed that the ends of such arms project forwardly of the remaining arms and are, therefore, brought into contact with the center portion of the mantle before the remaining arms thereby drawing the lower hemmed edge of the mantle toward the center of the mantle to take up the slack. The remaining fingers then engage with the mantle forcing the remaining portion into plaited form and drawing the ends of the arms 87 and 88 back into alinement with the remaining arms so that the eyes of all the arms are in longitudinal alinement. As soon as the plaiting arms have assumed the position shown in Fig. 22 the roller 35 enters the spiral portion of the cam groove 9 of the cam 8 thereby swinging the lever 13 forward and the needles 21 and 22 forward so as to pass longitudinally through the eyes 94 and 95 and into the grooves 187 so that the slotted openings of the eyes are immediately above the slots 190 and 191. As the eyes of the needles assume this position the cam 156 has been rotated so that the gravity dog 176 drops into the recess 158 rocking the shaft 175 carrying the gravity dog downward and swinging the arm 178 upward, such movement being assisted by the tension spring 179. By means of the link 198× connected to the arm 178 the block 182 is carried upward carrying the ribbon fingers 195 and 196 through the eyes of the needles, the extreme ends of such fingers spreading outwardly after their passage through the eyes into the form shown in Fig. 17. As the arm 243 is swung in the direction of arrow (see Fig. 5) the gravity dog 259 passes off the periphery of the cam plate 257 and engages the notch 247. The operating lever 7 is then swung in the opposite direction to arrow. By this movement the disk 244 is rotated in the opposite direction of arrow so that the notch 247 engages the pawl 259 by carrying the arm 243 in the opposite direction to arrow. As has been before stated the cord 208 has been gripped between the jaws 265 and 266 and therefore, as the arm 243 swings in the reverse direction the cord is drawn through the perforation 206 around the peripheral edge of the plate 5 toward the opposite side of the plate. As the lever 7 assumes its final position and the arm 243 has reached the position shown in Figs. 4 and 5, the roller 235 again engages the eccentric portion 227 to the cam way 225 thereby drawing the pitman 234 downward and swinging the knife 210 downward to sever the fed portion of the cord from the stock, the arm 243 finally carrying the severed portion of the cord into the position shown in Fig. 5. As the arm 243 reaches this position the jaw member 266 is released by means of the finger 272 engaging the inclined portion 280 of the cam plate as has hereinbefore been described thereby releasing the cord. Also by the reverse movement of the lever 7 the carrier 335 is swung back to its normal position or the position shown in the drawing, and the guide piece 305 raised. In order that the inwardly projecting portion 313 should pass the cord carried by the upper edge of the plate 5 as the guide piece 305 assumes its uppermost position, the tongue 325 engages the horizontal portion of the arm 327 thereby forcing the member 307 outwardly on its pivot against the pressure of the spring 329 thereby allowing the inwardly projecting end 313 to pass the cord. It will, of course, be understood that the cord bridges the open upper end of the opening 300 when it is in position on the upper edge of the plate 5 and that the inwardly projecting portion 321 is drawn downward so as to extend directly beneath the cord, such downward movement being imparted to the member 315 carrying such inwardly projecting portion by the spring held portion 317 engaging the inward projection 330. As the tongue 324 passes above the hori-

zontal arm 327 the inward projection 313 passes over the cord.

Simultaneously with the upward movement of the slide piece 305 the pin 367 carried thereby engages with the arm 369 forcing it into the vertical position shown in the drawing against the tension of the spring 372, the horizontal portion 371 passing over the body of the carrier 335 and beneath the spring fingers 341 thereby holding the carrier accurately in position to receive the cord. As the lever 7 is again swung in the direction of arrow the slide piece 305 is carried downward by means of the cam way, 362, co-acting roller 366, link 363 and swingable arms 361 and 360 connected by the link 357 to the slide piece. As the slide piece passes downward the tongue 324 engages the horizontal portion of the arm 327 swinging it downward on its pivot against the compression of the spring 328 thereby allowing such tongue to pass downward without effecting the position of the extension 313. Simultaneously the projection 317 is carried out of engagement with the projection 330 enabling the tension spring 318 to draw the member 315 vertically and carry the inward extension 321 upward to grip the center of the cord against the extension 313. It will thus be seen that as the slide piece 305 passes downward that the center portion of the cord is drawn downward into the guideways 338 and 339 of the carrier 335.

