

June 16, 1942.

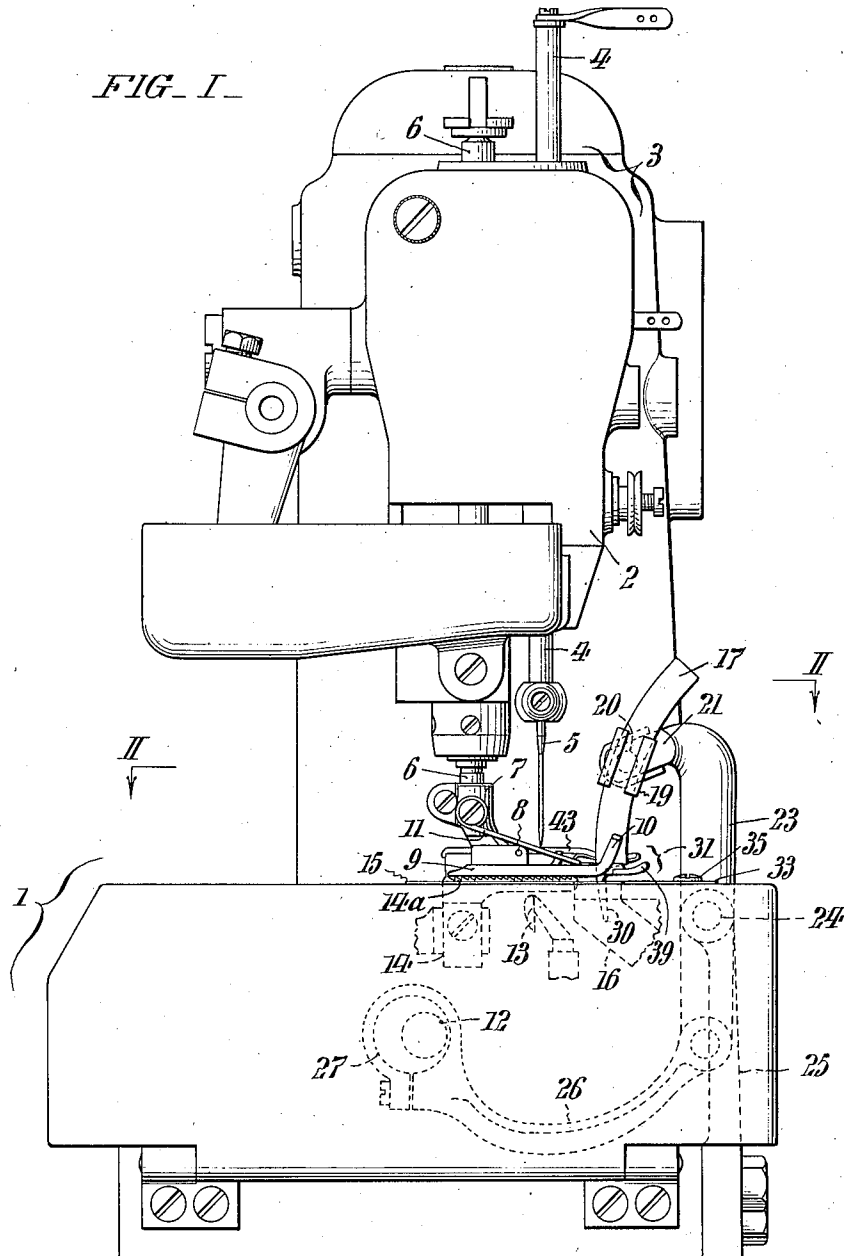
W. E. LE ROY ET AL

2,286,426

SEWING MACHINE

Filed June 27, 1939

3 Sheets-Sheet 1



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FIG. II

