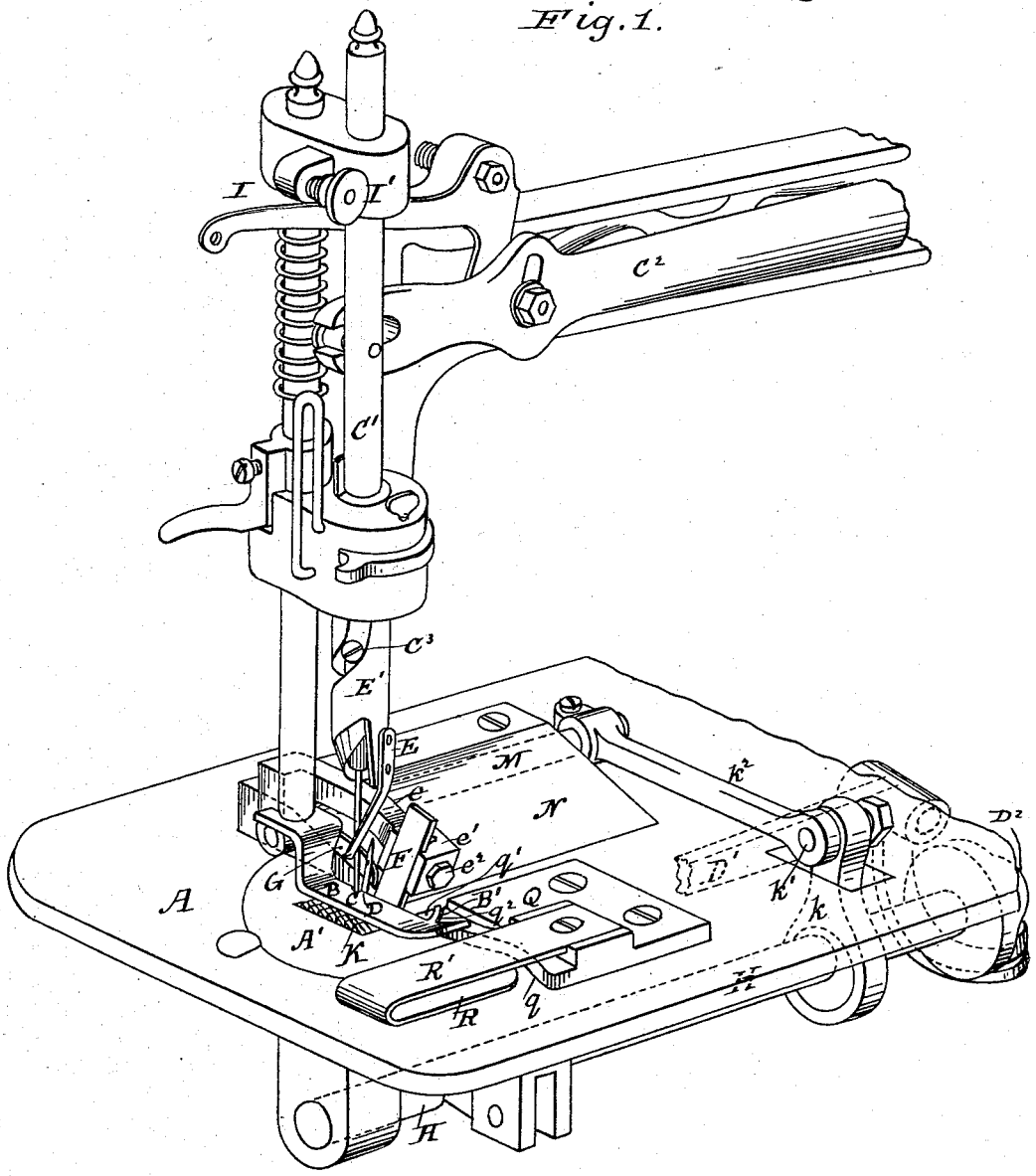
(No Model.) 3 Sheets—Sheet 1.

C. H. WILLCOX.

MACHINE FOR FORMING WELTS OR HEMS ON FABRICS.

