

D. NOBLE.
SEWING MACHINE FOR EMBROIDERING.
APPLICATION FILED OCT. 4, 1911.

1,049,520.

Patented Jan. 7, 1913.

4 SHEETS—SHEET 1.

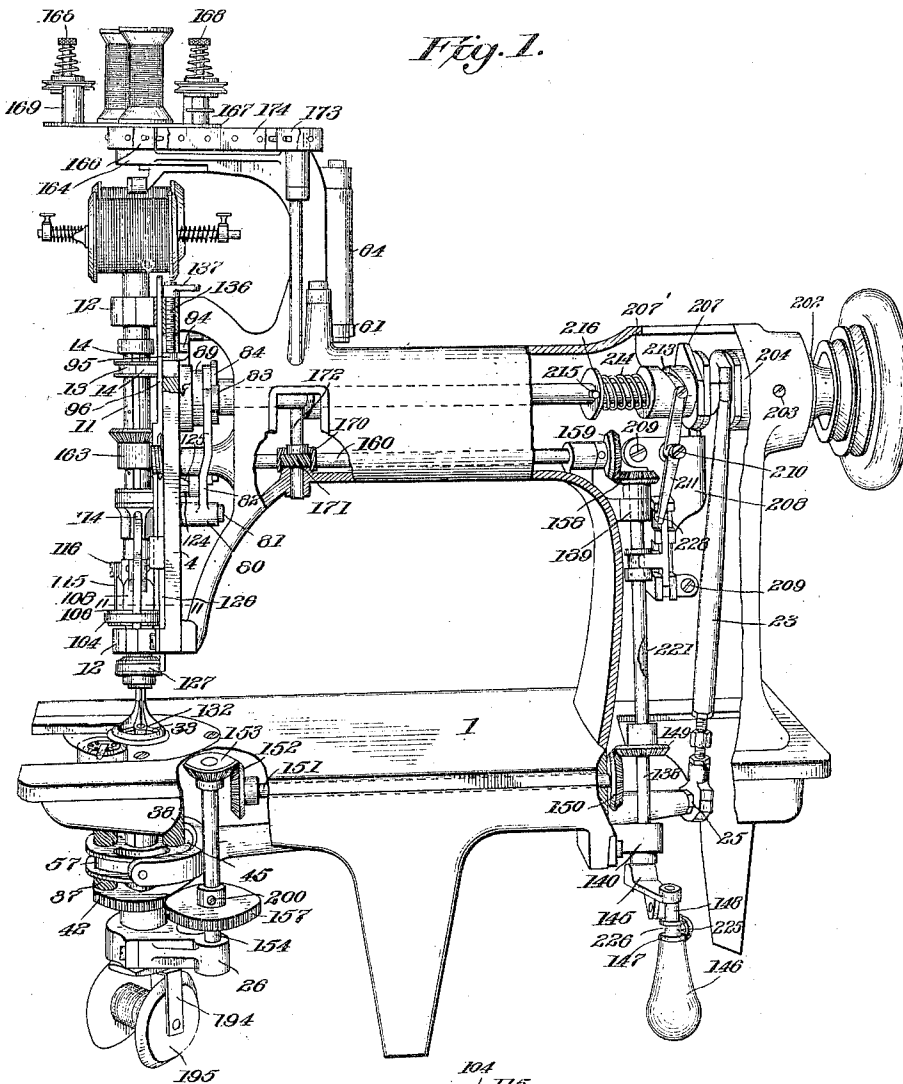
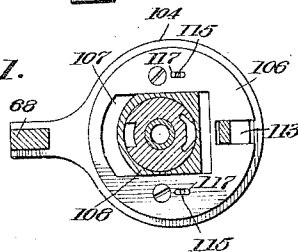


Fig. 11.