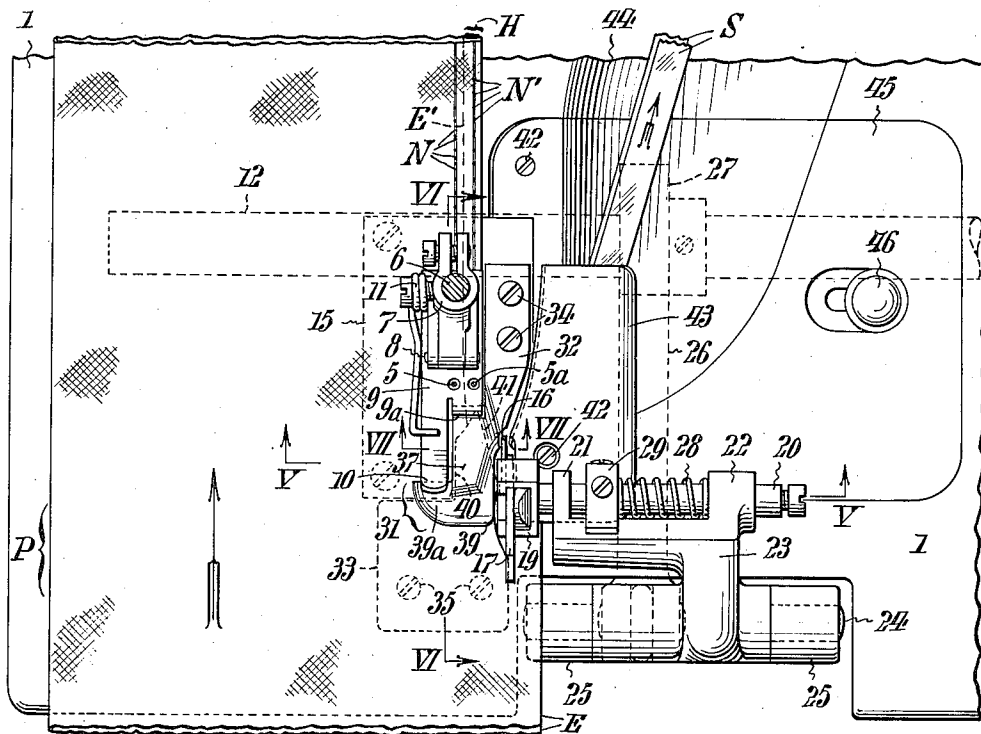


FIG. III

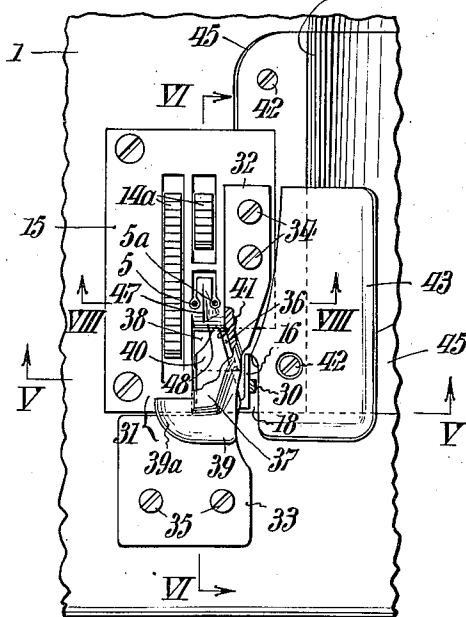
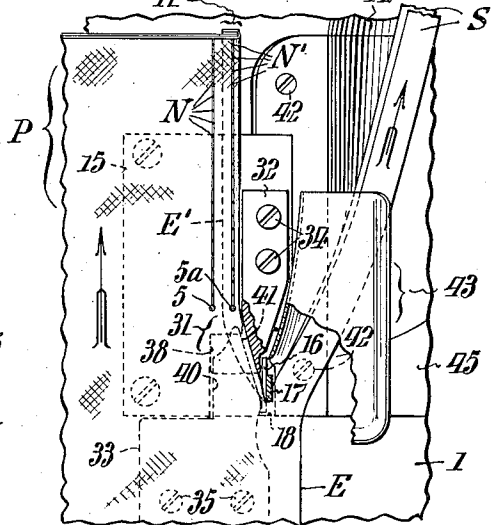


FIG. IV



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FIG. V.