It may be stated that as the carrier is carried into the position shown in the drawing the cross bar 342^{x} and enlargements 342 bear against the vertical edge of the lateral extension 321. As the cord is drawn into the guideways 328 and 329 it is also drawn into the eyes 343^{x} and 344^{x}, being drawn longitudinally therethrough until the slide piece assumes its lower or dotted position shown in Fig. 6 drawing the cord into looped form.

In Fig. 32, I have shown an alternative construction of head and co-acting parts adapted for use when it is desired to thread an upright mantle instead of an inverted mantle. It will be understood that an upright mantle does not require an inturned hem as above described in connection with an inverted mantle and that, therefore, when the machine is used for an upright mantle the hook fingers 199 are removed by loosening the set screw 73 and withdrawing the U-shaped bar 71 from the rocking members 63. The mantle support comprising the head 37, base portion 39 and connecting parts together with the stems 39^{x} are removed and the mantle support 381 is employed. This support comprises the head 382, base portion 383, connecting portions 384 having open eyes 385 and long stems 386. The stems 386 instead of being secured to the cross bar 51 are reduced in size to the stems 39^{x} and pass downwardly through the internally threaded orifices of the cross bar 51 and are secured at their lower ends in the cross bar 61, such cross bar being adjusted to the lower position shown in Fig. 32.

387 indicate upwardly curved pins against which the lower end of the mantle rests. The cam 106, arm 104, link 105 and link 123 are all adjusted so that when the thread is passed through the crimped edge of the mantle by the needles the cam 106 operates to raise the arm 104 and, therefore, the head 382 carrying all the portions carrying the mantle completely free of the needles so that there will be no danger of the finger of the operator being injured when withdrawing the mantle and placing a new one in position ready to be threaded.

What I claim as my invention is.

1. In a mantle sewing machine, a mantle support on which the mantle fits, a main shaft, an operating lever therefor, and means operated by the main shaft for engaging the lower edges of the mantle, and means also operated from the main shaft for engaging the mantle above such engaged portion and drawing it downwardly below the engaged portion to form an inturned hem.

2. In a mantle sewing machine, a mantle support provided with a head at its upper end over which the mantle is passed, a main shaft, an operating lever therefor, means operated from the main shaft for infolding the lower edge of the mantle beneath the head, and hook means also operated from the main shaft and adapted to engage the mantle above the infolded edge, and means for drawing such hook means downwardly when in engagement with the mantle past the infolded edge to form an inturned hem.

3. In a mantle sewing machine, a mantle support provided with a head at its upper end over which the mantle is passed, a main shaft, an operating lever therefor, means operated from the main shaft for infolding the lower edge of the mantle beneath the head, and hook means also operated from the main shaft and adapted to engage the mantle above the infolded edge, means for drawing such hook means downwardly when in engagement with the mantle past the infolded edge to form an inturned hem, and means for carrying such hook means out of engagement with the mantle after the forming of the hem.

4. In a mantle threading machine, the combination with the mantle holder comprising an upwardly tapered head, a body portion, and a series of spaced apart vertical members connecting the head to the body portion and having open eyes in each outer

edge thereof, of swinging members located at each side of the vertical members of the head, means for swinging such members inwardly beneath the lower edge of the head, and means for engaging the mantle at each side of the head, and means for drawing such engaging means downward when in engagement with the mantle and for freeing such engaging means from the mantle at the end of its downward stroke.