No. 263,641. Patented Aug. 29, 1882.

Fig. 1.



Witnesses:

E. E. Masson

Philip Adams

Inventor:

Charles H. Willcox

by A. Pollok

his attorney

(No Model.) 3 Sheets—Sheet 2.

C. H. WILLCOX.

MACHINE FOR FORMING WELTS OR HEMS ON FABRICS.

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Fig. 3.

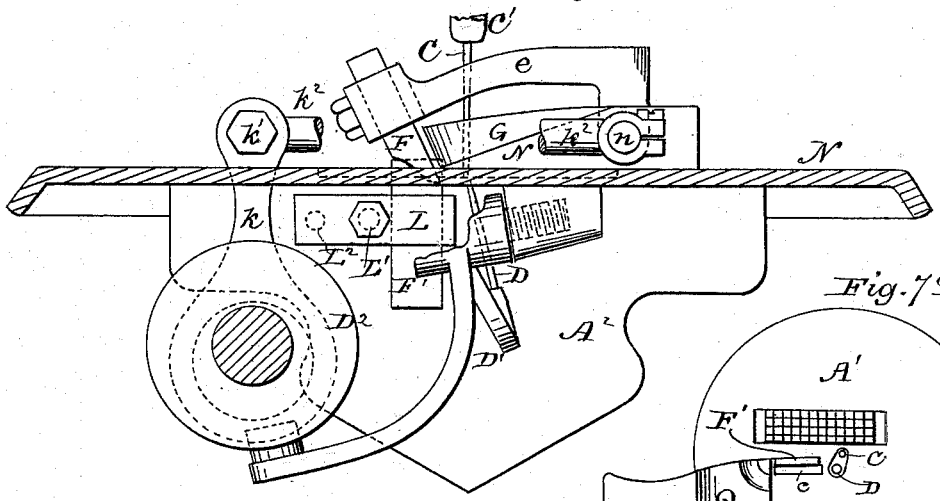


Fig. 7ª.

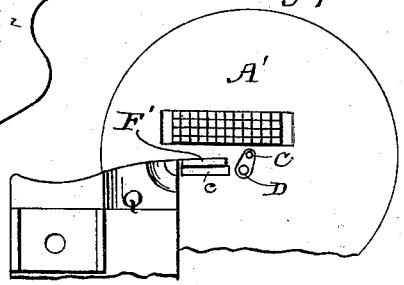
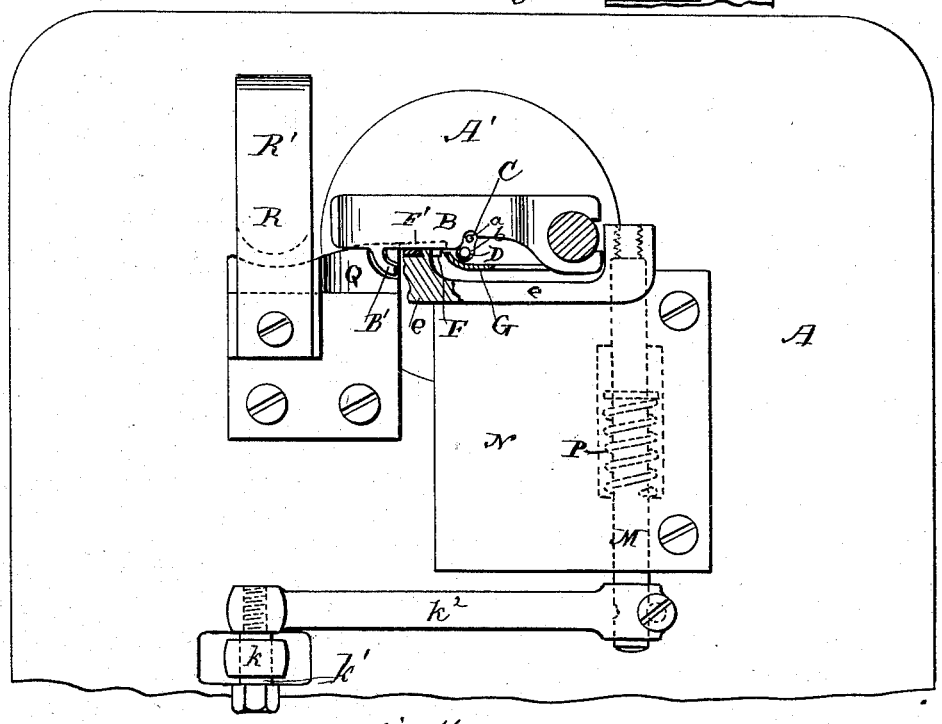


Fig. 2.

