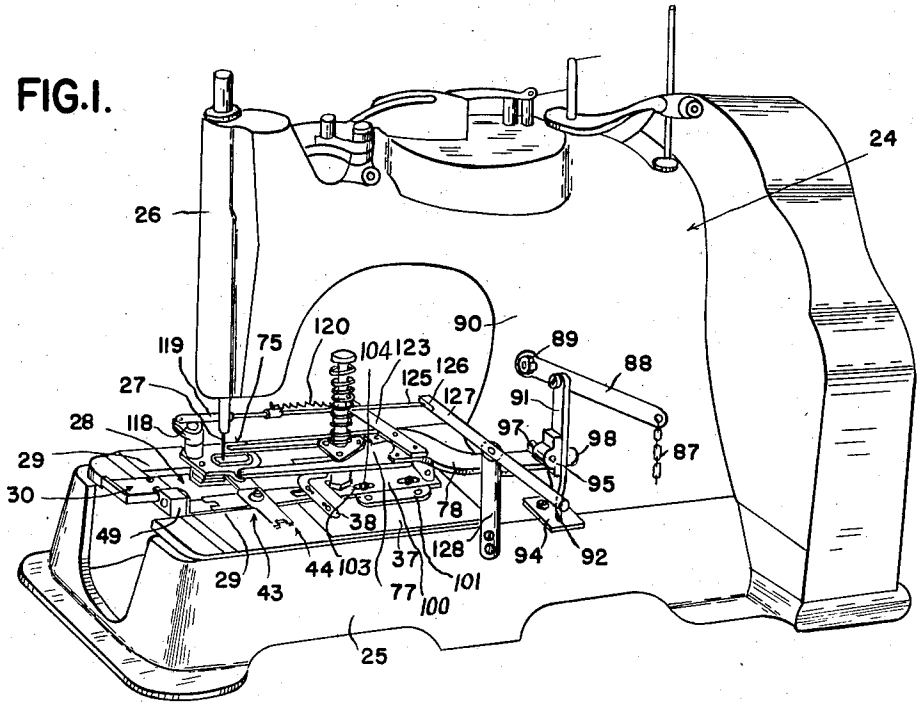
Sept. 15, 1942. F. M. LEE 2,295,851

SEWING MACHINE

Filed July 20, 1939 3 Sheets-Sheet 1

FIG.1.



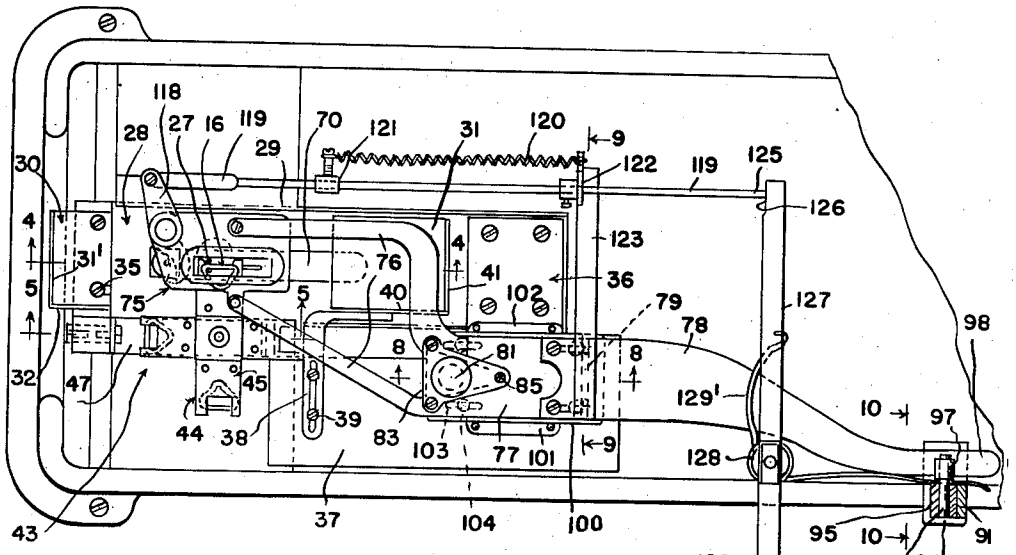


FIG.2.

