SEWING MACHINE WITH AUTOMATIC HEMMING DEVICE

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The present invention relates to sewing machines equipped with automatic means for the production of a double-folded hem along the edge of a fabric or workpiece being operated on.

It is customary to sew a hem upon the edge of a fabric by the aid of a hemming guide, preceding the needle or stitching point of a sewing machine, in the form of a metal sheet bent into a conical folding guide, in such a manner as to pre-fold the edge portion of said fabric fed to the needle into a double-folded hem. In the case of devices of this type, it is necessary to manually insert the leading edge of the fabric into the hemming guide each time prior to the commencement of a new sewing operation. This insertion of the fabric is both cumbersome and time consuming and requires, especially in the case of relatively narrow hems, aside from a certain skill on the part of the operator, the use of a pointed tool or special implement. This, in turn, may result in damage to the fabric, aside from distortion of the starting point or edge of the hem, whereby to deleteriously affect the appearance of the finished work.

It is further more difficult in the use of the known hemming devices to position the leading edge of the hem in line with the edge of the workpiece being at right angle to the edge of the hem to be produced, in that the double folding of the fabric edge by the aid of the known hemming device must be carried out within a relatively short folding path or space determined by the small width of the hem to be sewn. As a consequence, the leading edge of the hem may lie at an angle to the edge of the workpiece or fabric, that is, such as to project beyond the latter, in such manner as to make it necessary to cut the projecting fabric portions after completion of the hem sewing operations.

Accordingly, an important object of the present invention is the provision of an improved hemming device or folding mechanism for use in machines in which the previously related drawbacks and difficulties inherent of the prior hemming guides or devices are substantially overcome or minimized.

A more specific object of the invention is the provision of an improved hemming device of the referred to type for automatically hemming a limited leading portion of the edge of a fabric to be sewn, said device including means to be converted, in the end position of the automatic folding operation, to a hemming guide for the folding of the remaining portions of the workpiece or fabric to be hemmed.

Not only does the invention eliminate the manual insertion and folding of the fabric or workpiece, as a result of the fully automatic initial folding operation, but the latter will ensure a perfectly aligned hem under all circumstances due to the special design of the folding device or mechanism. Besides, the invention may be used with equal ease for the hemming of workpieces of any size or length of the hems, as will become further apparent as the description proceeds.

The invention, both to the foregoing and ancillary objects as well as novel aspects thereof, will be better understood from the following detailed description, taken in conjunction with the accompanying drawings forming part of this specification and wherein:

FIG. 1 is a front elevation, shown partly in section, of a conventional sewing machine embodying an automatic hemming device constructed in accordance with the principles of the invention.

FIG. 2 is an enlarged perspective view of the hemming device and its operating mechanism of FIG. 1.

FIGS. 3—7 are fragmentary views illustrating schematically the positions of the hemming tool of FIGS. 1 and 2 in the successive operating stages during a hemming operation.

FIG. 8 shows a sewing machine embodying an alternative hemming device constructed in accordance with the invention,

FIG. 9 is a part plan and part sectional view taken on line IX—IX of FIG. 8.

FIG. 10 is an enlarged perspective view of the hemming device and its operating mechanism of FIG. 8; and

FIGS. 11—15 are fragmentary views illustrating schematically the successive positions of the hemming device according to FIG. 8 during a hemming operation.

Like reference numerals denote like parts in the different views of the drawings.

With the foregoing objects in view, the invention involves generally the combination, in combination with a sewing machine having a stitching plate, as reciprocating needle, a loop taker cooperating with said needle and means to feed a workpiece to be operated on, of a hemming device or mechanism comprising essentially an oblong stationary hem folding plate having a first and a second longitudinal edge and mounted upon the machine adjoining said stitching plate and in line with the needle and the work feeding direction. The folding plate has a width equal to the width of the double-folded hem to be produced upon the edge of the workpiece. Cooperating with said folding plate is a substantially U-shaped hemming tool comprising a first and larger leg portion, an intermediate transverse portion and a second shorter leg portion, said tool being disposed in its normal position with its intermediate portion adjoining the first edge of said folding plate in slightly spaced relation and with its longer leg portion being slightly transversely spaced from and being parallel to said plate, in such a manner as to allow of the insertion of the edge portion of a workpiece or fabric to be hemmed between said plate and larger leg portion, to project by a predetermined distance beyond said first edge.