WITNESSES:
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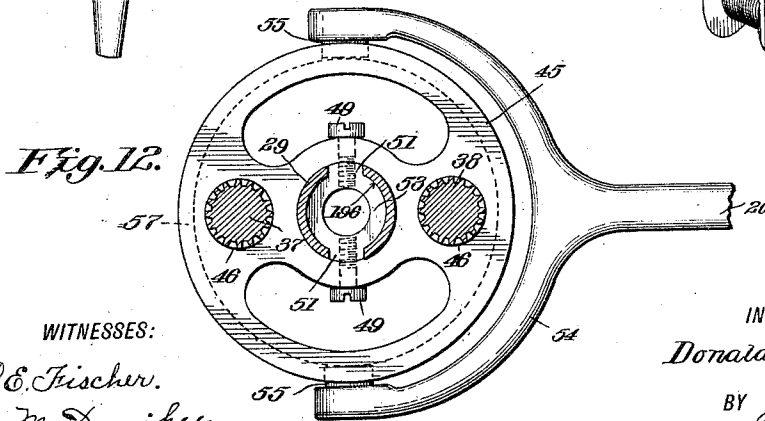
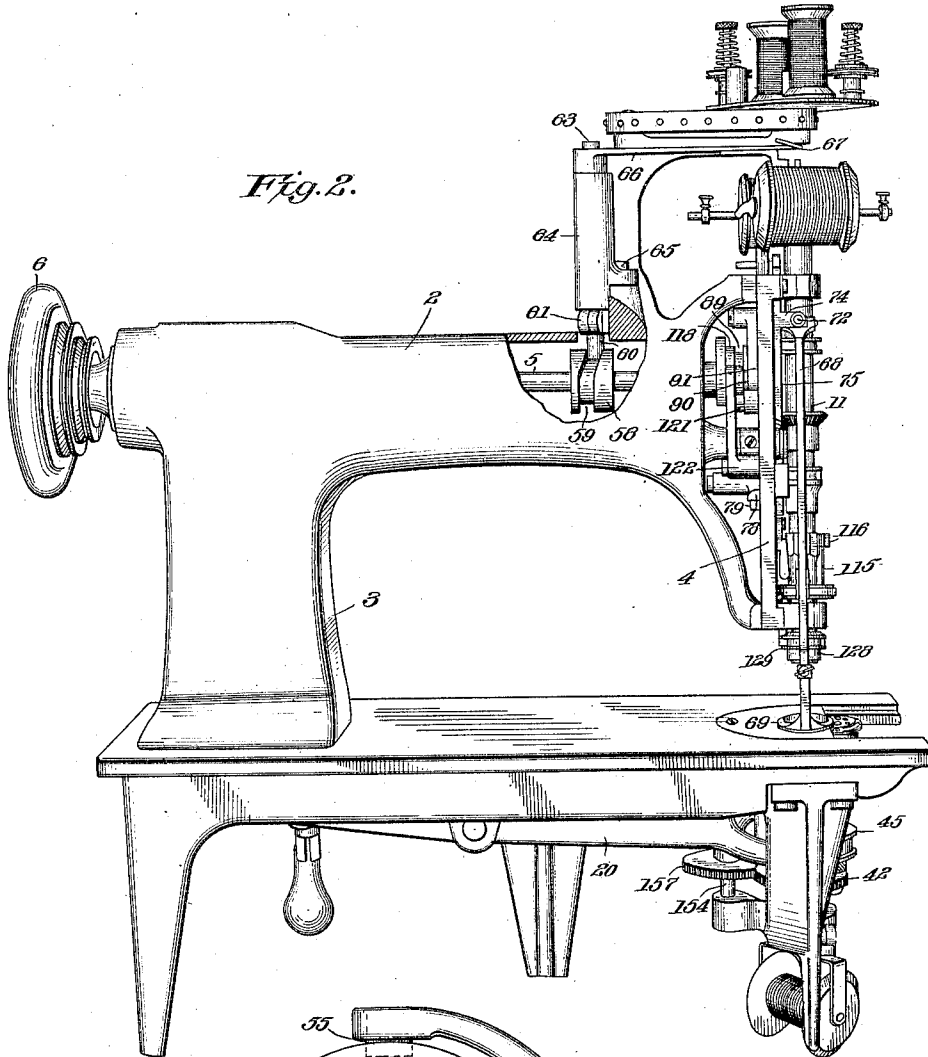
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4 SHEETS—SHEET 2.