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SEWING MACHINE

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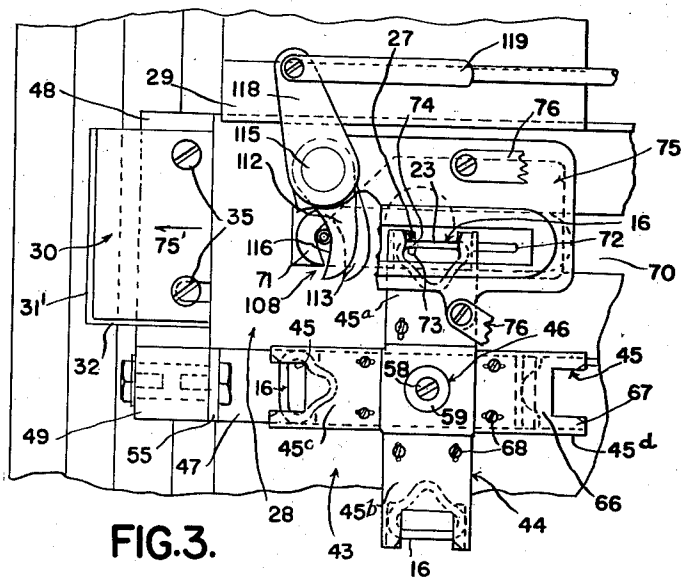


FIG.3.

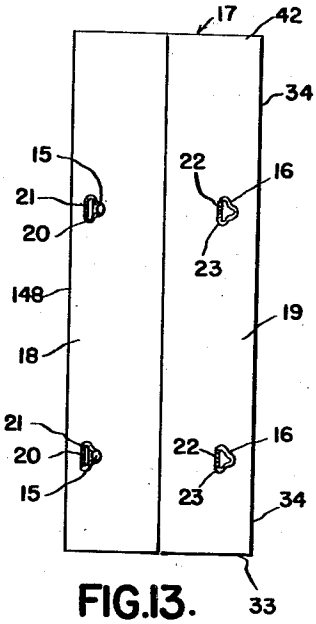


FIG.13.

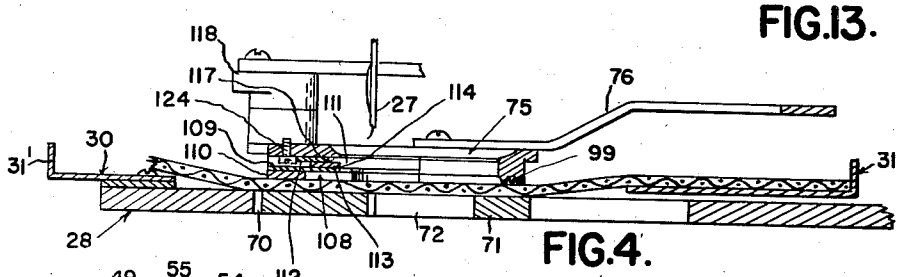


FIG.4.

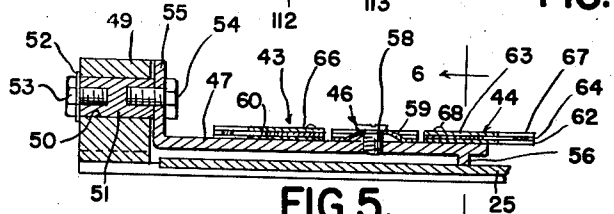


FIG.5.

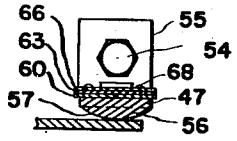


FIG.6.

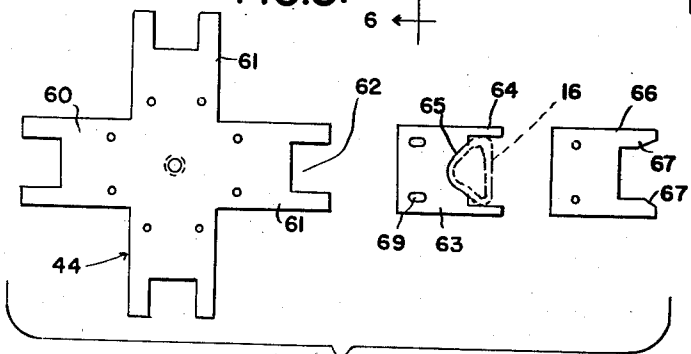


FIG.7.

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SEWING MACHINE

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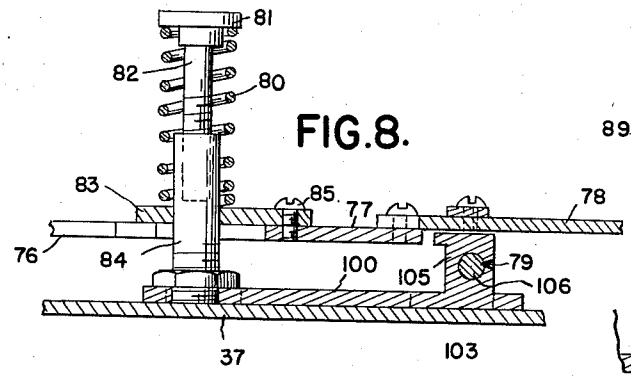


FIG.8.