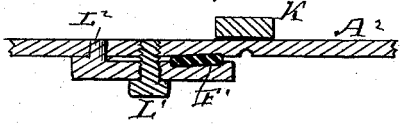


Witnesses.

E. E. Masson

Philip Williams

Fig. 7.



Inventor:

Charles H. Willcox

by A. Pollok

his attorney

(No Model.) 3 Sheets—Sheet 3.

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MACHINE FOR FORMING WELTS OR HEMS ON FABRICS.

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Fig. 4.

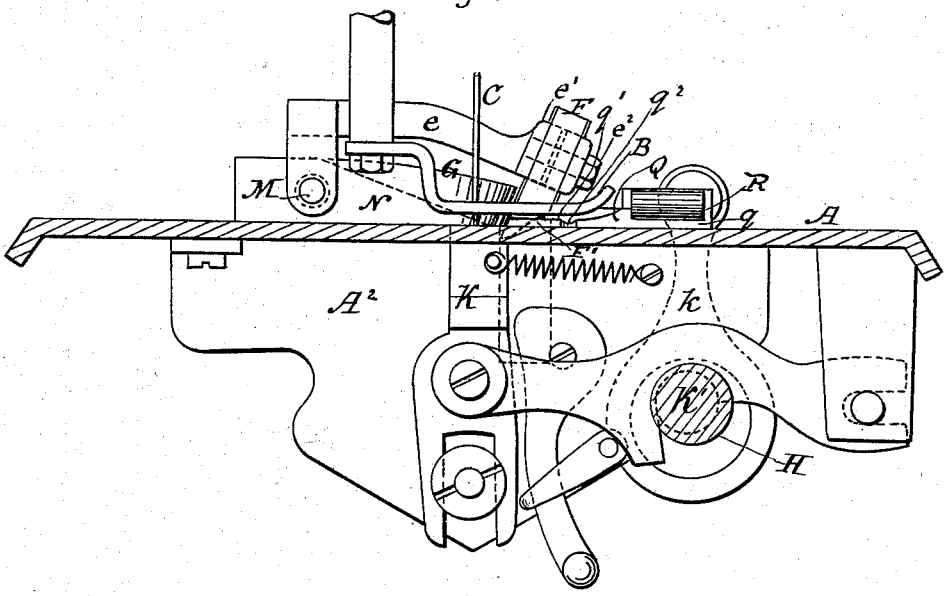


Fig. 5.

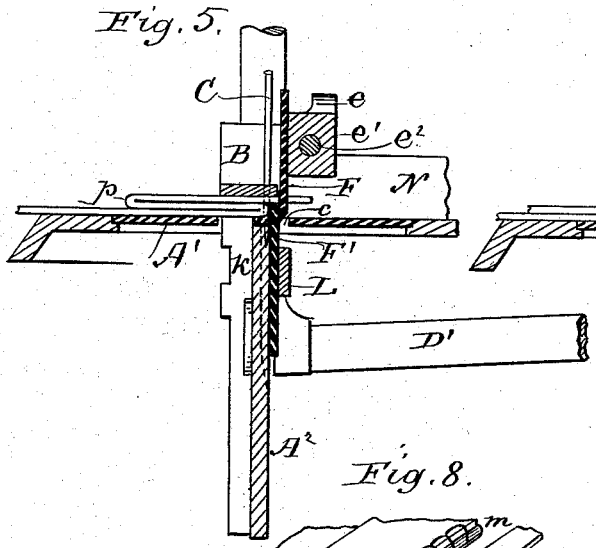


Fig. 6.