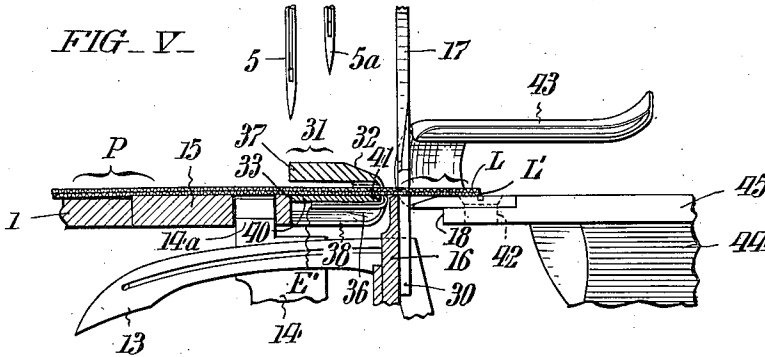


FIG. VI.

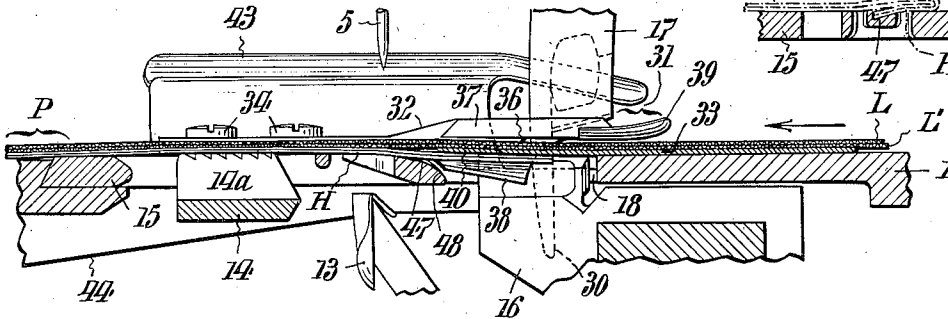


FIG. VIII.

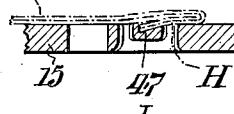


FIG. XI.

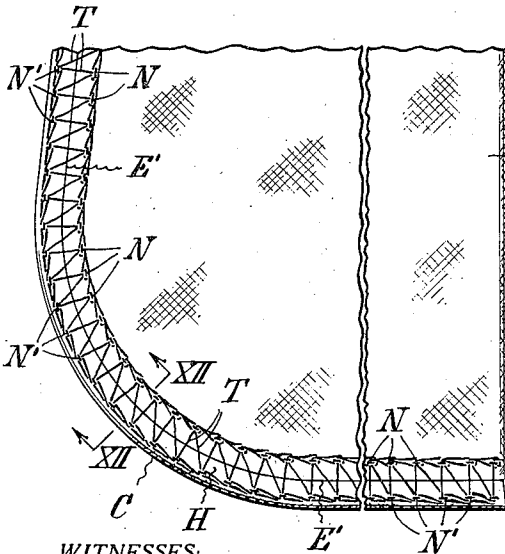


FIG. XII.

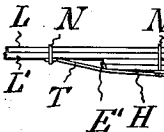


FIG. X.

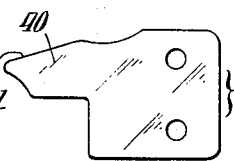


FIG. IX.

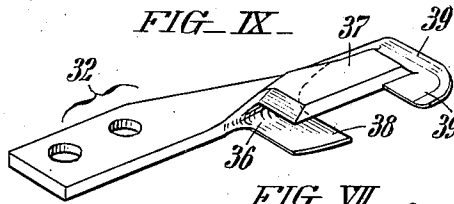
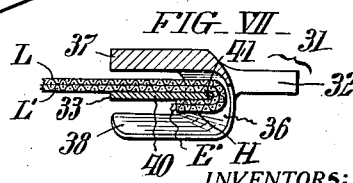


FIG. VII.



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UNITED STATES PATENT OFFICE

2,286,426

SEWING MACHINE

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Application June 27, 1939, Serial No. 281,340

9 Claims. (Cl. 112—123)

This invention relates to sewing machines, and it has reference more specifically to multiple needle cover stitch sewing machines capable of producing hemmed work.

