Aug. 13, 1935. H. McK. CARMICHAEL ET AL 2,011,512

METHOD OF BINDING THE EDGES OF KNITTED FABRICS

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Fig. 1.

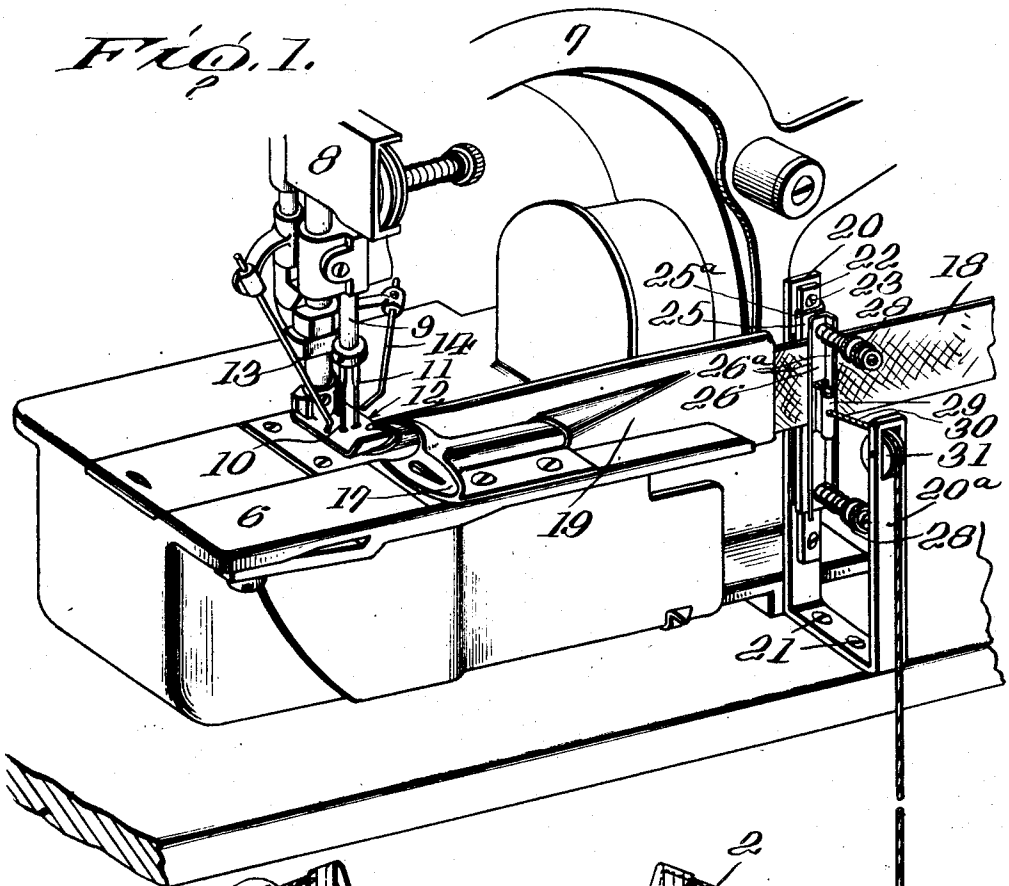


Fig. 2.

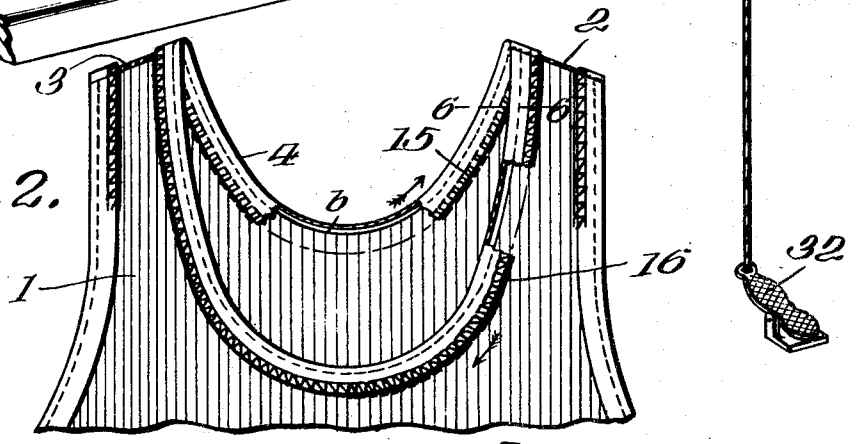
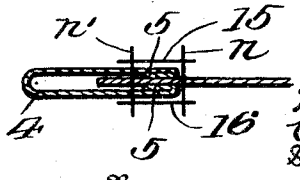


Fig. 3.



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METHOD OF BINDING THE EDGES OF KNITTED FABRICS

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1 Claim. (Cl. 112—262)

The invention relates to new and useful improvements in a method for applying a binding strip to the curved cut edge of a knitted fabric. In making knitted undergarments, it is a common expedient to form a tubular knitted blank, and to cut and shape the blank to form the neck portion and armholes of the garment. The wales of the fabric extend lengthwise of the blank and of the finished garment. The cut edge forming the neck portion extends in part lengthwise of the wales and in part crosswise of the wales, and is curved therebetween. The same is true of the armholes. The present invention has to do with the applying of a knitted binding strip to a cut edge of a knitted fabric which extends in part lengthwise of the wale and in part crosswise of the wale.