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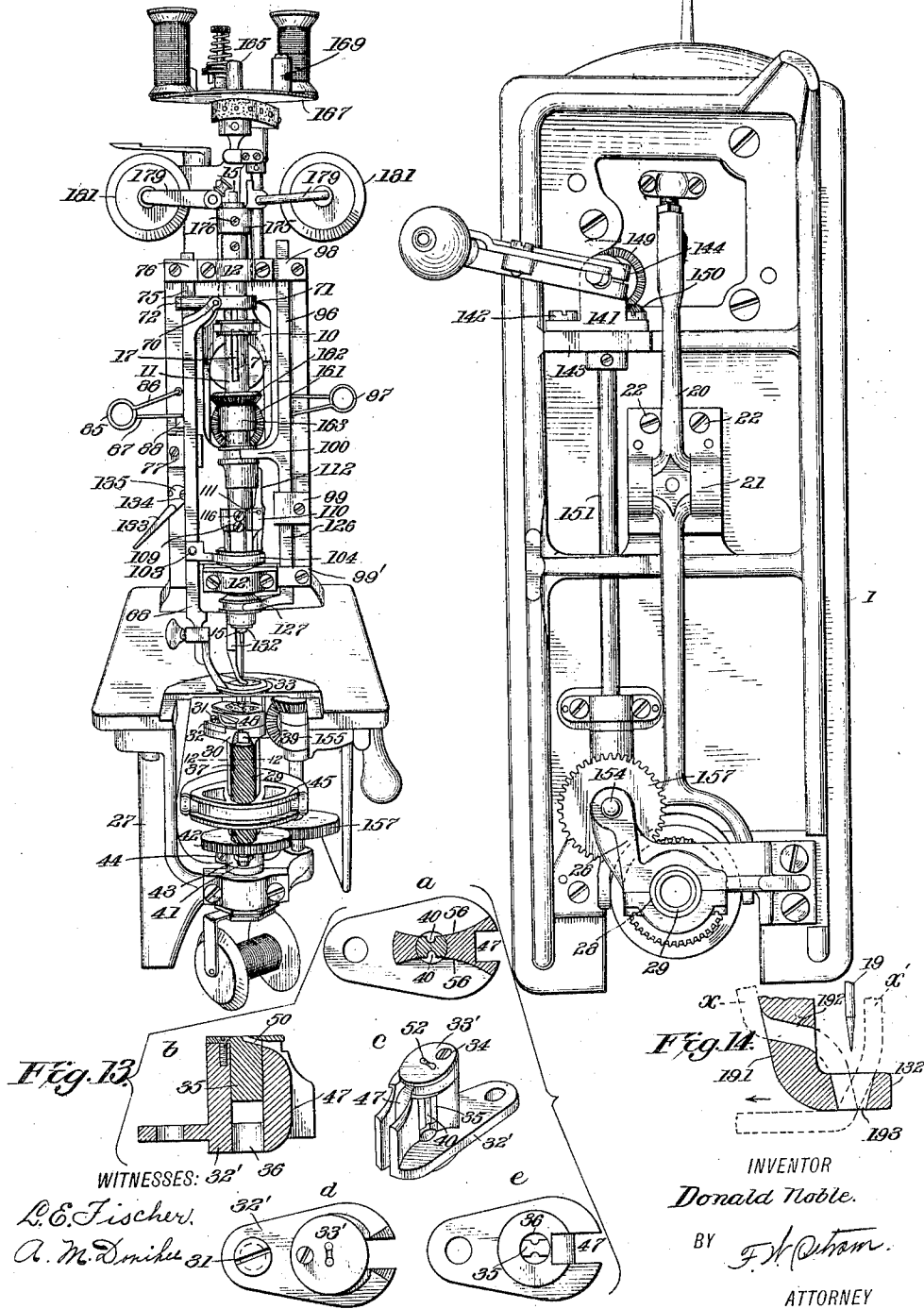
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4 SHEETS—SHEET 3.

Fig. 3.

Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

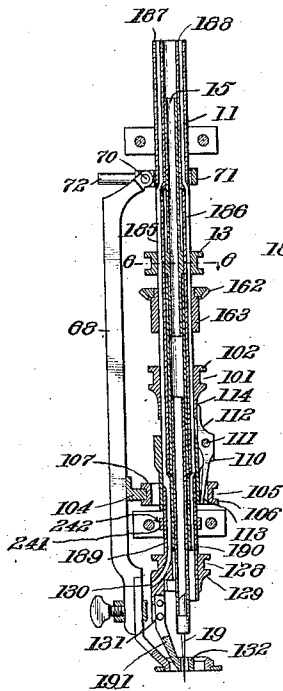


Fig. 6.

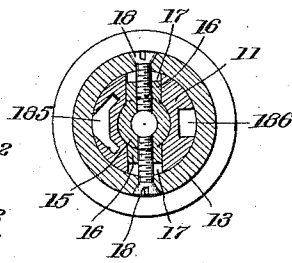


Fig. 15.

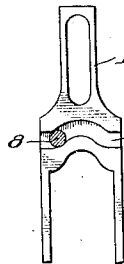


Fig. 8.

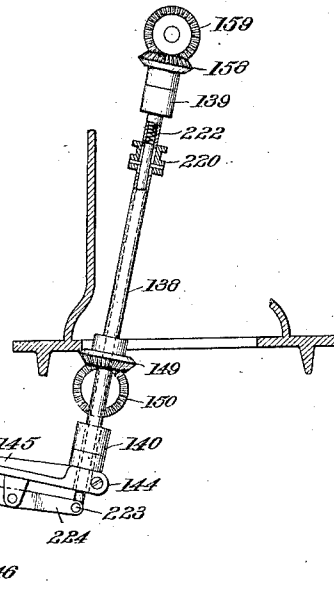


Fig. 7.

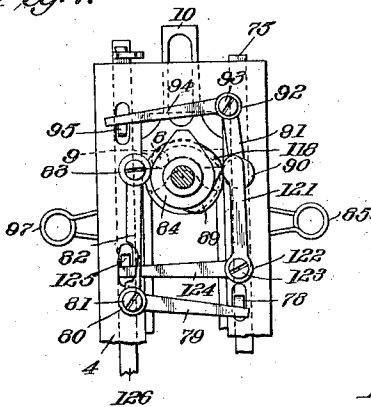


Fig. 9.