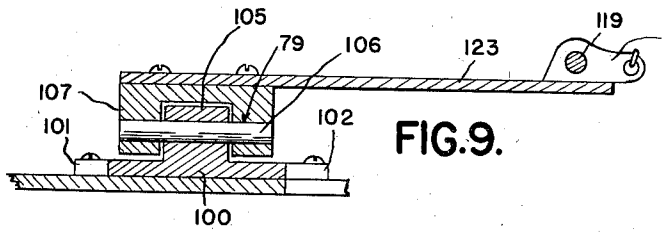


FIG.9.

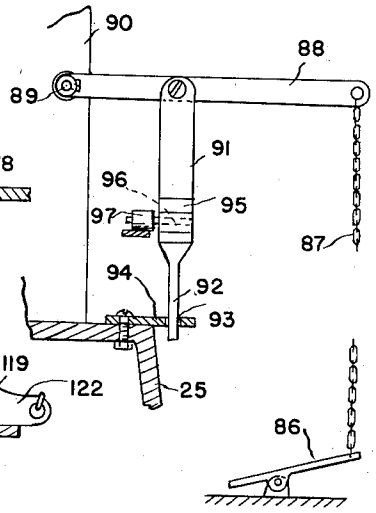


FIG.10.

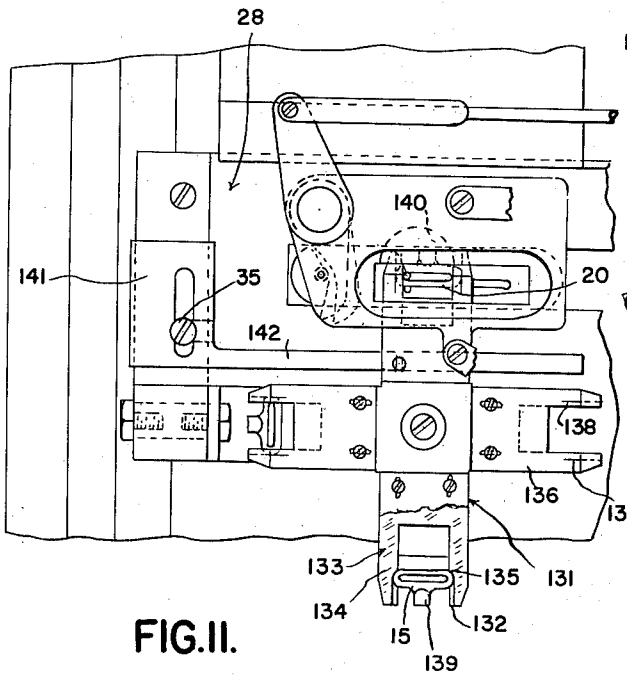


FIG.11.

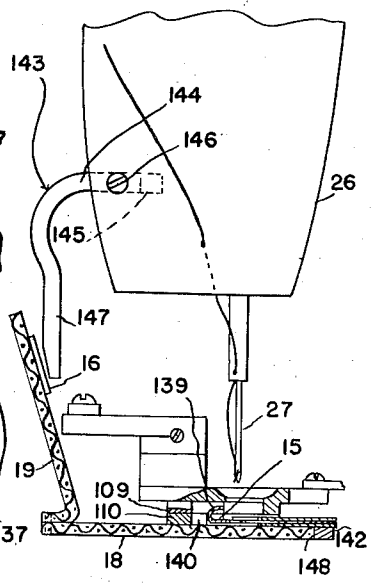


FIG.12.

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Patented Sept. 15, 1942

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UNITED STATES PATENT OFFICE

2,295,851

SEWING MACHINE

Fred M. Lee, Detroit, Mich., assignor to American Lady Corset Company, Detroit, Mich., a corporation of Michigan

Application July 20, 1939, Serial No. 285,592

8 Claims. (Cl. 112—105)

This invention relates generally to sewing machines and more particularly to machines of that type for sewing fastening elements, such as hooks, eyes, buttons, buckles, clasps, etc., to material.

In sewing fastening elements to cloth or other material the needle is reciprocated transversely, as well as vertically, to form stitches having bights encircling a bar-like portion of the fastening element to secure the latter to the material. During the stitching operation, the material and the fastening element are reciprocated longitudinally to enable the stitching to traverse a desired length of the bar of the fastening element. To insure proper registration of the stitches with the bar of the fastening element, it is essential that the latter be properly positioned upon the carriage relative to the needle.