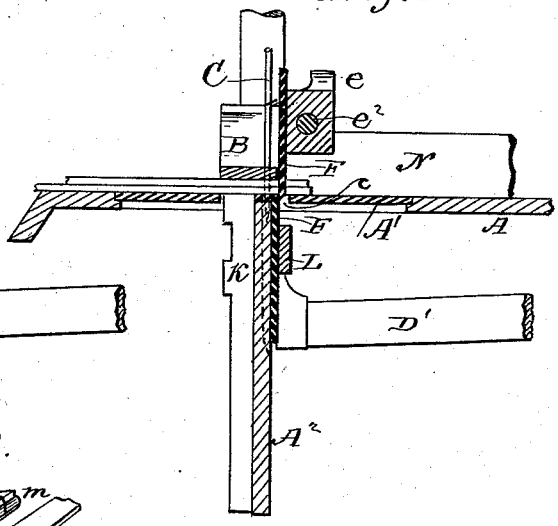


Fig. 8.

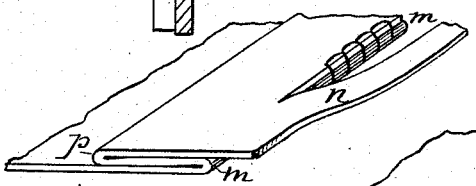
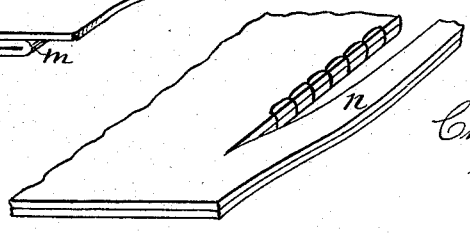


Fig. 9.



Witnesses:
E. E. Masson
Philip Mauro

Inventor:
Charles H. Willcox
by A. Pollok
his attorney

UNITED STATES PATENT OFFICE.

CHARLES H. WILLCOX, OF NEW YORK, N. Y.

MACHINE FOR FORMING WELTS OR HEMS ON FABRICS.

SPECIFICATION forming part of Letters Patent No. 263,641, dated August 29, 1882.

Application filed July 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WILLCOX, of New York city, in the county and State of New York, have invented a new and useful Improvement in Machines for Forming Welts or Hems on Knit Goods and other Fabrics, which improvement is fully set forth in the following specification.

This invention has reference more particularly to a welting or hemming guide or system of welting and hemming guides for use in connection with a combined trimming and overseam sewing-machine; but it also comprises certain modifications in the trimming mechanism itself, whereby its operation is improved as well generally as with respect to the formation of the welt or hem.

The welting or hemming guides generally are like those described in Letters Patent Nos. 255,576 and 255,580, granted to the assignee of S. Borton and myself on the 28th day of March, 1882—that is to say, they are designed for use in making a hem or welt invisible or but little apparent on the right side of the fabric, and are adapted to guide the folded fabric to the sewing and trimming mechanism, so that the needle passes through the layer turned over to form the hem or welt and through the fold or doubled portion of the goods, allowing the margin of the turned-over layer to project into the path of the trimmer. Being applied, however, to an overseam sewing-machine with trimming mechanism acting in advance of sewing, modifications of the guides and a reorganization of the apparatus generally are made in order that the said guides and trimming mechanism may properly co-operate with each other and with the overseam sewing mechanism.

An important new feature in the new machine or combination of trimming, guiding, and overseam sewing mechanism is a guiding surface or edge for the folded edge of the fabric alongside of the cutting portion of the trimmer, between the line of trimming and the line of the needle-punctures. This guiding surface or edge may be formed on a device or edge-guide supported from above, being formed on or applied to the presser-foot or presser-bar of the sewing-machine, or from below, being attached to or formed on the bed-plate or the machine-frame. When the edge-guide is supported from above the fold in the fabric lies uppermost; when from below the fold is beneath. Preferably it is supported from beneath, and consists of a projecting portion of the stationary blade or cutter forming part of the trimming attachment. It is so shown herein, the said blade or cutter being made vertically adjustable to adapt it to goods of different thickness, and the presser-foot being arranged to clamp the fabric on top of the cutter.