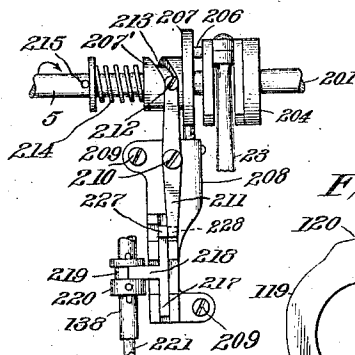


Fig. 16.

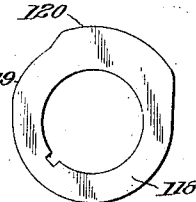
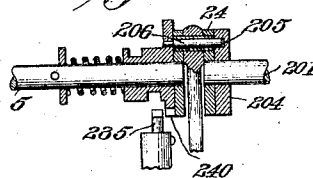


Fig. 10.



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UNITED STATES PATENT OFFICE.

DONALD NOBLE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE FOR EMBROIDERING.

1,049,520.

Specification of Letters Patent.

Patented Jan. 7, 1913.

Application filed October 4, 1911. Serial No. 652,820.

To all whom it may concern:

Be it known that I, DONALD NOBLE, a subject of the King of Great Britain, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines for Embroidering, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in sewing machines for embroidering, especially those employed for sewing to a body fabric ornamental fabrics consisting of braids, tapes, edgings, ribbons, or the like, and to this end the stitch-forming mechanism is combined with a universal feeding mechanism and braid supply and guiding elements, so that by a change in the direction of the feed of the trimming with respect to the line of seam formation, trimming may be sewed either to one or both sides of a body fabric by employing either exposed or hidden stitches.

The above referred to new and useful characteristics, together with other improved means, are fully illustrated in the drawings and hereinafter described and claimed.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a view in front side elevation of the improved sewing machine, the bed-plate and bracket arm being broken out to better illustrate certain details in construction. Fig. 2 is a rear side elevation of Fig. 1, the arm bracket being broken out to better illustrate the take-up-actuating cam. Fig. 3 is a view in front end elevation of Fig. 1. Fig. 4 is an underside view of Fig. 1. Fig. 5 is a view in central vertical section of the arm bracket cylinder, needle-carrying bar and parts carried by said cylinder, together with a full-line view of the feed-lever. Fig. 6 is an enlarged view in cross-section on the line 6, 6, Fig. 5. Fig. 7 is a rear side view of the upper end portion of the bracket arm face-plate, illustrating the cams and coacting levers for moving the feeding foot vertically and horizontally and for actuating the braid-guide nipple. Fig. 8 is a detail of the hand crank shaft and parts carried by it, together with a vertical section of a portion of the bed-plate and

bracket arm standard. Fig. 9 is a view in front side elevation of that portion of the stop-motion mechanism arranged in the arm standard, together with a portion of the main or needle-bar-driving shaft. Fig. 10 is a view, mainly in section, of certain elements comprising the stop-motion mechanism to be referred to hereinafter. Fig. 11 is a view in cross-section on the line 11, 11, Fig. 1. Fig. 12 is an enlarged view in cross-section, directly below the line 12, 12, Fig. 3. Fig. 13 comprises full-line sectional and perspective views of the needle-plate and needle-plate bracket used in connection with multiple needles, as distinguished from the single needle construction illustrated in Figs. 1, 2, 3, 5 and 14. Fig. 14 is an enlarged view in central section of the braid-guide nipple, illustrating in dotted lines the position of the braid or trimming for effecting both exposed and hidden stitches when applying the braid to the upper side of the body fabric. Fig. 15 is a rear side elevation of the needle-bar-actuating gate, together with the cam roller, in section. Fig. 16 is a detail view of the braid-guide nipple actuating cam.

1 represents the bed-plate of the sewing machine upon which is mounted the bracket arm comprising the arm bracket 2 and arm standard 3, 4 the arm bracket face-plate, 5 the main or needle-bar-driving shaft mounted in said bracket arm, and 6 the hand or band wheel, said main shaft carrying at its forward end the shaft flange 7 provided with a cam roller 8 which tracks a cam groove 9 formed in the needle-bar-actuating gate 10, said gate being mounted to move vertically in suitable bearings formed in said face-plate.

11 represents a rotary cylinder mounted in suitable bearings, as 12, located at the opposite ends of the face-plate 4 and provided with a sliding collar 13 which is embraced by a forked connection 14 formed integral with said needle-bar-actuating gate 10.

15 is a hollow needle-bar which is mounted to move vertically in the cylinder 11 and provided with oppositely arranged lugs, as 16, which pass through slots, as 17, formed in said cylinder, and to these lugs is secured by screws, as 18, the sliding collar 13, thus, through the action of the cam roller 8 on the cam groove 9, stitch-forming movements

are transmitted from the main shaft 5 to said needle-bar and its attached eye-pointed needle 19.

20 represents the looper-actuating lever mounted to oscillate in a bracket 21 secured by screws, as 22, to the underside of the bed-plate 1, and 23 represents a crank connection which, at its upper end, embraces a crank 24 carried by the main shaft 5, and at its lower end is connected by a ball-and-socket joint 25 with the rear end of said loop-taker-actuating lever.