5. In a mantle threading machine, the combination with the mantle support comprising an upwardly tapered head, a body portion, a series of vertical members connecting the head and body portion together and having open eyes in each outer edge, of a pair of swinging members located at each side of the vertical connecting portions of the head having inwardly extending arms, a vertically movable member connected at its upper end to such arms, and means for imparting vertical movement to the vertically movable member to carry the upper edges of such members inwardly into engagement with the mantle edge depending below the head whereby it is carried inwardly beneath the head.

6. In a mantle threading machine, the combination with the main shaft and operating lever thereof, of a mantle support comprising an upwardly tapered head and a reduced intermediate portion, a pair of plate members swingably supported on such reduced portions of the head so as to swing inwardly beneath the head, arms extending inwardly from such plate members, a vertically movable member engaging arms at its upper end, a cam roller carried by the lower end of the vertically movable member, and a cam mounted on the main shaft co-acting with the cam roller to impart movement to such vertically movable member.

7. In a mantle threading machine, the combination with the mantle support having a head at its upper end over which the mantle is passed, of means for infolding the lower edge of the mantle beneath the head, a series of hook fingers swingably mounted at their lower ends at each side of the head, and means for swinging the hook members into engagement with the mantle, then drawing the hook members downward and for then disengaging the hook members from the mantle.

8. In a mantle threading machine, the combination with the mantle support provided with a head at its upper end over which the mantle is passed, of means for infolding the lower edge of the mantle beneath the head, a main shaft, a cam on the main shaft, a vertically movable supporting structure, bars turnably supported in such supporting structure, hook members carried thereby, a vertically movable member carried by the vertically movable supporting structure, connecting means between the turnable members and vertically movable member whereby a turnable movement is given to the turnable members by the vertical movement of the vertical member to carry the hook members in and out of engagement with the mantle, and mechanism operated by the cam for first carrying the movable member vertically downward and then carrying the vertically movable supporting structure downward.

9. In a mantle threading machine, a pair of standards having vertically opposing guideways, of a mantle support carried by the standards having a head at its upper end and over which the mantle is designed to be passed, of automatic means for infolding the lower edge of the mantle beneath the head, a slidable supporting member held within each guideway and having a vertical guideway therein, a slidable member held at its ends within the guideways of the supporting member and having recesses therein, bars turnably carried by the slidable member having arms engaging the recesses of the slidable member, hook members carried by such bars designed to be carried into engagement with the mantle by the turnable movement of the turnable members, a main shaft journaled within the standards, a cam mounted thereon, and cam operated mechanism connected to the vertically movable member whereby such member is drawn vertically to carry the hook members into engagement with the mantle during the downward movement and out of engagement with the mantle during the upward movement.

10. In a mantle threading machine, a pair of standards having vertically opposing guideways, of a mantle support carried by the standards having a head at its upper end and over which the mantle is designed to be passed, of automatic means for infolding the lower edge of the mantle beneath the head, a slidable supporting member held within each guideway and having a vertical guideway therein, a slidable member held at its ends within the guideways of the supporting member and having recesses therein, bars turnably carried by the slidable member having arms engaging the recesses of the slidable member, hook members carried by such bars designed to be carried into engagement with the mantle by the turnable movement of the turnable members, a main shaft journaled within the standards, a cam mounted thereon, and cam operated mechanism connected to the vertically movable member whereby such member is drawn vertically to carry the hook members into engagement with the mantle during the downward movement and out of engagement with the mantle during the upward movement, and resilient means for slidably resisting the

downward movement of the slidable supporting member during the initial downward movement of the vertically movable member held within the supporting member.

11. In a mantle threading machine, the combination with the main shaft, a cam mounted thereon having a cam way therein, a counter shaft, an arm secured to the countershaft, a mantle hem forming mechanism connected to such arm, and means for regulating the length of the stroke of the arm operated by the cam.