Further provided, in accordance with the invention, means in the form of a cam and follower mechanism, to successively operate said hemming tool along a rectangular path at right angle and parallel, respectively, to the edge of said folding plate, whereby to fold the edge portion of the workpiece or fabric into a double-folded hem about the edges of said folding plate. Inasmuch as the hemming device, being of limited length, serves to hem only a relatively limited leading portion of the workpiece, there is furthermore provided, in accordance with the invention, means in the form of a confining or retaining member being operatively connected with the hem folding mechanism, to convert the latter in its end position into an ordinary stationary hemming guide for the hemming of the following work portions in cooperation with the work feeding means of the sewing machine, in a manner as will become further apparent as the description proceeds.

Inasmuch as the initial hemming or folding operation of the workpiece is fully automatic, the invention is especially suited for use in conjunction with automatic work feeding and transfer device mechanisms.

According to an improved feature and application of the invention, the latter may advantageously be embodied.
in a double-needle sewing machine for the simultaneous sewing of two hems upon the edges of a pair of juxtaposed workpieces, such as on both sides of the previously cut edges of a workpiece or blank derived from a continuous web of fabric or the like material. For the latter purpose, the end of the web may be clamped upon a displaced work feeding frame and cut by means of a rotary knife while being fed to the hemming device for the hemming of both cut edges of the workpiece. There is advantageously provided for the latter purpose a common retaining member cooperating with the mechanisms for the synchronous operation of a pair of juxtaposed hemming devices, in the manner shown by the drawings and described in detail in the following.

Referring more particularly to FIGS. 1 and 2 of the drawings, there is shown a conventional sewing machine having a work supporting or cloth plate 1 being fitted with an insert plate 4 located ahead of the stitching plate 2 and feed dogs 3 and provided with a recess 5. Secured to the plate 1 is an upright 6 terminating in a horizontal arm 7 which in turn terminates in the sewing head 9 and wherein is mounted the arm-or drive shaft 7 of the machine. Shaft 7 carries a hand wheel 8 at one end and a crank 9 at its opposite end, the latter being operably connected through a link 10 with the vertically reciprocable needle bar 12 mounted in a needle bar frame 11. Bar 12 carries a sewing needle 13 at its lower end in accordance with a conventional sewing machine design. Frame 11 may be mounted to oscillate in a known manner in the fixed direction about a shaft or bolt 14. In the latter case, oscillating motion may be applied to the frame 11 and needle 13 by means of an eccentric 15 mounted upon the drive shaft 7 and cooperating with a rock-shaft 17 by way of a fork 16, said rockshaft in turn carrying a link 18 connected to the frame 11.

Secured to the head 19 is a support or casing 20 which is provided with a vertical guideway 21 having provided therein an angular support or carrier 22 for movement in both upward and downward directions. Extending at right angle from the carrier 22 are a pair of spaced supporting plates 23, 24 being provided in the sides thereof with horizontal guideways 25 wherein is mounted a horizontally reciprocable supporting frame 26. Extending on the latter is a depending arm 27 to which is secured the hemming device or tool 28. A pair of spaced cross-arms 29, 30 of the frame 26 are formed to cam lobes or extensions 31, 32 arranged to cooperate with a cam disk 33 disposed between the plates 23, 24 and within the frame 26 and having radially varying control surfaces, said disk being mounted upon the shaft 33 of an operating or drive motor 34 supported by the casing 20. Besides the mechanism for the horizontal displacement of the frame 26 by the disk 35, there is mounted upon the shaft 35 a further cam disk 36 having an edge or axially varying control surface 37 arranged to cooperate with a follower pin 38 secured to the supporting plate 23. Pin 38, together with the carrier 22, frame 26, and hemming device 28, are maintained in continued operative engagement with the disk 36 by the action of a tension spring 41 mounted between a pin 39 secured to the casing 20, on the one hand, and a pin 40 secured to the carrier 22, on the other hand.