Accordingly, it is one of the principal objects of the present invention to provide a feeding device for holding the fastening element in the proper position relative to the needle. It is also an important object of the invention to equip the feeding device with means for holding a plurality of fastening elements adapted to be successively moved into proper position for sewing the latter to the material. This enables the operator to insert a fastening element into one part of the feeding device while a fastening element on another part of the device is being sewed to the material. In this manner a considerable saving of time is effected since the feeding device can be immediately shifted to bring a new fastening element into registration with the needle. The invention also contemplates providing means upon the feeding device for accurately positioning the fastening elements thereon and to provide means for resiliently holding the fastening elements on the device. In addition, means are provided for moving the feeding device toward and away from the material to compensate for material of various thicknesses.

In order to insure the proper location of the fastening element on the material, it is necessary to properly locate the material upon the carriage. Furthermore, when cooperating fastening elements, such as a hook and an eye, are being sewed to the same or to separate pieces of material, they must be respectively sewed in complementary position to insure proper registration with each other. It is, therefore, another object of the invention to provide guide means for properly positioning the material and also to provide guide means adapted to insure the proper registration of cooperating fastening elements.

Other objects of the invention are to provide shearing mechanism for cutting the thread after the stitching operation and to construct the shearing mechanism to provide clearance for fastening elements having a laterally projecting part, as well as for fastening elements which are substantially flat.

Further objects and advantages of the present invention will be made more apparent as this description proceeds, particularly when considered in connection with the accompanying drawings, wherein

Figure 1 is a perspective view of a sewing machine embodying my invention;

Figure 2 is a plan view of a portion of the construction shown in Figure 1;

Figure 3 is an enlarged plan view of a portion of Figure 2, with certain parts broken away for the sake of clearness;

Figure 4 is a section taken substantially on the plane indicated by the line 4—4 of Figure 2;

Figure 5 is a section taken substantially on the plane indicated by the line 5—5 of Figure 2;

Figure 6 is a section taken substantially on the plane indicated by the line 6—6 of Figure 5;

Figure 7 is a plan view of a portion of the feeding device, showing the parts thereof in disassembled relation;

Figures 8, 9 and 10 are sections taken substantially on the planes indicated by the lines 8—8, 9—9 and 10—10 of Figure 2;

Figure 11 is a fragmentary plan view similar to Figure 3 showing a feeding device adapted to accommodate hooks;

Figure 12 is a fragmentary front elevation, partly in section, illustrating the guide means for registering cooperating fastening elements;

Figure 13 is an elevation of a portion of a garment having cooperating fastening elements secured thereto by means of the present invention.

For the purposes of illustration, I have disclosed herein a sewing machine embodying my invention which is adapted to sew hooks 15 and eyes 16 to a portion of a garment 17, as best shown in Figure 13. The portion of the garment 17 illustrated comprises two cloth strips 18 and 19 which serve to join two panels of a foundation garment. The hooks 15 are located in predetermined positions on the strip 18 and the bar-like portions 20 of the hooks are fastened to the material by means of stitches 21. The eyes 16 are located upon the strip 19 in positions such that the eyes 16 will register with the hooks 15 for cooperation therewith to secure the strips 18 and 19 together when the latter are arranged in juxtaposition. Suitable stitches 22 secure the bar-like

portions 23 of the eyes 16 to the strip 19. It will, of course, be understood that the present invention contemplates securing other types of fastening elements, such as buckles, clasps, buttons, etc., to various types of garments and the like.

To secure the hooks 15 and eyes 16 to the garment 17, a sewing machine 24, Figure 1, is used, comprising a base 25 and a head 26. The head 26 carries a needle 27 which is adapted to be reciprocated transversely, as well as vertically, and which cooperates with a suitable bobbin (not shown) in the conventional manner. The garment 17 is positioned upon the reciprocable carriage 28 which is adapted to be longitudinally reciprocated in ways 29 upon the base 25 by suitable means (not shown) in timed relation to the transverse and vertical reciprocation of the needle 27. The portions of the sewing machine described above are conventional in sewing machines of the type adapted to sew on hooks, eyes, buckles, etc. The throw of the transverse reciprocation of the needle 27 is predetermined to enable the machine to form stitches extending on opposite sides of the bar-like portions 20 and 23 of hooks 15 and eyes 16 respectively, and the simultaneous longitudinal reciprocation of the carriage 28 enables the stitching to traverse the desired length of the bar-like portions of the fastening elements. The machine is adapted to operate in a complete cycle which includes one complete reciprocation of the carriage 28, and, consequently, a double row of stitches are provided for securely fastening the fastening elements to the material.