In an application of even date herewith, numbered 66,381, the guide is shown as supported from above and formed of a device separate from the trimming mechanism.

With the edge-guide arranged as above indicated is combined an overhanging guide, adapted to enter the folded fabric and to control or determine the depth of the welt or hem.

The trimming mechanism preferably employed is a shear-trimmer embodying improvements described in Letters Patent No. 255,578, granted to the assignee of S. Borton and myself March 28, 1882, the said mechanism being modified to adapt it for operation in connection with overseaming mechanism.

The vibratory blade is carried by a rock-shaft back of the needle, being connected with said shaft by means of an arm extending past the needle and bent so as to be clear of the overseaming device. The said rock-shaft has a slight endwise movement and is combined with a spring adapted to hold in contact the edges of the two blades or cutters. The rock-shaft is so disposed that the trimmed-off portion or strip passes over it, and the diverting-guide which wards the said portion or strip from the overseaming device is extended, so as to prevent it becoming entangled with the arm which carries the vibratory cutter or blade.

The two cutters are held in place by clamps which can readily be released to allow the said blades to be removed for guiding or other purposes, or to be adjusted.

The accompanying drawings, which form a part of this specification, represent the trimming mechanism and the welting or hemming guides, in connection with the principal parts of an overseaming sewing-machine, sufficient

to illustrate the application of the trimmer and guides thereto.

Figure 1 is a perspective view; Fig. 2, a plan partly in horizontal section; Figs. 3 and 4, views in section in vertical planes parallel with the feed-movement, on opposite sides of the needle and in elevation, looking in opposite directions; Figs. 5 and 6, sections in vertical planes at right angles to the feed-movement; Figs. 7 and 7ª, detail views; and Figs. 8 and 9, perspective views, illustrating the sewing and trimming of fabric. Figs. 1 to 5 show the machine arranged for welting or hemming, and Fig. 8 the welt or hem in process of formation, while Fig. 6 shows the machine as arranged to make a plain seam, such as illustrated in Fig. 9.

The machine shown is known as the "American button-hole and overseam sewing-machine," and is in common use.

A is the cloth-plate or work-plate of the sewing-machine; B, the presser-foot; C, the needle; C′, the needle-bar; D E, overseaming devices, operating conjointly with the needle to form the stitches; F, a vibratory cutter or cutting-blade; F′, a stationary blade or cutter; G, a shield or guide for diverting the trimmed-off portion to prevent its interference with the operating mechanism; H, the main shaft of the machine; I, the take-up; I′, a tension, and K the feed-bar. The needle-bar is operated from a cam (not shown) on the shaft through a lever, C^2. The overseaming device E is carried by a sleeve, E′, journaled in the head of the machine, and is vibrated horizontally at each reciprocation of the needle-bar by a pin, C^3, working in the slot in said sleeve. The overseaming device D is carried by a lever, D′, and is operated by the cam D^2 on the shaft H.

The feed-bar K is given the ordinary four motions by an eccentric, K′, on the same shaft. The take-up I is operated by the lever C^2. As these parts and the other elements of the sewing-machine are of ordinary and well-known construction, and form in themselves no part of this invention, being shown simply by way of example of an overseam sewing-machine, it is unnecessary here to give a detailed description of their construction and operation. It may be well, however, briefly to indicate the operation of forming a stitch as follows: Two threads are used—an upper thread, which is led from the spool through the tension and take-up and eye of the needle, and an under thread, which is led from a spool through a tension and the eye in the end of the device D. The needle passes a loop of the upper thread through the fabric. The device D passes a loop of the under thread through the first-named loop and up past the edge of the fabric. The device E catches the loop of the under thread and spreads it in the path of the needle, which carries the next loop of the upper thread through it. Thus the loops in the upper thread are locked below the fabric by loops in the under thread, which extend around the edge of the fabric, and are themselves locked above the fabric each by the next succeeding loop of the upper thread.

The throat-plate A′ is pierced at *a* for the passage of the needle, and at *b* for the passage of the device D.