The cam disk 36 carries at its circumference a switching lobe or projection 42 arranged to cooperate with an electric switch 43 mounted upon the plate 23 and having an actuating lug or pin 44. Further secured to the frame or support of the sewing machine is a stationary hemming device or folding plate 45 being preferably of hollow construction, FIG. 2, and extending to a point close to the stitching plate 2.

Item 46 is displacable work feeding plate mounted in suitable guides (not shown) of the frame or support of the machine. The edge of the plate 46 adjoining the folding plate 45 may be fitted with retaining needles or the like fabric retaining means well known in the art.

Mounted within a recess of the insert plate 4 is a switch 47 having an actuating element 48 adapted to be engaged by the front edge of the plate 46 in its end position, to operate said switch, in the manner as will be further described in reference to the operation of the hemming device.

In order to enable utilization of a material being difficult to bend or flex, and to provide an effective hemming guide after initially hemming or folding the edge or leading portion of a workpiece by the hemming tools 28, 45, the hemming device of tool 28 is fitted with a pair of lateral bars 46, 47 being preferably angularly bent therefrom having bosses wherein is mounted the shaft 51 of a confining plate or guide member 52 being bent to an L-shape at its lower end. The free end of the plate 52 is rounded to afford a smooth guidance of and prevent damage to the work during the hem folding operation. A torsion spring 53 encircling the shaft 51 and having one end engaging the plate 52, on the one hand, and having its opposite end engaging the hemming device 28, on the other hand, urges the plate 52 to rotate in clockwise direction. Shaft 51 may be secured against axial displacement by the provision of set rings or in any other suitable manner. Inasmuch as the distance between the shaft 51 from the lower end of the plate 52 is equal to the distance between said shaft and the inside surface of the bottom wall of the hemmer 28 and since the lower end portion of the plate 52 is offset in a direction parallel to the straight vertical line through the shaft 51, the plate 52 is allowed to carry out only a limited swinging movement about the shaft 51 as a fulcrum, the two end positions being shown in FIGS. 5 and 7, respectively.

FIGS. 8-10 show an alternative embodiment of a hemming device according to the invention in combination with a double-needle sewing machine for the simultaneous sewing of two hems along the edges of a previously cut work piece or web. For this purpose, the machine used is of the type having a work feeding direction parallel to and in the direction of the overhanging or upper arm of the machine, that is, longitudinally instead of transversely to the housing as in the case of the FIG. 1 embodiment.

Referring more particularly to FIG. 8, the work supporting or cloth plate 60 of the machine has secured thereon, by ways of an upright or standard, the overhanging arm 61 which terminates in the sewing head 62. Mounted within the arm 61 is a drive shaft 64 carrying a hand wheel 65 at one end and a crank 66 at its opposite end, said crank being in turn operably connected, by way of a link 67 and connecting member 68, with a pair of reciprocable needle bars 69 mounted within a needle bar frame 68. The bars 69 are carried at their lower ends a pair of sewing needles 70, FIG. 9, cooperating in a known manner with loop takers 71 disposed below the plate 60, to form stitches in a manner well known.