An object of the invention is to provide a method whereby a binding strip may be stitched to the curved cut edge of a knitted fabric without distorting the cut edge or unduly stretching the same when crossing the wales.

In the drawing—

Figure 1 is a perspective view showing a sewing machine to which the tension device has been applied for applying tension to the binding strip as it is being stitched to the body fabric;

Fig. 2 is a view showing more or less diagrammatically a portion of a garment with the binding strip attached thereto,

Fig. 3 is a sectional view on the line 6—6 of Fig. 2.

In Fig. 2, a portion of an undergarment is shown, which undergarment includes a body portion 1 formed from a tubular knit blank, the wales of which extend lengthwise of the blank and the garment and are indicated in general by the broken lines in this figure. This blank is cut to form the neck opening. The front portion of the neck opening is formed by a line extending from the shoulder seam 2 to the shoulder seam 3 and a portion of the cut edge is indicated at *a*. The rear portion of the blank is cut on a curved line of a shorter radius, and a portion of the cut edge is indicated at *b*. Both of these cut edges extend in a direction lengthwise of the wales at the shoulder seam, and in a direction crosswise of the wales at the center of the garment. The cut edges are curved so as to give a proper shaped neck opening. The portions of the garment at one of the shoulder seams are joined, and then the cut edge forming the neck opening is enclosed within the binding strip indicated at 4. The binding strip preferably extends from one shoulder seam all the way around the neck opening, front and back, to the same shoulder seam. As shown in the drawing, the binding of the neck opening began at the shoulder seam 2.

The binding strip is also formed from a knitted fabric the wales of which extend lengthwise of the binding strip. The edges are inturned as indicated at 5, 5, and the binding strip is secured to the body fabric by a stitching mechanism which, as shown in the drawing, forms a covering stitch for both edges of the binding. While other forms of stitching may be used, this covering stitch is preferable, as it not only firmly joins the binding to the body fabric, but gives an ornamental effect to the garment. The stitch is produced by a two-needle machine having a cover thread laying mechanism for laying a thread which joins the two lines of stitching on one face of the fabric, and the needle thread loops are joined by a looper thread which covers the other edge of the binding strip. This is a common form of cover stitch forming mechanism.

The binding strip is passed through a binder preferably of the type wherein the fabric edges are folded and then the strip is inverted so as to bring the folded edges between the strip and the body fabric. This binder is of a character so that the binding strip will be guided therethrough with little resulting or stretching tension on the binding strip. At the receiving end of the binder is a tension device including tension plates between which the binding strip passes. There is a spring means for yieldingly moving the plates against the strip and a manually controlled means for separating the plates so as to free the strip from all tension.

The binding strip, when being stitched to the body fabric by a feed of the strip and the body fabric in a direction lengthwise of the wales, is substantially free from all tension. When, however, the binding strip is being stitched to the body fabric at a portion thereof crossing the wales, a tension or drag is placed on the strip, so that the feed of the machine will stretch the strip to a certain extent. The knitted binding strip with the wales extending lengthwise thereof has a certain amount of elasticity, so that the application of a tension to the strip will stretch it. The feed of the fabric, when extending lengthwise of the wales will lay the fabric smoothly without stretching the same. When, however, the feed extends crosswise of the wales, or approximately in a crosswise direction, the handling of the fabric, together with the feed, necessarily stretches the fabric, this distorting or separating the normal lay of the wales at the cut

edge. Inasmuch as the binding strip is also stretched at this time, when the binding strip passes from beneath the presser foot, after it is stitched to the body fabric, it will return to its normal unstretched condition, and this will likewise restore the cut edge of the fabric sections to their normal condition with the wales parallel all the way to the cut edge. In other words, the binding strip and the edge of the fabric are both stretched to substantially the same degree during stitching.

In the drawing, an apparatus has been shown more or less diagrammatically, which may be used in carrying out the method. The sewing machine used includes a work support 6, an overhanging arm 7 carrying a needle head 8 in which the needle bar 9 reciprocates. Said needle bar carries two needles 10 and 11. The material is held on the work support by a presser foot 12 and is fed across the work support by a feeding mechanism including a feed dog cooperating with the presser foot 12. Cooperating with the needles above the work support is a thread laying mechanism which includes a thread guide 13 and a cooperating thread hook 14. This lays the thread in loop form so that it is secured by the needle threads and thus forms a covering for the upper edge of the binding strip. The upper covering threads are indicated diagrammatically in Fig. 6 at 15. Cooperating with the needles beneath the work support is a looper, the thread of which joins the needle thread loops and thus forms a covering for the lower edge of the binding strip which is indicated diagrammatically at 16 in Fig. 6. The needle threads are indicated at n and n'. The cut edge of the fabric to which the binding is to be applied is guided beneath the presser foot by a guiding member 17. The binding strip which is indicated at 18 passes through a binder 19 which is of the usual type.