Figures 1 to 10 inclusive illustrate the attachments utilized for sewing the eyes 16 to the strip of material 19. To insure the proper location of the eyes 16 upon the material, guides 30 and 31 are provided. The guide 30 comprises a stamping having flanges 31' and 32 which are adapted to engage the edges 33 and 34 respectively of the cloth strip 19 to accurately position the latter with respect to the needle 27. Fastening means 35 removably secure the guide 30 to the forward portion of the reciprocable carriage 28. Secured to the rearward portion of the carriage 28 is an extension plate 36 which has a portion 37 offset laterally from the carriage 28. The guide 31 is carried by the portion 37 of the plate 36, having an extension 38 secured to the plate by the fastening elements 39. The guide 31 has flanges 40 and 41 adapted to engage the edges 34 and 42 respectively of the cloth strip 19 for positioning the latter with respect to the needle 27. It will be apparent from the foregoing that the guides 30 and 31 enable the strip 19 to be positioned in two different positions to enable a pair of spaced eyes 16 to be attached thereto.

Means are provided for supporting an eye 16 adjacent the strip 19 and in registration with the needle 27. In the embodiment shown herein, this means comprises a feeding device 43. The feeding device 43 includes a revoluble turret holder 44 having a plurality of angularly spaced jaws 45 adapted to hold eyes 16. The turret holder 44 is pivotally mounted at 46 and may be rotated by the operator to successively move the eyes 16 into position for attachment to the material. The pivot 46 for the turret holder 44 is carried by a bracket 47 supported upon the carriage 28 and adapted to be rockable with respect thereto. Secured to the forward end of the carriage 28 by the fastening means 35 is a plate 48 having the block-like portion 49 at one end thereof. The block-like portion 49 is provided with a bore 50 in which a cylindrical member 51 is positioned. A suitable washer 52 and stud 53 at one end of the cylindrical member 51 prevent longitudinal movement thereof and a stud 54 secures the flange 55 of the bracket 47 to the opposite end of the cylindrical member 51. The end of the bracket 47 remote from the flange 55 is provided with the depending portion 56 adapted to bear against the base 25 of the sewing machine. As best seen in Figure 6, the depending portion 56 has an arcuate lower edge 57, the center of curvature of which coincides with the axis of the cylindrical member 51. It will now be apparent that the bracket 47 is adapted to rock about the axis of the cylindrical member 51 and, inasmuch as the turret holder 44 is pivotally mounted upon the bracket 47 by means of the stud 58 and the spring washer 59, it follows that the jaw 45 of the turret holder which is in registration with the needle 27 is adapted to be rocked toward and away from the material to compensate for material of varying thicknesses.

The turret holder 44 is illustrated in disassembled relation in Figure 7 and, as shown, comprises a plate 60 provided with angularly spaced arms 61 having recesses 62 at their outer ends. Positioning members 63 are secured adjacent the upper surface of the arms 61 of the turret holder and have outwardly extending tongues 64 adapted to engage opposite portions of the eyes 16 and the recessed portion 65 having a configuration conforming to an intermediate portion of the eyes 16 to position the latter upon the turret holder 44. Spring plates 66 are placed above the positioning members 63 and have outwardly extending tongues 67 adapted to overlie portions of the eyes 16 to retain the latter upon the turret holder. The plate 60, the positioning members 63 and the spring plates 66 are secured together by means of fastening elements 68. It should be noted at this time that the positioning members 63 are provided with slots 69 to permit adjustment thereof to compensate for slight variations and inaccuracies in manufacture and to enable the eyes 16 to be accurately located relative to the needle 27. The thickness of the positioning members 63 is approximately the same as the thickness of the eyes 16 thereby enabling the eyes to be rigidly held between the plates 60 and the spring plates 66.

The feeding device 43 enables the eyes 16 to be rapidly fed into operative position for attachment to the material and results in a considerable saving of time. Heretofore the finished work had to be removed before another fastening element could be moved into operative position. With the present invention, however, the operator may insert an eye into a jaw 45 of the turret holder 44 while the machine is sewing another eye, supported in another jaw of the turret holder, to the material. Upon completion of the sewing operation, the material can be moved to a new position and the turret holder rotated by the operator to bring another jaw and the eye supported thereby into operative position. Inasmuch as these operations may be done simultaneously, it will be apparent that no time is lost in moving an eye into position to be sewed to the material. In the illustrated embodiment of the invention, the turret holder 44 comprises four equally spaced jaws 45, although it will be understood that any desired number of jaws may be provided. As shown in Figure 3, the eye 16 in the jaw is

supported in the jaw 45a in position to be sewed to the material and the jaw 45b diametrically opposite from the jaw 45a extends outwardly at the side of the machine to enable an eye to be readily inserted therein by the operator. Rotation of the turret holder 44 in a clockwise direction will move the eye 16 in the jaw 45c into operative position for sewing the eye to the material and will also move the empty jaw 45d to the side of the machine to enable the operator to insert a new eye therein.