Secured to the head 62 of the machine is a casing or support 72 upon which is mounted an electric motor 73 having a vertical drive shaft 74 which is journaled in a bearing or extension 75 of the casing 72. Secured to the lower end of the shaft 74, by means of a screw 78, is a first cam disk 76 having a pair of peripheral cylindrical cam surfaces 77 disposed diametrically in respect to one another and encompassing each an angle of 180° of the disk 76. Further secured to the shaft 74, above the disk 76 and by means of a screw 80, is a further cam disk 79 having a pair of axially varying edge cam surfaces 81 each encompassing an angle of 180° of the edge of the disk 79. The upper edge of the disk 79 joins the extension 75, while the opposite edge of the latter engages a set ring 82 mounted upon the shaft 74, to prevent axial displacement of the latter.

The set ring 82 has a circumferential lobe or projection 83 arranged to engage the actuating pins 84, 85 of a pair of diametrically disposed electric switches 88, 89, which are each supported by an angular bracket 86, 87, respectively, secured to the extension 75.
Disposed within the casing 72 on the opposite sides of the shaft 74 are a pair of vertical supporting arms 90, 91 each of which is provided at its upper end with a longitudinal vertical slot 92, 93 being engaged by pins or bolts 94, 95, respectively, extending from the casing 72. The lower ends of the arms 90, 91 are guided in a direction at right angles to the feeding direction through guides 96, 97 provided in the casing 72. Projecting from the sides of the arms 90, 91 facing the shaft 74 are follower cams or projections 98, 99, 100, 101 adapted for cooperation with the control surfaces 77, 81 of the disks 76, 79 respectively. Springs 102, 103, 104 serve to maintain the followers 98, 99, 100, 101 in resilient operating engagement with the respective control surfaces 77, 81 of the disks 76, 79. Secured to each of the lower ends of the arms 90, 91 is a hemming device or tool 105, 106, respectively, said tools being subject to both vertical and lateral movement about the bolts 94, 95 by the action of the cams 76 and 79, in a manner as will be further understood from the following description of the operation of the device.

Secured to the cloth plate 60 are a pair of guide rails 107, 108, FIG. 9, which serve to displaceably support a recessed work supporting or feeding plate or frame 109 acting in its inserted or right hand position, FIG. 9, switch 110 mounted upon the plate 60. Hinged to the plate 109 by a bolt 112 is a work clamping frame 111 from which extends a vertical clamp 113, FIG. 8, arranged to engage a stop 114 upon the arm 61 of the sewing machine, whereby to deflect the arm 113 and with it the frame 111 in the fully withdrawn or left hand position of the plate 109. The clamping frame 111 is provided at its front with a pair of interrupted folding tongues or planes 115, 116 forming part of the hemming device and extending to points close to the stitching points or needles 71. The cloth plate 60 is furthermore provided in front of the clamping frame 117, through which project in a known manner the serrated feed dogs 118, with a recess 119, FIG. 10, into which project the lower ends of the hemming devices 105, 106 in the position shown, that is, prior to the starting of a hemming operation.

Disposed below the hemming devices 105, 106 is a guide plane 120, which is provided with a number of depending guide pins 120, only one of the pins being shown in FIG. 10 for simplicity of illustration. The pins 120 slide within bores of a further plate 122 which is secured to the cloth plate 60. Mounted upon the free ends of the pins 120 are sets rings 123, while a spring 124 disposed between the plates 120 and 121 and the pins 120 serves to urge the plate 121 against the underface of the hemming devices 105, 106 for the purpose as will become more apparent as the description proceeds.

Further secured to the cloth plate 60, at a predetermined distance from the needles 70 and below the supporting plate 109, is a bracket 125 supporting a motor 126 which drives a rotary cutting knife 127. The latter projects through a slot 128 of a cover plate 130 secured to the bracket 125 by screws 129, whereby said knife extends beyond the upper surface of the plate 130, as shown in FIG. 8. The projecting portion of the knife 127 is advantageously covered by a counterhold cap or guard engaging the workpiece S and being mounted upon the end of a supporting arm or bracket 131.

In the following there will be described the operation of the hemming device according to FIGS. 1 and 2, showing the device in the starting position.