26 represents a bracket formed integral with the forward support 27 of the bed-plate 1, and in a suitable bearing 28 formed in said bracket is mounted the lower end of a vertically arranged hollow standard 29 provided at its upper end with a bracket 30 upon which is secured by screw 31 the needle-plate bracket 32 carrying the needle-plate 33 mounted in a suitable bearing (not shown, but later to be explained in connection with the description of the views shown in Fig. 13) formed in said bracket 32.

37 and 38 represent spirally-threaded loop-taker-actuating shafts journaled at their upper ends in bearings, as 39, (one only of which is shown) forming a part of the bracket 30, the opposite ends of said shaft being mounted on suitable pintle screws, as 41, (one only of which is shown, see Fig. 3) secured in the toothed disk 42 carried by the standard bracket 43 secured by pinch screw 44 to the hollow standard 29.

45 represents the hook shaft driver which is mounted to move vertically upon the hollow standard 29 and provided with oppositely arranged threaded openings, as 46, which coact with spirally-threaded shafts 37 and 38, respectively, to oscillate the attached loop-taker or loop-takers, as 48, dependent upon whether one or two needles are being used, said driver being secured by screws, as 49, to lugs, as 51, of the hollow hook shaft driver carrier 53 mounted in the standard 29. To transmit vertical movements from the oscillating lever 20 to the hook shaft driver 45, the forked end 54 of said loop-taker-actuating lever is provided with rollers, as 55, which coact with a groove 57 formed in the periphery of said hook shaft driver.

Upon the main shaft 5 is mounted a needle-thread take-up cam 58 provided with a cam groove 59 in which tracks a roller 60 carried by an arm 61, the latter being secured by a suitable pinch screw (not shown) upon the upright shaft 63 which, in turn, is mounted in a bracket 64 secured by screws, as 65, upon the upper side of the bracket arm 2, the shaft 63 having secured to its upper end the needle-thread take-up lever 66 provided at its free end with a self-threading thread-eye 67.

68 represents the feeding foot carrying

bar provided at its lower end with a detachable feeding foot 69 and pivoted at its upper end by pin 70 to a collar 71 loosely mounted on the cylinder 11, said collar being provided with a pin 72 which enters a bearing in the lug 74 formed integral with the feed-lift bar 75 mounted to move vertically in the guideway 76 formed in the face-plate 4 and guideway 77 secured to said face-plate.

78 represents a lug formed integral with the lower end of the feed-lift bar 75, said lug being acted upon by the arm 79 of a bell-crank lever 80 fulcrumed upon a stud 81, which latter is threaded into the rear side of the face-plate 4, the arm 82 of said bell-crank lever being provided at its free end with a roller 83 which coacts with a peripheral cam 84 carried by the main shaft 5, thus vertical movements are transmitted to the feeding foot 69 through the connections including 68, 71, 80 and 84.

85 represents a spring having arms 86 and 87, the former of which enters a suitable opening formed in the face-plate 4 and the arm 87 enters an opening in the lug 88 carried by the feed-lift bar 75, said spring acting in opposition to the cam 84 to hold the feeding foot 69 down upon the material.

For giving to the feeding foot its feed movements, the main shaft 5 is provided with a peripheral cam 89 which coacts with a roller 90 carried by the free end of an arm 91 of a bell-crank lever 92, which latter is pivoted upon a stud 93 threaded into the rear face of the face-plate 4, the arm 94 of said lever coacting with a lug 95 carried by the feed-bar 96 to move the latter downward in opposition to the resiliency of the spring 97, said feed-bar being mounted in a bearing 98 formed in the face-plate 4 and bearing 99 secured to said face-plate. Formed integral with the feed-bar 96 is a forked connection 100 which enters a groove 101 formed in the cam collar 102 mounted loosely on the cylinder 11, and to the feeding foot carrying bar 68 there is secured by pin 103 a feed ring 104 embracing a groove 105 formed in the feed-disk 106, the latter being provided with a central opening 107 into which extends a guide block 108 secured by screws, as 109, to the cylinder 11. The block 108 is provided with a grooved lug 110 in which is pivotally mounted on a pin 111 the feed-lever 112, the lower end of which latter enters an opening 113 formed in the feed-disk 106. Its opposite end being acted upon by the cam portion 114 formed on the cam collar 102, which cam portion causes the lower end of said feed-lever to move the feed-disk and the operatively connected feeding foot 69 in opposition to the resiliency of springs, as 115, mounted upon respective screws, as 116, the free ends of said springs entering suitable openings, as 117, formed in said feed-disk.