In connection with machines of the kind referred to, we aim to make it possible, through provision of improved and suitably-arranged means such as hereinafter fully disclosed, to accurately edge trim one or more layers of fabric, and to immediately thereupon turn the trimmed edge or edges over into the form of a hem whereof the width is such as to determine its subsequent penetration by at least one of the needles in penetration of the fabric inward of the hem by at least one of the remaining needles, with the cover stitches connecting the needle thread loops crosswise over the raw cut edges of the hem to protect them against subsequent unraveling.

The machine of our invention is especially advantageous in making garment pockets by use of two layers or folds of fabric with turned or hemmed edge seams characterized as above described.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein

Fig. I is a view in end elevation of a sewing machine conveniently embodying our invention.

Fig. II is a fragmentary horizontal sectional view of the machine as approximately indicated by angled arrows II—II in Fig. I, with the work in position and being trimmed, hemmed and sewed.

Fig. III is a view generally similar to Fig. II with the work removed from the machine, and with certain parts broken away and in section to expose important structural details.

Fig. IV is in turn like Fig. III showing how the work is trimmed before being hemmed and sewed.

Fig. V is a fragmentary cross sectional view taken as indicated by the angled arrows V—V in Fig. II.

Fig. VI is a fragmentary longitudinal sectional view of the machine taken as indicated by the angled arrows VI—VI in Fig. II.

Fig. VII is a fragmentary view corresponding to Fig. V taken as indicated by the angled arrows VII—VII in Fig. II.

Fig. VIII is a fragmentary detail section taken as indicated by the angled arrows VIII—VIII in Fig. III.

Fig. IX is a perspective view of one of the component parts of the hemmer of the machine.

Fig. X is a view in top plan of another component of the hemmer.

Fig. XI is a fragmentary view of a hemmed garment pocket such as can be made with the machine; and

Fig. XII is a detail sectional view taken as indicated by the angled arrows XII—XII in Fig. XI showing the formation of the seamed edge hem of the pocket.

The sewing machine herein illustrated is generally of construction featured in U. S. Patent #2,121,526 granted to F. A. Kucera on June 21, 1938, in that it has a hollow base 1 whereof the top constitutes the work support, and a needle head 2 at the distal end (that shown in Fig. I) of its overhanging arm 3. A bar 4, guided to up and down movement in the head 2, carries at its lower end, a pair of needles 5, 5a which are spaced laterally of the direction of feeding indicated by the arrows in Figs. II and VI. Also slidably guided in the head 2 is a presser bar 6 with a shank member 7 at its lower end where to is pivotally connected at 8, a presser foot 9 which has an upwardly turned toe 10. A spring shown at 11 yieldingly resists pivotal movement of the presser foot 9 about its fulcrum 8 as the pocket material P passes beneath it. Actuated from a longitudinal shaft 12 within the hollow of the base 1 by suitable means (not shown) to cooperate with the needles 5, 5a in forming cover stitching, is a four motion thread carrying looper 13. Also actuated from the shaft 12 by suitable means (not shown), is a four motion feed dog 14 whereof the toothed portions 14a project up through slots in the throat plate 15 of the machine to coast with the presser foot 9 in advancing the pocket material P on the work support relative to the needles 5, 5a.

The machine is, moreover, equipped with a trimming mechanism including fixed and movable shear blades 16 and 17 which meet in a plane laterally of the needles 5, 5a and which in accordance with our invention are disposed well in advance of said needles with reference to the direction of feeding. As shown, the blade 16 is secured to one side of a slot 18 in the top of the base 1, with its cutting edge at the level of the work supporting surface. The movable blade 17 is adjustably secured in a slotted head 19 at one end of a shank rod 20 which is slidably engaged in spaced coaxial bearings 21 and 22 at the top of a vertically-arranged rocker arm 23. As will be noted from Figs. I and II, the rocker arm 23 is fulcrumed at 24 in a fixed bracket 25, and actuated through a strap link 26, from an

eccentric 27 on the shaft 12. A coiled spring 28 in compression between the collar 29 on the shank rod 20 and the bearing boss 22a of the yoke arm 23 yieldingly maintains the movable trimming blade 17 in shearing contact with the fixed blade 16. A tongue extension 30 of the movable blade 17 serves as a means to keep the contiguous faces of the two blades aligned when the trimmer is in open position.