A pre-cut workpiece or blank W, FIGS. 3, 7, is placed by the operator upon the feeding plate 46 with a predetermined marginal portion thereof projecting beyond the outer edge of said plate adjoining the folding plate 45 and resting upon the latter. In order to hold the workpiece in position, retaining needles may be provided retractable below the plate 46, in a manner well known. Subsequently, the plate 46 together with the workpiece W is displaced in the feeding direction, to position the leading edge of the workpiece below the hemming device or tool 28. Upon reaching its end position, the plate 46 engages the actuating pin 48 of the switch 47, whereby to energize the motor 34 and to slowly rotate the shaft 33 together with its cam disks 35 and 36.

The cam disks 35, 36 are so designed as to displace the carrier 22, together with the frame 26 and hemming device 28, and by the disk 36, at first in the downward direction against the action of the spring 41 by the control surface 37 cooperating with the following pin 38, whereby to deflect the marginal portion of the workpiece projecting beyond the folding plate 45 downwardly by an angle of 90°, as shown in FIG. 4. Upon the hemming device 28 engaging its predetermined position determined by the shape of the cam surface 37, the cam disk 35 controlling the horizontal movement of the frame 26 assumes control, whereby to displace the frame 26 together with the device 28 towards the left and in a direction parallel to the folding plate 45, as shown in FIG. 5. In other words, in the latter position the marginal portion of the workpiece has been reversely folded or bent about the right hand edge of the folding plate 45 adjoining the folding device 28, whereby to form the first fold of the double-folded hem to be produced. During the last-mentioned displacement of the device 28, the confining member 20 of said device 28 is displaced from the fold or the edge of the plate 45, as shown in FIG. 5.

The edge surface 37 of the cam disk 36 has a shape of zero slope coinciding with the range of horizontal displacement of the hemming device 28 by the disk 35 and the range of zero slope of the disk 36 is followed by a range within which the carrier 22 together with the frame 26 and hemming device 28 is displaced in the upward direction by the action of the spring 41, whereby to deflect the end portion of the workpiece by another 90° angle about the left hand edge of the folding plate 45, and to partly return the member 52 to its starting position, as shown in FIG. 6. Finally, the remaining marginal portion of the workpiece W is again folded and inserted between the upper or main portion thereof and the short leg of the hemming device 28 by horizontal displacement of the frame 26 and device 28 in the opposite direction under the control of the cam disk 35, as shown in FIG. 7. In other words, the first and second deflections, FIGS. 4 and 5, of the workpiece result in the formation of the main fold and the third and fourth deflections, FIGS. 6 and 7, result in the formation of the second fold of the double-folded hem to be produced. In the end position of the hemming device, FIG. 7, the L-shaped end of the guide member 52 having returned to its starting position engages the edge of the plate 45 or the first fold of the hem, whereby to provide a substantially closed hemming guide for the subsequent (non-pretended) portions of the workpiece being operated on.

In other words, the lower U-shaped portion forming the actual hemming tool of the device 28 has its normally free end opposite to the transverse portion of the U closed or confined by the member 52 in the operative position, FIG. 7, to provide a stationary hemming guide for the following portions of the workpiece W. Upon return to the starting position, FIG. 3, the device is ready for another folding for pre-hemming operations.

Upon completion of the hem-laying operation by the device 28, encompassing a rotation of the shaft 33 of about 270°, the workpiece W is fed to the stitching tools by the feed dogs 3 and the hem sewn in a manner well known and understood. For the following portions of the workpiece which has not been previously fed to the device 28, the latter acts as an ordinary hemming guide by the action of the guide member 52 in the end position of the pre-folding operation, FIG. 7, whereby to ensure proper insertion and hemming of the main or non-pre-folded portions of the workpiece W.

After the hem has been sewn along the entire length of the workpiece in the manner described, the rotation of the motor 34 may be reversed by the operation of a
reversing switch (not shown), to return the hemming device 28 to the starting position, FIG. 3, by the operation of the hemming mechanism in the reverse direction, in a manner readily understood.