118 represents the braid-guide nipple-ac-

tuating cam secured upon the main shaft 5, said cam being provided with two cam portions 119, 120 which coact with the free end of the arm 121 of the bell-crank lever 122, which latter is mounted upon the stud screw 123 threaded into the rear side of the face-plate 4. The free end of the arm 124 of said bell-crank lever coacts with a lug 125 carried by the braid-guide nipple lifting rod 126 mounted to move vertically in the bearings 99 and 99', the upper end of the rod 126 being located at the rear of the bar 96, and the lower arm of the spring 97 acting upon the upper end of said rod 126 to hold the latter depressed in opposition to the action of said cam portion. The rod 126 at its lower end is provided with a forked lever 127 which enters a cam groove 128 formed in the braid-guide nipple lifting collar 129 mounted loosely upon the cylinder 11, and to a downwardly extended portion 130 of said guide collar is secured by screws, as 131, the braid-guide nipple 132. The function of the cam portion 119 of the cam 118 is to lift the guide 132 sufficiently to permit the body fabric to be rotated beneath the needle and retain the same in this position until the take-up has tightened the stitch, when the cam portion 120 raises said guide to its highest position so as to permit the body fabric, together with the attached trimming, to be freely advanced under said guide.

133 represents the feeding foot lifting lever pivoted by screw 134 upon the face-plate 4 and provided with a cam portion 135 which coacts with the lower end wall of the feed-lifting bar 75 to raise the foot 69 in the usual manner.

136 is a stitch-regulating screw threaded into the upper end of the face-plate 4, the lower end of which contacts with the lug 95 to limit the upward movement of the feed-bar 96, the nut 137 acting to hold said screw against accidental movement.

138 represents the hand crank shaft mounted at its upper end in a bearing 139 and at its lower end in a bearing 140, the latter being formed in a bracket 141 secured by screws, as 142, to a depending portion 143 of the bed-plate 1. To the lower end of the crank shaft 138 is secured by a pinch connection 144 a crank arm 145 carrying at its outer end a crank handle 146 loosely mounted upon a metal bushing 147 which, in turn, is slidably mounted upon a depending rod 148 secured in said crank arm.

149 represents a bevel gear secured on the crank shaft 138, which gear meshes with a like gear 150 carried by a horizontal shaft 151 mounted in suitable bearings located at the underside of the bed-plate of the sewing machine. The opposite end of said horizontally mounted shaft is provided with a bevel gear 152 which meshes with a like gear 153 carried by the upright shaft 154 mounted at

its upper end in the bracket 155 secured to the underside of the bed-plate 1, the lower end of said shaft being mounted in a suitable bearing formed in the bracket 26, and upon said upright shaft is mounted a toothed wheel 157 which meshes with the like toothed wheel 42 carried by the hollow shaft 29, thus, through the connections including 138, 151 and 154, rotary movements are transmitted from the crank handle 146 to the hollow shaft 29 and parts carried by the latter. To the upper end of the crank shaft 138 is secured a second bevel gear 158 which meshes with a like gear 159 carried by a horizontal shaft 160 mounted in suitable bearings formed in the bracket arm 2, and at the forward end of the shaft 160 is mounted a second bevel gear 161 which meshes with a corresponding gear 162 formed on a collar 163 secured upon the cylinder 11, thus, through the connections including 138 and 160, rotary movements are transmitted from the crank handle 146 to the cylinder 11 in a manner common to universal feed sewing machines.

In the free end of the overhanging arm 164 of the bracket 64 carried by the bracket arm 2 is secured against rotation a hollow hub 165 upon which is rotatably mounted a sprocket wheel 166 and upon the upper side of said wheel is suitably secured a thread and thread-tension plate 167 provided with suitable spool-holding wires (not shown), thread-tensions, as 168, and thread-checks, as 169. For giving rotary movements to the plate 167 corresponding to the rotary movements of the cylinder 11 and hollow standard 29, the horizontal shaft 160 is provided with a worm gear 170 which meshes with a gear 171 carried by the upright shaft 172 mounted at its lower end in a bearing formed in the bracket arm at its upper end in a bearing formed in the bracket 64, said shaft carrying at its upper end a sprocket wheel 173 corresponding in diameter to the sprocket wheel 166, a belt 174 acting to transmit motion from one to the other of said sprocket wheels.

175 represents the cord or tape supply bracket secured by a screw 176 upon the upper end of the cylinder 11, and in said bracket are secured, by suitable screws, holders, as 179, upon which are mounted braid or tape supply spools, as 181. To guide the braid or tape from the supply spools to the action of the needle or needles, suitable grooves 185 and 186 of unlike proportions are formed in the cylinder 11 to accommodate different widths of braid or trimming. In order that the braid or tape may be protected from becoming soiled as it passes along that portion of the cylinder 11 embraced by its bearings, the grooves 185 and 186 are connected at their upper ends with tubular openings 187 and 188, 130

respectively, and at their lower ends with tubular openings 189 and 190, respectively, the opening 189 guiding the tape or braid α to the outside or rear of the standard 191 (see Fig. 14) of the braid-guide nipple 132, when it is passed through the opening 192 formed in said standard, down through the needle opening 193 and out under the bottom of the nipple 132 in the direction of the feed, which is indicated by the arrow, causing the needle to enter and emerge from the same side of the braid and thus effect the so-termed "blind" or hidden stitches. The opening 190 directs the braid α' through the needle opening 193, in front of the needle and out under the bottom of the foot in the direction of the feed, thus effecting the ordinary through-and-through or exposed stitches.