Operative between the trimming blades 16 and 17 and the needles 5, 5a is a hemmer 31 comprising two fixed components 32, 33 which are longitudinally arranged in the direction of feeding, see Figs. II-IV. The component 32 is affixed to the throat plate 15 by a pair of screws 34, and the component 33 to the top of the base 1 of the machine by a pair of screws 35. As shown in Figs. VII and IX, the component 32 has a laterally-open throat 36 between vertically spaced upper and lower wing projections 37 and 38 whereof the former extends beyond the latter and has its end upwardly rounded as at 39. It is to be particularly noted from Figs. III and IV that the side wall of the recess 36 lies in a plane which is at an angle to the direction of feeding, said plane passing substantially through the meeting or shearing point of the trimming blades 16 and 17 and sloping inward toward the needles 5, 5a. The component 33 of the hemmer is in the form of a flat plate profiled as shown in Fig. X and provided with a tongue 40, which, see Figs. III, VI and VII, extends into the throat 36 of the component 32 with its side edge 41 sloped in parallel relation to the sloped wall of said throat.

Positioned to the right of the hemmer 31, as viewed in Figs. II-IV and secured to the top of the machine base 1 by screws 42, is a deflector 43 by which the trimmings S cut from the pocket material P as it passes through the machine, are directed from the trimming blades 16, 17 into a downwardly sloping lead off guide depression 44 in the top of the work support 1. As shown, the depression 44 is partly formed in a removable cover plate 45 held in place on the base 1 by a retractable latch bolt 46.

Referring again to Figs. II-IV, it is to be particularly noted that the presser foot 9 has a lateral recess at 9a, and that the portion of the component 32 of the hemmer 31 which provides the throat 36 is laterally offset to fit into said recess. It is to be further especially noted that the throat-defining projections 37 and 38 of the hemmer component 32 and the tongue 40 of the hemmer component 33 are substantially in line with the needles 5, 5a in the direction of feeding, while the extended upwardly-turned frontal portion 39 of said component is laterally extended as at 39a to underreach the upwardly turned forwardly extending toe 10 of the presser foot which is disposed laterally of the line of feeding to one side of the needle group.

The operation of the machine is as follows: The material P from which the pocket is to be formed is doubled upon itself and passed into the machine with the side edges E of the two superposed folds or layers L, L' extending slightly beyond the meeting plane of the trimming blades 16 and 17 (which are located laterally of the feeding to the side of the needle group opposite the forward toe extension 10 of the presser foot 9, and which operate upon the fabric when the latter is already within the field of influence of said extension) as shown in Figs. II and IV. As the doubled pocket blank is

intermittently advanced in the machine under the action of the feed dog 14, the edges E of the two layers L, L' are evenly trimmed by the trimming blades 16 and 17, the trimmings S being diverted by the deflector 43 into the lead off channel 44 in the top of the base 1 as already understood. Immediately upon being trimmed, the coinciding cut edges E' enter the throat 36 of the hemmer 31 and as a consequence of co-operation between the side wall of said throat (which slopes inwardly toward the needle 5a) and the tongue 40 of said hemmer, are gradually turned under as shown in Fig. VII into the form of a hem H. Due to the aforedescribed construction and arrangement of the throat 36 of the hemmer component 32 and the tongue 40 of the hemmer component 33, the hem H is so proportioned and laid that it terminates in a line E' within a vertical plane passing substantially midway between the needles 5, 5a in the direction of feeding so that the needle 5a penetrates the four thicknesses of the hem near the fold edge of the turnover, while the needle 5 penetrates only the two layers of fabric inwardly of the hem. As a consequence of cooperation of the looper 13 with the needles 5, 5a, the needle stitches N, N' (Figs. XI and XII) are connected by concatenating crosswise loops T of the looper thread which cover and protect the raw cut edges of the hem H along the line E'. The bottom of the pocket is closed as also shown in Fig. XI by continuing the hemming and stitching around the rounded corner at C and along the lower transverse edges of the folds of the blank. In doing this, the operator of the machine, of course, guides the pocket material by hand in the way ordinarily practiced in pocket making. The upturned end portion 39a operates to depress the pocket material incident to initial placement thereof in the machine, and thus facilitates its entry beneath the presser foot. As shown in Figs. III, VI and VIII, the throat plate 15 is provided in its top surface with a recess in the form of a groove 47 which extends rearward from the rounded edge portion of the plate at 48 between the needle holes to a point somewhat to the rear of the needles, said groove having one side running straight in the direction of feeding adjacent the hole for the needle 5, see Fig. III, and its bottom sloped downwardly toward that edge, see Fig. VIII. Thus, it will be further observed from Fig. VIII that a clearance is afforded for the double under-turned hem fold H of the fabric to prevent it from being pushed up as it encounters the rounded front edge portion 48 of the throat plate 15. The ability to form rounded seams with the machine of our invention is due to the aforedescribed construction of the presser foot 9 and the hemmer, as a consequence of which it is possible to bring these parts and the blades of the trimmer into closer relationship with each other and with the needles. In order to make this perfectly clear, attention is directed to the fact that the edge turning portion of the hemmer extends into the interval between the forwardly-extending toe 10 of the presser foot 7 and the blades of the trimmer as shown in Fig. II, with the inwardly sloping inner side (which reverts the fabric edge) of the trimmer terminating at the outer side of the outer needle 5a in very close proximity thereto, and with the point 41 of the element 33 extending into similarly close proximity to said needle at the front thereof. Thus in forming the rounded