The trimming attachment comprises an upper vibratory blade or cutter, F, and a lower stationary blade or cutter, F′, the latter being adapted to serve also as an edge-guide for welting or hemming, or for other purposes. Both blades or cutters are in front of the stitching mechanism. The stationary blade F′ fits in a groove in the clamp-plate L, and is secured in position between said plate and the plate A^2, forming part of the machine-frame. The clamp-plate is attached to the plate A^2 by a screw, L′, and a steady-pin, L^2, the screw exerting the necessary pressure to hold the blade or cutter F′. By loosening the screw the said cutter may be set up or down, or can be removed for sharpening or other purpose. The right-hand edge, Figs. 5 and 6, or edge farthest from the needle, is the cutting-edge. The vibratory blade or cutter F is carried by an arm, *e*, attached to the end of the rock-shaft M, which is journaled in bearings in the frame N, and is operated from an eccentric on the shaft H through the link *k*, pin *k*′, and arm k^2. This rock-shaft is capable of a slight endwise movement, and is combined with a spring, P, which tends to move it in the direction required for holding the edges of the two cutters or blades in contact. These cutting-edges are preferably made slightly oblique to each other, so as to give a lateral movement to the vibratory cutter at each stroke. This obliquity could be secured by setting the upper blade at an angle to the line of feed; but, as shown, it is accomplished by setting the stationary blade slightly oblique. (See Figs. 2 and 7.) The blade or cutter F consists of a flat plate ground at the end, so as to leave a cutting-edge at one side, and is secured to the arm *e*, preferably in an inclined position, (as in Figs. 1, 3, and 4,) so as to clear other parts of the machine. It fits in a dovetail groove in the split head *e*′ of arm *e*, and is clamped by the screw e^2, acting to draw together the sides of the head. By loosening the screw it can be adjusted vertically, or can be removed for sharpening or other purposes. The arm *e* (see Figs. 1, 2, 3, 4) is fixed on the projecting end of the rock-shaft, behind the presser-foot, and is bent both vertically and laterally, so as to extend over a portion of the frame N, and to clear or be out of the way of the overseaming devices. The frame N is inclined in front, so that the trimmed-off portion of the fabric will readily pass up the incline and over the rock-shaft. The presser-foot in front of the needle is of sufficient width to extend over the top of the stationary cutter, so as to clamp the fabric thereon. It is provided with a lateral finger, B′, which bears on the fabric beyond the

line of trimming, and acts to uncurl and flatten out the edge to be trimmed off. It is useful mainly in sewing cut knit goods, the edges of which have a tendency to curl. The curl, if not taken out, would interfere with the trimming and overseam-sewing operations.

The shield or diverting-guide G has its forward end behind the cutter or blade F, and extends past the overseaming mechanism and along the edge of frame N until near the top of the frame. It diverts the trimmed-off portion, not only from the overseaming mechanism but also from the upright portion of the arm *e*, and prevents said portion from slipping over the end of frame N. The upper or vibratory blade should be so adjusted that the heel or rear part thereof will, when the cutter is at its highest elevation, extend below the top of the stationary blade or cutter and interpose itself between the trimmed-off portion and the body of the goods and never uncover the front end of the diverting-guide G. At *c* is an opening in the throat-plate to allow the upper blade to pass through.

The apparatus, as thus far described, constitutes a very efficient combined trimming and overseam sewing-machine. By setting down the stationary blade F′ so that its top is flush with the upper surface of the cloth or throat plate, and properly adjusting the upper blade in the head *e′*, it may be used for uniting two or more layers by an overseam, and for trimming off the surplus material from both or all of said layers, as shown in Figs. 6 and 9.

In order that the stationary blade may serve as an edge-guide it is made to project above the cloth-plate or throat-plate. The left face of this projecting portion constitutes the guiding surface or edge, which therefore lies alongside the cutting portion of the trimmer—that is to say, it lies at the side of said cutting portion, so that a plane perpendicular to the line of feed passes through both. The disposition of the stationary blade is such that the guiding face or surface is in the line of seam and between the line of trimming and the line of needle-punctures. For making a welt or hem, such as shown in Fig. 8, the projecting portion should equal two thicknesses of the fabric, so that it will form a perfect guide for the folded edge, while the third layer, or layer to be trimmed, may extend over the top across the cutting-edge, as shown in Fig. 5. By setting the blade up or down the guiding-edge (formed by the side of the projecting portion) can be given the depth required for welting different thicknesses of fabric.