12. In a mantle threading machine, the combination with the main shaft and cam mounted thereon having a cam therein, of a counter shaft, an arm secured to the countershaft, a mantle hem forming mechanism connected to the outer end of the arm, a slotted arc-shape arm carried by the countershaft, means for adjusting the arm circumferentially upon the countershaft, and a link connected at one end of the slot of the arc-shaped arm and provided at its opposite end with a cam roller engaging the cam way of the aforesaid cam.

13. In a mantle threading machine, the combination with a pair of standards and a main shaft journaled therein, of a mantle support carried by the standards having a head at its upper end over which the mantle is designed to be passed, rocking shafts journaled in the standards at each side of the head, a series of fingers rigidly secured to each rocking shaft, fingers yieldably secured to each rocking shaft centrally thereof so that the engaging ends thereof are normally held in advance of the engaging ends of the rigidly secured fingers, and means operated from the main shaft for swinging the fingers inwardly into contact with the mantle to crimp the lower edge thereof.

14. In a mantle threading machine, a standard plate having an arc-shaped upper grooved edge, a cord gripping device carried by the plate at one side of the arc-shaped edge, gripping jaws designed to engage the end of the cord protruding from the gripping device, means for swinging such jaws circumferentially concentrically with the edge of the plate to carry the cord around the same, means for automatically opening the jaws at the opposite end of its swing to free the cord, and automatic means for then severing the cord portion from the stock in proximity to the carrier ready for insertion in the eyes of the needles.

15. In a mantle threading machine, a standard plate having an arc-shaped upper grooved edge, a cord gripping device carried by the plate at one side of the arc-shaped edge, gripping jaws designed to engage the end of the cord protruding from the gripping device, means for swinging such jaws circumferentially concentrically with the edge of the plate to carry the cord around the same, means for automatically opening the jaws at the opposite end of its swing to free the cord, automatic means for then severing the cord portion from the stock in proximity to the gripping device, and means for drawing the free ends of the cord together ready for insertion in the eye of the needle.

16. In a mantle threading machine, the combination with the reciprocating needles having the usual eyes, an arc-shaped standard plate having a grooved upper edge, over which a cord portion is fed, a cord carrier normally vertically disposed and centrally of the cord portion, means for gripping the cord portion centrally and drawing it downward in loop form into and through the gripping device so that the ends thereof protrude from the carrier, cord engaging means adapted to pass and project through the eyes of the needles, and means for operating the cord carrier to carry the protruding cord ends into position in the cord engaging means extending through the eye of a needle, and means for drawing the cord engaging means downward through the eye of the needle.

17. In a mantle threading machine, the combination with the reciprocating needles, a standard plate having an arc-shaped grooved upper edge and a vertical recess extending from the upper edge of such plate, a cord carrier, a rocking arbor mounted in suitable bearings and to which the cord carrier is secured, means extending into the recess and opposing the carrier for gripping the cord centrally of its length, means for carrying such gripping means vertically downward to draw each end of the cord downward through the carrier, means for freeing the cord gripping mechanism from the cord at the end of its downward stroke so as to leave cord ends protruding from the carrier, means for swinging the carrier from its normal position in the recess toward the eyes of the needles, and means extending through the eyes of the needles for engaging such cord ends to draw them downwardly through the eyes.

18. In a device of the class described, the combination with the rocking shaft, a cord carrier comprising an arm secured to such rocking shaft, a channel member carried by such arm having undercut grooves at each side thereof and having the normally upper end of the bottom of the channel way of the channel cut away, spring fingers secured to the arm and having enlargements formed at their upper ends protruding through such cut away portions into the channel and having upwardly curved faces, and a leaf spring having a cross bar at its

upper end having open eyes in alinement with the normally upper end of the under cut sides of the channel.

19. In a mantle threading machine, the combination with the rocking arbor, a cord carrier secured to the arbor and comprising an arm having a normally vertically disposed channel secured to its outer end and having undercut grooves at each side thereof, leaf springs carried by the arm having means co-acting with the undercut portions of the channel to engage the cord, a cord gripping device comprising an upper and lower member normally held apart and between which the cord is drawn and against the lowermost of which the leaf springs bear in their normal position, and means for drawing the lower member upwardly against the upper member to grip the cord, and means for drawing the upper and lower members downwardly when in the gripping position to carry the cord in looped form into and through the engaging portions of the carrier.