The reciprocable slide 28 is provided with an elongated slot 70 through which extends a stationary plate 71 provided with a slot 72. The forward end of the slot 72 is widened, as at 73, to permit the transversely reciprocating needle 27 to pass therethrough and to cooperate with a suitable bobbin (not shown) positioned beneath the stationary plate 71. In the initial starting position of the machine, the eye 16 in the jaw 45a of the turret holder is positioned centrally of the widened portion 73 of the slot 72. It will also be noted that initially the eye 16 is positioned with the needle 27 adjacent the forward end 74 of the bar-like portion 23 of the eye. When the operator starts the machine (by a suitable control), the carriage 28 moves in the direction of the arrow 75', Figure 3, and the needle 27 reciprocates vertically and transversely forming stitches 22 straddling the bar-like portion 23 of the eye. When the carriage is moved in the direction of the arrow 75' a distance predetermined by the length of the stitching desired, the direction of movement of the carriage reverses, returning the latter to its initial position, at which time the machine is automatically stopped. Inasmuch as the turret holder supporting the eye 16 is carried by the carriage 28, it will be apparent that a double row of stitches are formed securely fastening the eye 16 to the material.

The material is clamped in position upon the carriage 28 by means of a bracket 75 secured to the forward ends of the furcations 76 of a rockably mounted plate 77. As shown in Figures 2, 8 and 9, the plate 77 is secured to a plate 78 which, in effect, forms a continuation thereof and which is rockably mounted upon the transverse pivot 79 carried by the lateral extension 37 of the carriage 28. The bracket 75 is normally urged into clamping engagement with the material by means of a spring 80 supported intermediate the head 81 of a stud 82 and a plate 83. The stud 82 is adjustably mounted in a stud 84, the latter being secured to a plate 100 mounted on the extension 37 of the reciprocable carriage. The plate 83 is secured to the plate 77 at the junction of the furcations 76 by means of the fastening elements 85.

Movement of the bracket 75 away from the material and against the action of the spring 80 is effected by the operator by means of the construction shown in Figure 10. The foot pedal 86 is connected by means of a chain 87 to an arm 88 having its opposite end pivotally connected at 89 to the stationary portion 90 of the sewing machine. A link 91 is pivoted to the arm 88 intermediate the ends thereof and has a stem 92 at its lower extremity passing through an aperture 93 provided in a plate 94 attached to the base 25 of the machine to guide the link 91 in a generally vertical direction. Intermediate the ends of the link 91 is a cap 95 which forms a support for a stub shaft 96. A roller bearing 97 is rotatably mounted upon the end of the shaft 96 and is arranged to engage the end 98 of the plate 78. Depression of the foot pedal 86 by the operator causes the roller bearing 97 to move the portion 98 of the plate 78 downwardly, thereby rocking the plates 77 and 78 about the transverse pivot 79 and raising the bracket 75 from the material, permitting the finished material to be removed and a new piece to be inserted. The bracket 75 is provided with serrations 99 on the bottom thereof engageable with the material to effectively clamp the latter to insure movement of the material with the carriage.

Means are provided for adjustably mounting the pivot 79 about which the plates 77 and 78 are rockable. In detail, a plate 100 is positioned for movement upon the lateral extension 37 of the carriage between the ways 101 and 102, the latter being secured to the carriage. The plate 100 is provided with slots 103 and is clamped in any desired adjusted position by means of fastening elements 104. At one end of the plate 100 is an upright flange 105 in which is journaled the shaft 106. Depending from the plate 78 is a yoke portion 107 pivotally mounted upon the ends of the shaft 106. The construction described above permits the bracket 75 to be adjusted longitudinally relative to the carriage 28.

The bracket 75 functions not only as a clamp, but also as a support for the shearing mechanism 108. Secured to the underside of the bracket 75 are plates 109 and 110, Figure 4. The plate 109 is cut away at 111 to provide clearance for the blades 112 and 113 and also to form a cutting edge 114 adapted to cooperate with the blade 113 to sever the thread extending from the top of the material at the end of the sewing operation. The blades 112 and 113 are keyed to a shaft 115 and are angularly offset with respect to each other. The upper blade 112 functions to catch the thread between its forward edge 116 and the portion 117 of the bracket 75. The thread is then held taut and upon further rotation of the shaft 115 the blade 113 cooperates with the edge 114 to sever the thread.