It has been found advantageous in welting or hemming to have the guiding-edge for the folded material slightly oblique to the line of feed. By using as the stationary blade a flat plate with parallel edges and setting it slightly oblique to the line of feed, as before explained, and as shown in Figs. 2 and 7, this advantage, together with the advantage of an oblique cutting-edge, is secured.

In connection with the edge-guide formed by the stationary blade or cutter an additional edge-guide, Q, and an overhanging-guide, R, adapted to enter the fold in the fabric, are employed. The guide Q is so secured in position on the cloth-plate that the stationary cutter or blade forms a continuation thereof. In front of the presser-foot the guide Q has a raised or thickened portion, *q*, but opposite the toe of the presser-foot the upper surface is cut away (preferably on the curve of said toe) and descends, leaving in front of the stationary blade or cutter a portion, *q′*, equal in thickness to the projecting portion of said blade or cutter. In this thinner portion, beneath the finger B′, is a groove, q^2, into which the said finger may press the fabric in order to assist in taking out the curl. This groove may be omitted, or the finger B′ may be made to extend below the bottom surface of the presser-foot, so as to sink farther into the groove, and thus operate more effectually.

The overhanging guide forms part of the bent strip R′, that is secured to the guide Q a short distance from its edge. The outer end of the overhanging guide R is preferably curved in a horizontal plane, and is brought into line with the guiding-face of the blade or cutter F′, and the portion *q* of the guide Q is cut away opposite this point to allow seams or thick portions of the goods to pass without difficulty.

The operation will be readily understood. For hemming or welting the fabric is folded as in Figs. 5 and 8, and is introduced under the presser-foot B, with the folded edge *m* against the guiding-face of the stationary blade or cutter F′ and against the edge of guide Q, and the free edge *n* extends over into the path of the trimmer. The folded portion of the goods is inserted above the guide R, with the folded edge *p* in contact with the bend in the strip R′ and the end of the guide R against the inner surface of the fold *m*. The machine being started, the guides automatically direct the fabric to the trimmer, which removes the surplus margin *n*, and to the stitching mechanism, which unites the upper layer to the fold *m*, the needle passing through the fold, so that the stitches will not show, or will be but little apparent on the right side of the fabric.

For plain sewing the guides Q R are removed, the blade F′ is set down, the upper blade is adjusted, if required, and the two or more layers of fabric to be united are introduced under the presser-foot. The machine being started, the free edges *n*, that project into the path of the trimmer, are removed, leaving the proper width of margin for the overseaming mechanism to operate on.

If it is desired to unite two layers of fabric and to trim one only, it is obvious that the stationary blade could be caused to project sufficiently to serve as a guide for the uncut edge; or, if it is not desired to trim the fabric at all, it could be made to guide both edges. It might or might not be desirable in such cases

to remove the guide R, or both it and the guide Q.

If it should be desirable to have a line of trimming closer to or farther from the line of needle-punctures, this can be secured by using as the stationary blade plates of various thicknesses, the arrangement of the rock-shaft permitting the necessary lateral adjustment of the vibratory blade or cutter.

Modifications may be made in the details of construction without departing from the spirit of the invention, and parts thereof may be used separately. For example, the stationary blade is made to serve as an edge-guide, but a similar plate not adapted to serve as a cutter could be used, an additional plate for a cutter being employed if a shear-trimmer is desired, and the vibratory blade working between the two plates. A thin extension of the guide Q might be made to project rearward between the line of trimming and the line of needle-punctures. The welting or hemming guides could be used in connection with other than shear-trimmers—for example, with knife-trimmers having only one cutter, or with any known or suitable form of trimmer. The improvements in the trimmer could be used without the guides.