20. In a device of the class described, the combination with an arc-shaped standard plate having a grooved upper edge designed to carry a cord and having a central recess across the open upper end of which the cord extends and having a vertical guideway, a cord gripping device comprising a main member slidable within the guideway and carrying an upper gripping member pivotally secured thereto and a lower gripping member slidable vertically thereof, resilient means for normally holding the lower gripping member against the upper gripping member, means for reciprocating the gripping mechanism vertically in the guideway so as to carry the upper edge of the lower gripping member substantially flush with the upper edge of the arc-shaped standard plate, and means extending into the guideway for engaging the lower gripping member to draw it downwardly at the end of the upward stroke of the gripping mechanism, and means for simultaneously swinging the upper gripping member out of alinement with the upper edge of the standard plate so as to pass the cord bridging the recess at the upper end of its stroke.

21. In a device of the class described, the combination with an arc-shaped standard plate having a grooved upper edge designed to carry a cord and having a central recess across the open upper end of which the cord extends and having a vertical guideway, a cord gripping device comprising a main member slidable within the guideway and carrying an upper gripping member pivotally secured thereto and a lower gripping member slidable vertically thereof, resilient means for normally holding the lower gripping member against the upper gripping member, means for reciprocating the gripping mechanism vertically in the guideway so as to carry the upper edge of the lower gripping member substantially flush with the upper edge of the arc-shaped standard plate, means extending into the guideway for engaging the lower gripping member to draw it downwardly at the end of the upward stroke of the gripping mechanism, a tongue extending inwardly from the upper gripping member into the guideway, a bell crank pivotally mounted upon the standard plate having a horizontal arm extending into the path of the tongue, and a depending arm resting against a suitable stop, and resilient means for holding such depending arm against the stop.

22. In a device of the class described, the combination with an arc-shaped standard plate having a grooved upper edge designed to carry a cord and having a central recess across the open upper end of which the cord extends and having a vertical guideway, a cord gripping device comprising a main member slidable within the guideway and carrying an upper gripping member pivotally secured thereto and a lower gripping member slidable vertically thereof, resilient means for normally holding the lower gripping member against the upper gripping member, means for reciprocating the gripping mechanism vertically in the guideway so as to carry the upper edge of the lower gripping member substantially flush with the upper edge of the arc-shaped standard plate, means extending into the guideway for engaging the lower gripping member to draw it downwardly at the end of the upward stroke of the gripping mechanism, means for simultaneously swinging the upper gripping member out of alinement with the upper edge of the standard plate so as to pass the cord bridging the recess at the upper end of its stroke, and means for again throwing the upper gripping member clear of the cord at the lower end of the vertical stroke of the gripping mechanism.

23. In a device of the class described, the combination with an arc-shaped standard plate having a grooved upper edge designed to carry a cord and having a central recess across the open upper end of which the cord extends and having a vertical guideway, a cord gripping device comprising a main member slidable within the guideway and carrying an upper gripping member pivotally secured thereto and a lower gripping member slidable vertically thereof, resilient means for normally holding the lower gripping member against the upper gripping member, means for reciprocating the gripping mechanism vertically in the guideway so as to carry the upper edge of the lower gripping member substantially flush with the upper edge of the arc-shaped standard plate, means extending into the guideway

for engaging the lower gripping member to draw it downwardly at the end of the upward stroke of the gripping mechanism, a tongue extending inwardly from the upper gripping member into the guideway, a bell crank pivotally mounted upon the standard plate having a horizontal arm extending into the path of the tongue, and a depending arm resting against a suitable stop, resilient means for holding such depending arm against the stop, a plate secured in the guideway in proximity to its lower end having an inclined upper edge with which the tongue of the upper gripping member is designed to engage.