For securing the braid to the underside of the body fabric either by exposed or hidden stitches, there is secured to the lower end of the hollow standard 29 a spool-carrying bracket 194 provided with a braid supply spool 195, the braid being led from said spool up through the opening 196 in the hollow standard 29 and out through a suitable opening (not shown) formed in the bracket 30, from which point it is led through a suitable braid-guide (not shown) formed in the needle-plate bracket 32, when it is passed through a suitable braid and needle opening (not shown) formed in the needle-plate 33 and continued in a like direction across the upper surface of said plate for effecting the ordinary exposed stitch. To cause the needle to enter and emerge from the same side of the braid for the purpose of effecting hidden stitches, the operator loosens the screw 200 and moves the toothed disk 157 out of engagement with the toothed disk 42, followed by giving to the standard 29 and parts carried by it a half revolution, when the toothed disk 157 is again secured in operative relationship with the toothed disk 42, followed by re-setting the needle a half turn or in a position corresponding to the adjustment of the toothed disk 42 and, consequently, the feeding foot, owing to the changed relationship of the braid guide 47 with respect to the feed movements of the feeding foot 69, effects a travel of the braid over the needle-plate 33 in a direction opposite to the travel of said braid beneath said needle-plate, or in a direction to cause the braid to travel over the needle-plate in superposed relationship with its travel beneath said plate.

The sectional views a and b , perspective c , plan d and underside view e of Fig. 13 illustrate the details in construction of the needle-plate bracket 32' and needle-plate 33', for use in connection with two needles and two loop-takers, which differ from the corresponding elements 32 and 33 of Fig.

3 only in the matter of the braid and needle opening in the needle-plate and the provision for mounting two loop-takers instead of one; accordingly, a description of the needle-plate bracket and needle-plate for effecting multiple seams is deemed sufficient for an understanding of the construction of the corresponding elements 32 and 33 for effecting a single seam.

Referring to Fig. 13, in connection with Fig. 3, the needle-plate bracket 32' is secured upon the bracket 30 by screw 31, and the needle-plate 33' is secured upon the bracket 32' by screw 34, said needle-plate being provided with a depending portion 35 which enters an opening 36 formed in said needle-plate bracket, said depending portion being provided with grooves, as 40, which act as needle-guards and assist in forming the needle-thread loops.

47 represents a braid-guide which leads the braid from the opening 196 in the standard 29 to the underside of the needle-plate 33', where said guide 47 joins the guide 50 formed in said needle-plate to direct said braid through the braid and needle opening 52 formed in the last mentioned plate, the loop-takers 48 being located so that their loop-seizing points will travel close to the curvilinear walls, as 56, or in position to seize their respective needle-thread loops as the needles recede from the grooves 40.

In the construction of the stop-motion mechanism now to be described, the crank 24 carried by the main shaft 5 is detachably connected with the band or hand wheel shaft 201 mounted in a bushing 202 secured by screw 203 in the bracket arm 2, the inner end of said band wheel shaft carrying a flange 204 provided with an opening 205 with which a bolt 206 carried by a cam flange 207 coacts, at the will of the operator, to determine the action and inaction of the main shaft relative to the shaft 201, as will now be explained.

208 represents a bracket secured by screws, as 209, to the inner rear wall of the standard 3, and on said bracket is pivoted, by screw 210, a cam lever 211 carrying at its upper end a roller (not shown) carried by the roller stud 212 which tracks a cam groove 213 formed in the cam 207', the latter having movements on the main shaft in the direction of its length in opposition to the resiliency of the spring 214 mounted on said shaft and confined thereon by a pin 215 and washer 216.

In the bracket 208 is mounted a stop-motion release slide 217 provided with a forked lug 218 which enters a groove 219 formed in the sliding collar 220 mounted on the crank shaft 138, which shaft is made hollow from its lower end a distance sufficient to accommodate a slide rod 221 mounted in said hollow portion and connected at its upper

end with the sliding collar 220, said rod being held depressed by a spring 222 confined between the upper end of said slide rod and the end wall of the hollow portion of said crank shaft. The lower end of the slide rod 221 is pivotally connected, by a pin 223, with a rock-lever 224 carrying at its opposite end a roller 225 which enters a groove 226 formed in the hollow bushing 147 carrying the crank handle 146. The stop-motion release slide 217 is provided at its upper end with a lug 227 which, when the machine is in operation, is located above the lug 228 carried by the lever 211, thus permitting the cam groove 213 to continuously oscillate the lever 211 and allow the spring 214 to force the bolt 206 into operative relationship with the opening 205 formed in the flange 204, which adjustment is effected and maintained by the operator forcing the crank handle 146 downward in opposition to the resiliency of the spring 222. When it is desired to bring the machine to rest, the operator allows the crank handle 146 to be moved upward by the action of the spring 222, which causes the lug 227 carried by the release slide 217 to drop in line with the travel of the lug 228 extending inward from the lower end of the lever 211, and in the further rotation of the main shaft 5 the action of the cam groove 213 upon the lever 211 causes said lever to withdraw the bolt 206 from engagement with the opening 205, thus arresting the action of the main shaft 5 independent of the rotation of the shaft 201 and parts carried by the latter.