seam, the fabric may be swung, so to speak, about the needle 5a as a center.

While we have herein illustrated and described our improved machine in connection with pocket sewing, it is not necessarily restricted to this field alone, since it may be used to produce other forms of hemmed work in ways which will readily suggest themselves to those skilled in the art. The machine may, moreover, be provided with needles in excess of two provided that at least one of them passes through the hem.

Having thus described our invention, we claim:

1. A sewing machine comprising reciprocating needles which are transversely spaced with regard to the direction of feeding; means for feeding fabric; means laterally of and in advance of the needles for trimming the fabric; a hemmer operative between the trimming means and the needles for turning the trimmed edge of the fabric and forming it into a hem which terminates in a plane intermediate a pair of the needles so that at least one needle penetrates the hem and another needle penetrates the fabric inward of the hem, said hemmer having a surface which underturns the fabric edge and which slopes inwardly and reaches to a point immediately adjacent the side of the outer needle of the group; and means cooperating with the needles to form concatenating thread loops which crosswise connect the needle thread loops and cover the cut edge of the hem.

2. A sewing machine comprising reciprocating needles which are transversely spaced with regard to the direction of feeding; means for feeding fabric; means laterally of and in advance of the needles for trimming the edge of the fabric; a hemmer operative between the trimming means and the needles for turning the trimmed edge of the fabric and forming it into a hem which terminates in a plane intermediate a pair of the needles so that at least one of the needles penetrates the hem and another needle penetrates the fabric inward of the hem, said hemmer including a fixed component with a laterally open throat whereof the side wall extends at an angle to the direction of feeding from the cutting point of the trimmer toward the needles, and a fixed component with a tongue which extends into the throat of the first component and has a sloped side edge substantially parallel to the side wall of said first component about which the hem is turned; and means cooperating with the needles to form concatenating thread loops which connect the needle thread loops and cover the cut edge of the hem.

3. A sewing machine comprising reciprocating needles which are transversely spaced with regard to the direction of feeding; means for feeding fabric; means laterally of and in advance of the needles for trimming the edge of the fabric; a hemmer operative between the trimming means and the needles for turning under the trimmed edge of the fabric and forming it into a hem which terminates in a plane intermediate a pair of the needles so that at least one needle penetrates the hem and another needle penetrates the fabric inward of the hem, said hemmer including a fixed component with a laterally open throat whereof the side wall extends at an angle to the direction of feeding from the cutting point of the trimming means toward the needles and whereof the top wall extends beyond the bottom wall at the receiving end and is curved upwardly for the purposes of a fabric depressing guide, and a fixed component with

a horizontal tongue extending into the throat of the first component and having a sloped edge substantially parallel to the side wall of the first component about which the hem is turned; and means cooperating with the needles to form concatenating thread loops which connect the needle thread loops and cover the cut edge of the hem.