24. In a device of the class described, the combination with an arc-shaped standard plate having a grooved upper edge designed to carry a cord and having a central recess across the open upper end of which the cord extends and having a vertical guideway, a cord gripping device comprising a main member, slidable within the guideway and carrying an upper gripping member pivotally secured thereto and a lower gripping member slidable vertically thereof, resilient means for normally holding the lower gripping member against the upper gripping member, means for reciprocating the gripping mechanism vertically in the guideway so as to carry the upper edge of the lower gripping member substantially flush with the upper edge of the arc-shaped standard plate, means extending into the guideway for engaging the lower gripping member to draw it downwardly at the end of the upward stroke of the gripping mechanism, a tongue extending inwardly from the upper gripping member into the guideway, a bell crank pivotally mounted upon the standard plate having a horizontal arm extending into the path of the tongue, a depending arm resting against a suitable stop, resilient means for holding such depending arm against the stop, a tongue extending inwardly from the upper gripping member and having an inclined upper edge secured in the guideway in proximity to its lower end and with the upper inclined edge of which the tongue of the upper gripping member is designed to be brought into engagement at the lower end of the downward stroke of the gripping mechanism.

25. In a mantle threading machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge concentric with the center of the main shaft, a vertical guideway formed in the standard plate, cord gripping mechanism slidable therein, a rocking shaft carried by the standard plate, an arm extending from one end of the rocking shaft, a link connection between the free end of the arm and the gripping mechanism, a short arm extending from the opposite end of the rocking shaft a cam carried by the main shaft having a suitable camway therein, a cam roller coacting with the cam way, a link carrying the cam roller and connected at its opposite end to the aforesaid short arm, and a link support connected to the free end of the link carrying the cam roller.

26. In a mantle threading machine, the combination with the standard plate having an arc-shaped upper edge, a bracket carried by the standard plate, a cord carrier slidable thereon, a spring finger having a ratchet shaped cord engaging face adapted to press the cord against the sliding piece, a main shaft extending through the standard plate concentrically thereof, a swingable member carried by the shaft, a lever pivotally mounted and pivotally connected at one end to the slidable piece of the cord carrier, a resilient support for the opposite end of the lever with which the swinging member carried by the main shaft is designed to engage, a head carried by the bracket of the cord carrier having a perforation therein through which the cord end is designed to extend, and means for gripping the protruding cord end and carrying it circumferentially around the edge of the arc-shaped plate.

27. In a mantle sewing machine, the combination with the standard plate having an arc-shaped upper edge, a cord carrier provided with a bracket having a head having a perforation therein into which a cord is designed to extend, a main shaft extending through the standard plate concentrically thereof, cord gripping mechanism swung on such main shaft and means operated by the cord gripping mechanism when carried to the gripping position for carrying the cord through the perforation of the cord carrier to protrude therefrom to be engaged by the cord gripping mechanism.

28. In a mantle sewing machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge concentric with the center of the main shaft, an arm swingably carried by the main shaft, upper and lower cord gripping jaws carried by the arm, a cord carrier secured to the arc-shaped plate having a head having a perforation into which the cord extends, means for automatically spreading the jaws of the cord gripping mechanism apart; when swung into proximity to the cord carrier, means operated by such arm when brought into proximity to the cord carrier for carrying a thread through the perforation of the cord carrier to protrude therefrom between the jaws of the gripping mechanism, means for freeing the jaws to engage the cord as they are carried into the gripping position, means for swinging the arm of the cord gripping mechanism in the reverse direction, and means for automatically opening

the jaws to free the cord at the end of its reverse swinging movement.

29. In a mantle threading machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge concentric with the main shaft and a cord carrier carried by the standard plate having a perforation, means for automatically carrying a cord through the perforation so as to protrude therefrom, an arm swung upon the main shaft and having a hollow portion, a lower jaw member having a stem extending into such hollow portion, a compression spring extending between the lower end of the stem and bottom of the hollow arm, a pin carried by the stem, and a pin carried by the arm, an upper jaw, and means designed to pass between the aforesaid pins to spread them apart and carrying the lower jaw away from the upper jaw when brought into proximity with the cord carrier, and means for freeing the pins as the jaws are carried into position at each side of the protruding cord end.