The shearing mechanism is operated by means of a crank arm 118 secured to the shaft 115 and actuated by means of a connecting rod 119. As best seen in Figure 2, a tension spring 120 is connected between a collar 121 secured on the rod 119 and a flange 122 at the outer extremity of a bar 123 secured to the plate 78. The spring 120 normally maintains the blade 112 against the stop 124 in an inoperative position. An aperture is provided in the flange 122 on the bar 123 through which the connecting rod 119 extends. The rearward end 125 of the connecting rod is adapted to be engaged by the flattened end portion 126 of a rod 127 which is pivoted to the base of the machine at 128 and which has a handle 129 for actuation by the operator. A spring 120' maintains the rod 127 in engagement with the end of the rod 119.

To sever the thread at the completion of the sewing operation, the operator moves the handle 129 in the direction of the arrow 130, Figure 2, swinging the blades 112 and 113 in a counterclockwise direction about the shaft 115. This swings the blades 112 and 113 beyond the thread depending from the needle 27 and upon release of the handle 129 by the operator, the spring 120 causes the blades to be moved in a clockwise direction, thereby catching and severing the thread.

In Figures 11 and 12, I have illustrated my invention as adapted to sew hooks 15 to the cloth

strip 18. It will be noted that the turret holder 44 has been replaced by a turret holder 131 adapted to support the hooks 15 and feed the latter into operative position. The turret holder 131 is similar in construction to the turret holder 44, with a few minor exceptions. The arms 132 are necessarily longer since the hooks 15 are sewed to the material in a position reverse to that of the eyes 16. The positioning plates 133 have tongues 134, the latter being narrowed in width at their outer extremities to form shoulders 135 serving as stops to position the hooks 15 upon the turret holder. Spring plates 136 having cuts or slits 137 forming spring fingers 138 are secured to the positioning members 133. The spring fingers 138 engage the upper surface of the hooks 15 to firmly hold the latter upon the turret holder.

In order to provide clearance for the laterally extending return-bent portion 139 of the hook 15, the bracket 75 is provided with an additional plate 110, and the plates 109 and 110 are cut away at 140, thereby forming a recess and adapting the bracket 75 for use with fastening elements having laterally extending portions, as well as with fastening elements which are substantially flat.

To properly position the material relative to the needle 27, the clamps 30 and 31 are removed and a clamp 141 having a longitudinally extending bar 142 is secured to the reciprocable carriage by the fastening element 35. As shown in Figure 12, the guide member 143 is provided to enable the operator to position the material in such a manner as to insure proper registration of the hooks 15 and eyes 16. The guide member 143 comprises a rod having the portion 144 adjustably secured in an aperture 145 in the head 26 of the sewing machine by means of a set screw 146, and a downwardly depending portion 147 adapted to be registered with an eye 16 on the strip 19. By positioning the strip 18 with the edge 148 thereof in engagement with the bar 142 of the guide 141 and moving the material longitudinally until the eye 16 on the strip 19 is in registration with the depending portion 147 of the guide member 143, the strip 18 will be properly positioned and the hook 15 will be sewed to the material in a location complementary to that of the eye 16, insuring registration of the hook 15 with the eye 16 when the strips 18 and 19 are placed in juxtaposition.

Operation

To attach the hooks 15 and eyes 16 to the portion of the garment 17, as shown in Figure 13, the operator depresses the pedal 86, rocking the plates 77 and 78 about the transverse axis 79 and raising the bracket 75 against the action of the spring 80. The material is then positioned upon the carriage 28 with the edges 33 and 34 of the strip 19 in engagement with the flanges 31′ and 32 of the clamp 30, and the turret holder 44 is rotated to move one of the jaws 45 carrying an eye 16 into operative position with respect to the needle 27. The foot pedal 86 is then released and the bracket 75 clamps the material to the carriage. The operator next actuates the starting switch (not shown) of the sewing machine which automatically reciprocates the carriage longitudinally and simultaneously reciprocates the needle 27 transversely and vertically to stitch the bar-like portion 23 of the eye to the material with a double row of stitches. The operator then inserts a new eye 16 into the jaw 45*b* of the turret holder 44 from the side of the machine while the eye in the jaw 45*a* is being sewed to the material. As previously mentioned, the machine automatically stops at the completion of the complete reciprocation of the carriage and the handle 129 is then moved in the direction of the arrow 130 and then released to cause the blades 112 and 113 to sever the thread extending from the top of the material.