4. A sewing machine comprising reciprocating needles which are transversely spaced with regard to the direction of feeding; means for feeding fabric; means laterally of and in advance of the needles for trimming the fabric in the direction of feeding, including coacting fixed and movable shear blades; a hemmer operative between the trimmer and the needles for turning the trimmed edge of the fabric and forming it into a hem which terminates in a plane intermediate a pair of the needles so that at least one needle penetrates the hem and another needle penetrates the fabric inward of the hem, said hemmer having a surface which underturns the fabric edge and which slopes inwardly and reaches to a point immediately adjacent the side of the outer needle of the group; and means cooperating with the needles to form concatenating thread loops which connect the needle thread loops and cover the cut edge of the hem.

5. A sewing machine comprising reciprocating needles which are transversely spaced with regard to the direction of feeding; means for feeding fabric; means laterally of and in advance of the needles for trimming the fabric in the direction of feeding, including co-acting fixed and movable shear blades; a hemmer operative between the trimmer and the needles for turning the trimmed edge of the fabric and forming it into a hem which terminates in a plane intermediate a pair of the needles so that at least one needle penetrates the hem and another needle penetrates the fabric inward of the hem, said hemmer including a fixed component with a laterally open throat whereof the side wall extends at an angle to the direction of feeding from the region of the cutting point of the trimming blades toward the needles, and a fixed component which extends into the throat of the first component and has a sloped edge substantially parallel to the side wall of the first component about which edge the hem is turned; and means cooperating with the needles to form concatenating thread loops which connect the needle thread loops and cover the cut edge of the hem.

6. A sewing machine comprising a plurality of reciprocating needles transversely spaced with regard to the direction of feeding; means for feeding the fabric; means laterally of and in advance of the needles for trimming the fabric; a hemmer operative between the trimming means and the needles for turning under the trimmed edge of the fabric and forming it into a hem which terminates intermediate a pair of the needles so that at least one of the needles penetrates the hem and another needle penetrates the fabric inward of the hem; a throat plate having a rounded forward edge portion in advance of the needles and a groove in its top extending rearward in the direction of feeding from said rounded edge between the aforesaid pair of needles to a point to the rear of the needles whereby a clearance is provided for passage of the under-turned hem fold; and means cooperating with the needles to form concatenating thread loops which crosswise connect the needle

thread loops and cover the cut edge of the hem.

7. A sewing machine comprising a plurality of reciprocating needles transversely spaced with regard to the direction of feeding; means for feeding the fabric; means laterally of and in advance of the needles for trimming the fabric; a hemmer operative between the trimming means and the needles for turning under the trimmed edge of the fabric and forming it into a hem which terminates intermediate a pair of the needles so that at least one of the needles penetrates the hem and another needle penetrates the fabric inward of the hem; a throat plate having a rounded forward edge portion in advance of the needles and a groove in its top extending rearward in the direction of feeding from said rounded edge between the aforesaid pair of needles to a point to the rear of the needles, one side of the groove being straight in the direction of feed immediately adjacent the innermost needle of the pair and its bottom being sloped downward laterally toward said edge, whereby a clearance is provided for passage of the under-turned hem fold; and means cooperating with the needles to form concatenating thread loops which crosswise connect the needle thread loops and cover the cut edge of the hem.

8. A sewing machine comprising a pair of reciprocating needles which are spaced transversely of the direction of feeding; means for feeding fabric; a presser foot with a forwardly extending portion disposed laterally to one side

of the needle group with regard to the direction of feeding; trimming means located within the field of influence of the forwardly extending portion of the presser foot and disposed laterally to the opposite side of the needle group with regard to the direction of feeding; and a hemmer which reaches into the interval between the forwardly extending portion of the presser foot and the trimming means, for retroverting the edge of the fabric immediately after it is trimmed and before it reaches the needles.

9. A sewing machine comprising a group of reciprocating needles arranged transversely of the direction of feeding; means for feeding fabric; a presser foot with a main portion, and a portion which extends forwardly of said main portion to one side of the needle group with respect to the direction of feeding; trimming means located within the field of influence of the forwardly extended portion of the presser foot and disposed at the opposite side of the needle group; and a fixedly-supported hemmer for retroverting the edge of the fabric immediately after it is trimmed and before it reaches the needles, said hemmer being positioned ahead of the needles in the interval between the extended portion of the presser foot and the trimming means, and reaching to the main portion of said foot.

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