30. In a mantle threading machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge concentric with the main shaft and a cord carrier carried by the standard plate having a perforation, means for automatically carrying a cord through the perforation so as to protrude therefrom, an arm swung upon the main shaft and having a hollow portion, a lower jaw member having a stem extending into such hollow portion, a compression spring extending between the lower end of the stem and bottom of the hollow arm, a pin carried by the stem, a pin carried by the arm, an upper jaw, a yieldable arm swingably carried by the standard plate having a spear-shaped end, an arm forming the shank of the spear extending from one side of the head, and a beveled portion at the base of the spear head designed to extend and free the pins as the pins pass the base of the spear head whereby the movable pin carried by the stem of the lower jaw is brought into the path of the beveled portion of the base of the spear head.

31. In a mantle threading machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge and a cord carrier carried thereby, of a head forming part of the cord carrier and having a perforation therein into which the cord end extends, means for forcing the cord into a protruding position through the perforation, means for gripping the cord and drawing it circumferentially around the upper edge of the arc-shaped plate, and means for severing the cord when so drawn in proximity to the head.

32. In a mantle threading machine, the combination with the main shaft, a standard plate having an arc-shaped upper edge and a cord carrier carried thereby, of a head forming part of the cord carrier and having a perforation therein into which the cord end extends, means for forcing the cord into a protruding position through the perforation, means for gripping the cord and drawing it circumferentially around the upper edge of the arc-shaped plate, a cutting knife pivotally supported upon the head, a cam mounted on the main shaft, a camway formed in the cam, a link, a pin extending from the link, a roller mounted upon the pin and co-acting with the camway, and a pitman rod connecting the opposite end of the pin with the free end of the cutting knife.

33. In a mantle threading machine, the combination with the main shaft and standard plate having its upper edge concentric with the main shaft, an arm freely swung upon the main shaft, cord gripping mechanism carried by the outer end of the arm, an operating lever carried by the main shaft, and means carried by the shaft for alternately engaging the arm to swing it in opposite directions.

34. In a mantle threading machine, the combination with the main shaft and standard plate having its upper edge concentric with the main shaft, an arm freely swung upon the main shaft, cord gripping mechanism carried by the outer end or the arm, an operating lever carried by the main shaft, a disk carried by the shaft having a peripheral notch, a stationary cam plate having its upper edge flush with the outer periphery of the disk, and a pawl carried by the arm designed to engage the notch of the disk, when the arm is at one end of its stroke and to be freed from such notch by engagement with the stationary cam at the opposite end of its stroke, and a pin carried by the disk and designed to engage the opposite side of the arm.

35. In a mantle threading machine, the combination with the main shaft and standard plate having its outer edge concentric with the center of the main shaft, an arm swingably carried upon the main shaft, means for swinging the arm alternately in opposite directions, an upper and a lower gripping jaw carried by the arm, means for pivotally securing the upper gripping jaw to the arm, a tail piece extending from the upper arm having a slot therein having a notched recess in its lower inner edge, resilient means for connecting the tail piece to the stationary support extending from the arm, a swingable finger carried by the arm having its upper free end resiliently held in engagement with the notch, and a cam plate carried by the standard plate designed to pass between the arm and finger when the arm is at one end of its stroke to carry the

finger out of the notch and to raise the jaw so that the finger will reëngage the notch as it commences its reverse stroke.

36. In a mantle sewing machine, means for automatically forming an inturned hem in the lower edge of the mantle, automatic means for crimping the hem portion of the mantle, and means for taking up the slack in the mantle bottom during the crimping operation.

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Witnesses:
M. EGAN,
M. RUMBLE.