In order that the main shaft 5 when it is brought to rest may always register the needle in the same position above the throat-plate, there is provided a vertically-movable spring-yielding plunger 235 seated in a suitable pocket (not shown) formed in the bracket 208, the upper end of said plunger being wedge-shaped, and when the bolt 206 is withdrawn from the opening 205, the end of said plunger rides the periphery of the flange 207 until it coacts with the notch 240, thus registering the main shaft 5 in its predetermined position.

241 represents a flange secured to the cylinder 11 and seated in a bearing 242 formed in the lower of the bearings 12 in which said cylinder is journaled, said flange acting to hold said cylinder against movement in the direction of its length.

Claims:—

1. In an embroidering machine, the combination with a bed-plate provided with a cloth-plate, a bracket-arm, a fabric-feeding mechanism, a feed-directing mechanism, a stitch-forming mechanism including a rotary cylinder mounted in said bracket-arm and in which is mounted a vertically movable needle-bar carrying an eye-pointed needle, a rotary standard mounted below said bed-

plate and operatively connected with said feed-directing mechanism and carrying at its upper end a needle-plate provided with a needle opening and a needle-plate bracket, the latter provided with a trimming fabric guide leading into said needle opening for directing said trimming fabric to the action of said stitch-forming and feeding mechanisms.

2. In an embroidering machine, the combination with a fabric feeding mechanism including means for feeding the fabric in any desired direction, of a stitch-forming mechanism including an eye-pointed needle, a needle-carrying bar and a rotary standard, the latter having a central opening for the passage of a trimming fabric and carrying at its upper end a thread-holding loop-taker having oscillatory stitch-forming movements on its own axis in a plane transverse to the line of needle actuation and movements about the axis of said standard.

3. In an embroidering machine, the combination with a bed-plate provided with a cloth-plate, a bracket-arm, a fabric-feeding mechanism, feed-directing mechanism, a stitch-forming mechanism including a rotary cylinder mounted in said bracket-arm and in which is mounted a vertically movable needle-bar provided with an eye-pointed needle, a rotary standard mounted below said bed-plate and operatively connected with the feed-directing mechanism, said standard carrying at its upper end a loop-taker for carrying a mass of under thread and having oscillatory stitch-forming movements in a plane substantially parallel to the plane of said cloth-plate, said cylinder and standard each being provided with trimming fabric holders, and suitable guides for directing and laying the trimming fabrics carried by said holders on their respective sides of the fabric being embroidered and in position to be pierced by said eye-pointed needle in its movements to form stitches.

4. In an embroidering machine, the combination with a bed-plate provided with a cloth-plate, a bracket-arm, a fabric-feeding mechanism, a feed-directing mechanism, a stitch-forming mechanism including a rotary cylinder mounted in said bracket-arm and in which is mounted a vertically movable needle-bar provided with an eye-pointed needle, a rotary standard mounted below said bed-plate and operatively connected with the feed-directing mechanism, said standard carrying at its upper end a loop-taker for carrying a mass of under thread and having oscillatory stitch-forming movements in a plane substantially parallel to the plane of said cloth-plate, said cylinder and standard each being provided with trimming fabric holders, and suitable guides for directing and laying the trimming fabrics carried by said holders on their respective

sides of the fabric being embroidered and in position to be pierced by said eye-pointed needle in its movements to form stitches, said standard and feed-directing mechanism
5 being adjustable, with respect to each other, to feed the trimming fabric in opposite directions across the upper surface of said needle-plate.

10 5. In an embroidering machine, the combination with a fabric feeding mechanism including means for feeding the fabric in any desired direction, of a stitch-forming mechanism including an eye-pointed needle,
15 a needle-carrying bar and a rotary standard, the latter having a central opening for the passage of a trimming fabric and carrying at its upper end a thread-holding loop-taker

having oscillatory stitch-forming movements on its own axis in a plane transverse to the line of needle actuation and move- 20
ments about the axis of said standard, and a needle-plate bracket and needle-plate each being provided with a braid-guide and adjustable with respect to its actuating mechanism to direct the braid to the underside of 25
the body fabric in position to be secured either by exposed or hidden stitches.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

DONALD NOBLE.

Witnesses:

ABBIE M. DONIHUE,
LEONARD E. FISCHER.