The binder is provided with means for folding the edges of the binding strip and inverting the strip as it passes from the binder beneath the presser foot. This brings the inturned edges 5, 5 between the body portion of the binding strip and the body fabric. Before the binding strip passes into the binder, it passes through a tension device. This tension device, as illustrated in the drawing, is in the form of a bracket 20 which is secured to the machine by suitable screws 21, 21. Attached to the bracket 20 is a plate 22. Said plate is secured to the bracket by screws 23, 23. Rigidly supported by this plate 22 are two tension posts 24, 24 which are widely spaced from each other. Mounted on the tension posts is a tension plate 25. Said tension plate is freely mounted on the posts and is provided with a central portion contacting with the plate 22. It is also provided with winged portions 25a, 25a, which are inclined away from the front plane of the tension plate. Also mounted on the posts 24, 24 is a tension plate 26 having winged portions 26a, 26a inclining in the opposite direction from the central portion thereof. The binding strip 18 passes between these tension plates in the region between the posts 24, 24. There is a spring 27 on each post and an adjustable nut 28 which serves as an abutment for the spring and which may be shifted so as to vary the tension of the spring. The springs 27 bear continuously against the tension plate 26 and are normally tending to force said plate toward and into contact with the tension plate 25. The binding strip is gripped between these plates. In order to release the tension on the strip, the plate 26 is forcibly moved away from the strip by means of a tension releasing mechanism. Attached to the tension plate 26 is a metal bracket 29. A flexible cord 30 is attached to this bracket and runs over a roller 31 carried by the arm 20a of the bracket 20. The flexible cord, as shown in Fig. 1, is attached to a treadle 32. When the treadle is depressed, the tension plate may be moved away from the strip so as to relieve the strip from all tension. When the treadle is released, then the springs 27, 27 will operate to force the tension plate 26 into contact with the strip and the strip into contact with the tension plate 25. The operator, through the treadle, may vary the tension on the strip all the way from full tension to complete release.

The covering stitches formed by the looper thread more effectively cover and ornament the edge, and therefore, it is preferable to stitch the binding strip to the fabric so that the looper covering thread will appear on the right face of the garment. In the use of the apparatus for carrying out the method, the garment is placed on the work support with the right face of the garment in contact with the work support. The stitching, as shown in the drawing, begins at the shoulder seam 2, and the binding strip is stitched to the fabric by the feed of the fabric in the direction indicated by the arrow in the drawing. This joins the binding strip to the front portion of the neck opening and then to the rear portion of the neck opening. While stitching from the shoulder seam in a direction lengthwise of the wale, the operator depressing the treadle opens the tension so that the binding strip is free from tension and will be in its normal unstretched condition. At this time, the feeding of the fabric stretches the fabric very little, as it is lengthwise of the wales. When the fabric is turned so that the feed begins to cross the wales, the treadle is released by the operator sufficient to apply a tension to the binding strip, and when the feed is substantially at right angles to the wales, then the full tension is applied to the binding strip. The placing of the binding strip under tension will stretch the binding strip, inasmuch as it is of knitted fabric. It is the drawing of the binding strip through the binder by the feed of the fabric that stretches the binding strip. While the fabric is fed by the operator freely, the passing of the fabric under the presser foot results in some stretching or separating of the wales when crossing the wales. By stretching the binding strip at the time the fabric itself is stretched through the feeding thereof, both are practically stretched to the same degree, and are stitched together in this condition, so that when passing from beneath the presser foot, both the binding strip and the fabric will return to their normal condition with the wales substantially parallel all the way to the cut edge of the fabric. When the feed of the fabric approaches a direction parallel with the wales, the tension is gradually released. The same procedure is followed as to the manipulating of the tension during the stitching of the binding strip to the rear portion of the neck opening as to the front portion thereof.

In the forming of an armhole, the knitted blank is cut out leaving a curved cut edge. The binding strip is applied to this curved cut edge in precisely the same way as that described for the neck opening.

While the invention has been described as particularly adapted for the binding of a neck opening or the armhole of a garment, it may be ap-

plied to the binding of any curved cut edge of a knitted fabric.

Having thus described the invention, what we claim as new and desire to secure by Letters-Patent, is—

The method of attaching a binding strip to the curved cut edge of a knitted fabric wherein said binding strip extends in part lengthwise of the wales and in part crosswise of the wales, consisting in progressively stitching a knitted binding strip to said curved cut edge, stretching the binding strip as it is stitched to the knitted fabric in a direction crosswise of the wales, and laying said strip in a normal unstretched condition while the same is being stitched to the knitted fabric lengthwise of the wales, whereby the stretching of the knited binding strip while stitching the same to the knitted fabric crosswise of the wales will overcome the stretching of the knitted fabric by the feed of the machine so that said knitted fabric will be uniformly secured to the binding strip throughout the entire length thereof when the stitching operation is completed.

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