The foot pedal 86 is again depressed to raise the clamping bracket 75 from the material, and the operator then moves the material so that the edges 34 and 42 of the strip 19 engage the flanges 40 and 41 of the guide 31, and simultaneously revolves the turret holder 44 to move the jaw 45*c* and the eye 16 carried thereby into operative position. The remainder of the above described process is repeated to sew the eye to the material and sever the thread.

In order to facilitate production, a large number of eyes 16 may be sewed to strips 19 before making the changes necessary to enable the machine to sew the hooks 15 to the strips 18. To effect the latter operation, the turret holder 44 is replaced by the turret holder 131 and the guides 30 and 31 are replaced by the guide 141. The material is positioned upon the reciprocable carriage 28 with the edge 148 of the strip 18 in engagement with the bar 142 of the guide 141 and the strip is moved longitudinally to register the eye 16 with the portion 147 of the guide member 143. With these exceptions, the procedure followed in sewing the hooks 15 to the strip 18 is identical to that used in sewing the eyes 16 to the strip 19.

From the foregoing, it will be apparent that I have provided a construction adapted to facilitate the sewing of hooks, eyes and other fastening elements to garments or material of various types.

What I claim as my invention is:

1. In a sewing machine for sewing hooks to material, a plate adapted to support the material, means for supporting a hook adjacent the material, a bracket supported above the material and the hook, and a cutter carried by said bracket, said bracket having a recess therein to provide clearance for the laterally extending part of the hook.

2. In a sewing machine for sewing fastening elements to material, a plate adapted to support the material, means for supporting a fastening element adjacent the material, a clamp for holding the material on the plate, a cutter on said clamp, resilient means for holding the cutter in inoperative position, and means for tripping said cutter to sever the thread above the material.

3. In a sewing machine for sewing fastening elements to material, a movable carriage, a bracket, a rotatable member pivoted to said bracket intermediate the ends of the latter, said rotatable member being adapted to hold a plurality of fastening elements, a pivotal mounting between one end of said bracket and said movable carriage, and a segmented arcuate bearing portion at the other end of said bracket, said pivotal mounting and said arcuate bearing portion being arranged to permit pivotal movement of said bracket about an axis generally transverse to the axis of said rotatable member to permit movement of a portion of said rotatable member toward and away from the material.

4. In a sewing machine for sewing fastening elements to material, a plate adapted to support

the material, a bracket, a rotatable member pivoted to said bracket and adapted to hold a plurality of fastening elements, means for pivotally mounting said bracket to permit movement of a portion of said rotatable member laterally toward and away from the material, a clamp supported above said rotatable member for movement laterally toward and away from the latter, and means for urging said clamp toward said rotatable member to force the latter against the material and clamp the material against said plate.

5. In a sewing machine, a plate adapted to support material, a clamp for holding the material on the plate, a cutter movably mounted upon the clamp, a reciprocating needle positioned adjacent the clamp, means for moving said cutter to a position adjacent the thread depending from said needle, and resilient means for moving said cutter transversely of the thread to sever the latter.

6. In a sewing machine for sewing fastening elements to material, a plate adapted to support the material, means for supporting a fastening element adjacent the material, a clamp for holding the material on the plate, a cutter pivotally mounted on said clamp, a reciprocating needle positioned adjacent the clamp, a stop for said cutter determining the inoperative position of the latter, means for swinging said cutter from its inoperative position adjacent said stop to a position on the opposite side of the thread depending from said needle, and a spring operatively connected to said cutter to move the latter transversely of the thread to sever the latter and to move the cutter to its inoperative position adjacent said stop.

7. A sewing machine for sewing fastening elements to material comprising a reciprocating carriage, a base, a bracket, a rotatable member pivoted upon said bracket intermediate the ends of the latter, said rotatable member being adapted to hold a plurality of fastening elements, a pivotal mounting between one end of said bracket and the reciprocating carriage and an arcuate bearing portion at the other end of said bracket engageable with said base, said arcuate bearing portion having its center of curvature in alignment with the axis of the pivotal mounting at the opposite end of the bracket and permitting pivotal movement of said bracket about an axis generally transverse to the axis of said rotatable member to permit movement of a portion of said rotatable member toward and away from the material.

8. In a sewing machine for sewing fastening elements to material, a pivotally mounted feeding device comprising a plate for supporting a plurality of fastening elements, a plurality of angularly spaced members serving as stops to position the fastening elements on said plate, and means for individually adjusting each of said stop members toward and away from the axis of the feeding device.

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