There will now be described the operation of the embodiment of the invention shown by FIGS. 8-15.

The operator at first displaces the feeding plate 109 together with the work clamping frame 111 in a direction opposite to the work feeding direction indicated by the arrow V, FIG. 9, to a position where the lever 113 secured to the bolt 112 engages the stop 114 on the arm 61, whereby to deflect the frame 111 out of said bolt and to lift it from the plate 109. The operator then places a predetermined length of a web S of fabric or the like, which may have previously been hemmed along both its longitudinal edges, upon the plate 109 and displaces the latter in the opposite direction or direction of the arrow V, whereby the frame 111 by virtue of its own weight engages the workpiece and firmly presses the same against the plate 109, this displacement being continued until the free ends of the folding plates 115, 116 coincide approximately with the edge of the work on the side of the needles 70. During continued operation of the plate 109 in the direction of the arrow V, the web S being clamped by the frame 111 passes over the cutting knife 127 having been previously set in motion by the energization of the motor 126. As a consequence, a workpiece of predetermined length is cut from the continuous web S and the cut edges fed to the machine for hemming and sewing, to produce a blank or final fabric piece being hemmed, in the referred to example, on all four sides and suitable for any use as may be desired.

In the final position of the feeding plate 109, FIGS. 8 and 9, the leading portion of the cut edges of the web S are positioned below the hemming plates 115, 116 and upon the hemming devices 105, 106 positioned within the recess 119, as shown in FIGS. 10 and 11. Plate 109 upon reaching its end position operates the switch 110 which closes the circuit of the motor 73. As a consequence, the motor is started and the shaft 74, carrying the cam disks 76 and 79 for the control of the lateral and vertical movements of the arms 90, 91, rotated at a low speed. As a result, the hemming devices 105, 106 supported by the arms 90, 91 are subjected to successive overlapping movements under the guidance of the tools along a rectangular spiral path, to result in the formation of a double-folded hem in cooperation with the stationary folding plates. Alternatively, the hemming or pre-folding operation may be carried out manually by the operator at first displacing the tools in suitable guides provided with means for step-by-step operation of the tools in the manner described.

In the foregoing invention has been described with reference to specific illustrative devices or embodiments. It will be evident; however, that variations and modifications, as well as the substitution of equivalent parts or elements for those shown herein for illustration, may be made in accordance with the broader scope and spirit of the invention as defined by the appended claims. The specification and drawings are accordingly to be regarded in an illustrative rather than in a restrictive sense.

We claim:

1. A sewing machine having a stitching plate, a reciprocatory needle, a loop taker cooperating with said needle, and feeding means to feed a work piece to be operated on; a hemming device comprising in combination:
   (1) a double stationary folding plate having a first and second longitudinal edge and mounted upon said machine adjoining said stitching plate and in line with said needle and the work feeding direction, said plate having a width equal to the width of a hem to be sewn upon the edge of said workpiece,
   (2) a hemming device comprising a U-shaped hemming tool having a first longer leg portion, an inter-

2. A sewing machine comprising a U-shaped hemming tool having a first longer leg portion, an inter-
mediate transverse portion, and a second shorter leg portion, said device disposed in its normal position with said intermediate portion adjoining the first edge of said folding plate and with its longer leg portion being slightly transversely spaced from and parallel to said folding plate.

3. Mechanism to successively operate said device along a rectangular path at right angles and parallel to the edge of said folding plate, to fold the edge portion of said workpiece, positioned between said plate and the longer leg portion of said tool, into a double-folded hem about the first and second edges of said folding plate and said device during rotation of said shaft through a predetermined angle.

4. A sewing machine as claimed in claim 2, said confining member being comprised by a spring-loaded deflecting plate mounted upon said device, said deflecting plate adjoining said first edge in the final position of said device and being retractable to an intermediate position during the intermediate portion of operation of said device.