When the terms "edge-guide having a guiding edge or surface in front of the stitching mechanism" are employed, or when the terms "blade, plate, or cutter" are used with a similar limitation, it is to be understood that the guiding edge or surface is at least partly in front of said mechanism, and not that it is of necessity wholly in front of the same.

Having now fully described my said invention and the manner of carrying the same into effect, what I claim is—

1. A machine for forming welts or hems on knit goods and other fabrics, comprising, in combination with overseam sewing mechanism, trimming and guiding devices, substantially as described, said devices comprising a blade or cutter operating in advance of the overseaming mechanism and in the line of seam, and a guiding surface or edge arranged also in the line of seam and between the line of trimming and the line of needle-punctures, as set forth.

2. In a combined sewing and trimming machine, a vertically-adjustable plate arranged in front of the stitching mechanism and adapted to form an edge-guide, with guiding-surface between the line of trimming and the line of needle-punctures, substantially as described.

3. In a combined sewing and trimming machine, a projecting device adapted to form an edge-guide, and arranged with its guiding-surface between the line of trimming and the line of needle-punctures, in combination with a presser-foot extending over said device, so as to clamp thereon the overlying fabric, substantially as described.

4. The combination, with sewing mechanism, of trimming devices and guiding means, the latter comprising a guiding-surface extending alongside the cutting portion of the trimmer, between the line of trimming and the line of needle-punctures, and also an overhanging guide adapted to furnish a guiding-edge for the inner surface of a fold, substantially as described.

5. In combination with a sewing-machine, a vertically-adjustable edge-guide arranged to have a guiding surface or edge in front of the stitching mechanism, and supported from below, so as to project more or less above the cloth or throat plate, according to the adjustment, substantially as described.

6. The combination of the overseam sewing mechanism, the stationary blade or cutter, formed of a thin plate adapted to serve as an edge-guide and arranged in the line of seam, and the co-operating cutter or blade arranged on the opposite side of the stationary cutter from the guiding-surface, substantially as described.

7. The combination of the overseam sewing mechanism, the uncurling device, and the trimmer interposed between said device and the overseaming mechanism, substantially as described.

8. The combination, with a guide, of a blade or cutter arranged to form a continuation of said guide, substantially as described.

9. The combination of the overhanging guide, the edge-guide, the stationary blade or cutter, forming a continuation of said edge-guide, and the co-operating vibratory cutter, substantially as described.

10. In an overseam sewing and trimming machine, the combination of the rock-shaft, supported back of the stitching mechanism, the vibratory cutter or blade in front of said mechanism, and the connecting-arm, bent so as to clear the overseaming device, substantially as described.

11. The overseam sewing-machine and a trimmer arranged to act in advance of the stitching mechanism, and comprising a shaft disposed so that the trimmed-off portion or strip may pass over said shaft, in combination with a diverting-guide for warding the said trimmed-off portion or strip away from the stitching mechanism, and for assisting its passage over the said shaft, substantially as described.

12. The vertically-adjustable edge-guide for a sewing-machine, having its guiding edge or face oblique to the line of feed, substantially as described.

13. A welting or hemming machine comprising, in combination with sewing mechanism and a trimmer arranged to act in advance of said mechanism, an overhanging guide adapted to enter a fold and to determine or control the width of a welt or hem, and a folded-edge guide having its guiding-edge continued alongside of the cutting portion of the trimmer, substantially as described.

14. In a combined sewing and trimming

machine, the combination of a movable cutter or blade, a vertically-adjustable stationary cutter or blade arranged on the same side of the movable cutter as the needle of the sewing-machine, and a presser-foot projecting over the top of said stationary blade or cutter and adapted to clamp thereon the overlying fabric, substantially as described.

15. The method of forming overseamed welts or hems on knit goods and other fabrics by folding the fabric, as explained, trimming the surplus margin, automatically guiding the folded fabric past the trimming devices to the overseaming mechanism, and uniting the trimmed layer to the body of the fabric by stitches extending through and around the cut edge of said layer, and also through and around the fold in the body of the fabric, substantially as described.

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

CHAS. H. WILLCOX.

Witnesses:
PHILIP MAURO,
E. E. MASSON.