5. A sewing machine as claimed in claim 2, said confining member being comprised of a spring-loaded retaining plate being normally urged against the undersurface of the shorter leg portion of said device, and stop means to limit the displacement of said retaining plate by the initial displacement of said device to a limit position, whereby said retaining plate adjoins the first edge of said folding plate in the end position of said device.

6. A sewing machine as claimed in claim 2, said confining member being comprised of a spring-loaded retaining plate being normally urged against the undersurface of the shorter leg portion of said device, and stop means to limit the displacement of said retaining plate by the initial displacement of said device to a limit position, whereby said retaining plate adjoins the first edge of said folding plate in the end position of said device.

7. In a double-needle sewing machine including a sewing table, a stitching plate mounted therein, a pair of reciprocating needles, loop takers cooperating with said needles, and means to feed a workpiece to be operated on; a cutting and hemming device comprising in combination:

(a) a work feeding frame and clamp mounted upon said table and operable between an outwardly retracted position for the insertion of a workpiece and an operative position adjacent to said stitching plate, said plate being adapted to hold a workpiece clamped thereby,

(b) a pair of parallel oblong and stationary folding plates having inner edges facing one another, said plates being in line each with one of said needles and the work feeding direction, and said plates having a width equal to the width of the hem to be sewn upon the cut edges of said workpiece,

(c) a pair of U-shaped hemming devices each comprising a leg portion, an intermediate transverse portion, and a shorter leg portion, said devices being disposed in their normal positions with each of said intermediate portions adjoining one another and being slightly transversely spaced from and parallel to said folding plates,

(d) a common spring-loaded confining member operably connected with said operating mechanism to step-by-step operate said devices in synchronism and relative to said plates in the order named, to wit, in a first right angle direction to said plates, in opposite parallel directions outwardly away from said plates, in a second right angle direction opposite to said first right angle direction, and in opposite parallel directions towards said plates, whereby to fold the cut edge portions of said workpiece positioned between the respective longer leg portions of said plates into a pair of double-folded hems, and

8. A sewing machine as claimed in claim 3, including a displaceable work feeding frame to position a workpiece supported thereby in the starting position for performing a hemming operation by said device, first switching means operable by said feeding frame in its end position, to start said motor, and further switch means operable by a further cam upon said shaft, to stop said motor upon rotation through said predetermined angle.

9. In a double-needle sewing machine including a sewing table, a stitching plate mounted therein, a pair of reciprocating needles, loop takers cooperating with said needles, and means to feed a workpiece to be operated on; a cutting and hemming device comprising in combination:

(a) a work feeding frame and clamp mounted upon said table and operable between an outwardly retracted position for the insertion of a workpiece and an operative position adjacent to said stitching plate, said plate being adapted to hold a workpiece clamped thereby,

(b) a pair of parallel oblong and stationary folding plates having inner edges facing one another, said plates being in line each with one of said needles and the work feeding direction, and said plates having a width equal to the width of the hem to be sewn upon the cut edges of said workpiece,
vice to a limit position adjoining the respective inner edges of said folding plates.

8. In a sewing machine as claimed in claim 7, said operating mechanism comprising a pair of vertical supporting arms each mounted at its upper end for both vertical and horizontal swinging movement and each carrying a hemming device at its lower end, a drive motor having a shaft, a pair of cams mounted upon said shaft having control surfaces, one of said control surfaces varying radially and the other control surface varying axially in respect to said shaft, and cam follower means upon said arms in operative engagement with said cams, said cams being designed to effect a step-by-step operation of said devices during rotation of said shaft through a predetermined angle.

References Cited by the Examiner
UNITED STATES PATENTS
2,915,997 12/1959 Seaman 112—136 X
3,192,885 7/1965 Timm 112—2

JORDAN FRANKLIN, Primary Examiner.

H. H. HUNTER, Assistant Examiner.