April 27, 1954 G. SILVERBERG 2,676,557

APPARATUS FOR MAKING PIPED OR BOUND EDGINGS

Filed March 24, 1950 4 Sheets-Sheet 1

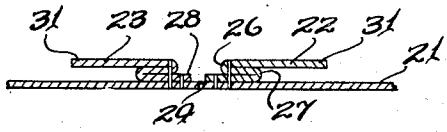


Fig. 1.

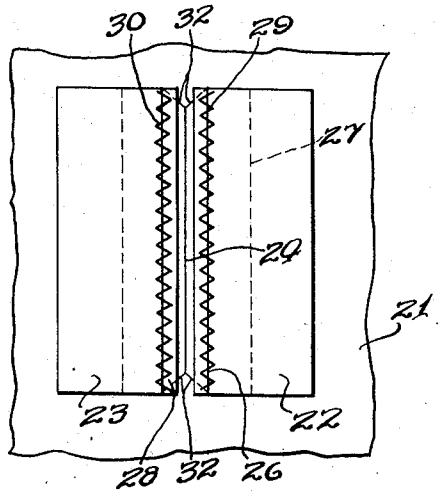


Fig. 2.

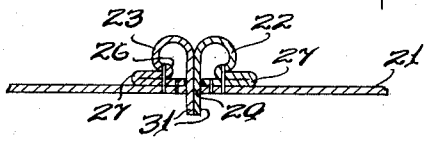
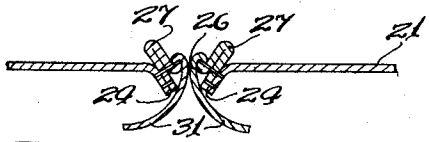


Fig. 3.



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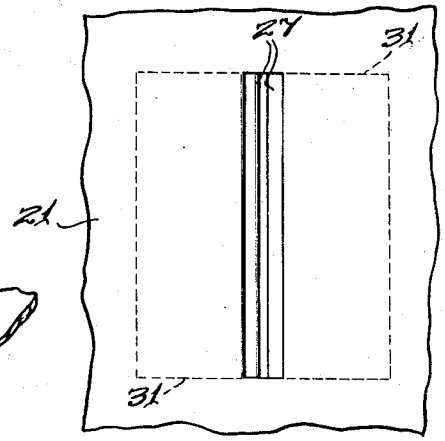

Fig. 5.

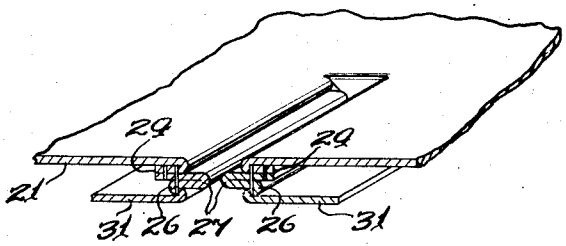

Fig. 6.

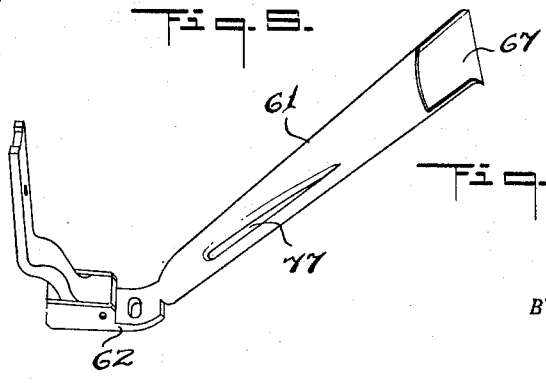

Fig. 18.

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April 27, 1954 G. SILVERBERG 2,676,557

APPARATUS FOR MAKING PIPED OR BOUND EDGINGS

Filed March 24, 1950 4 Sheets-Sheet 2

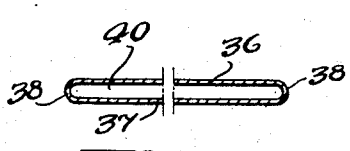

Fig. 10.

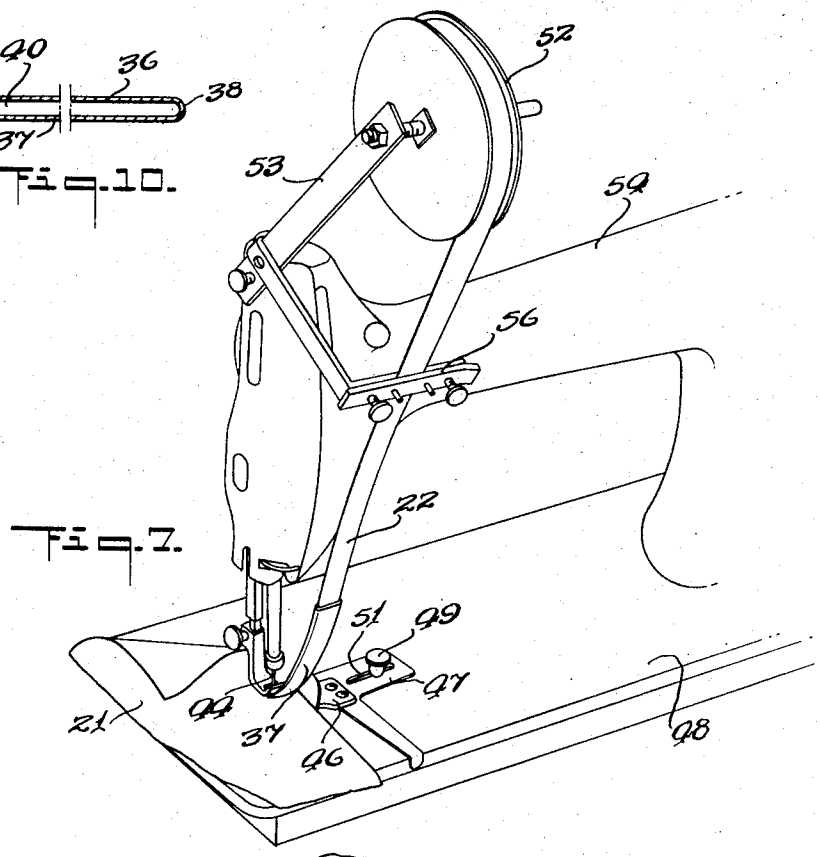

Fig. 7.

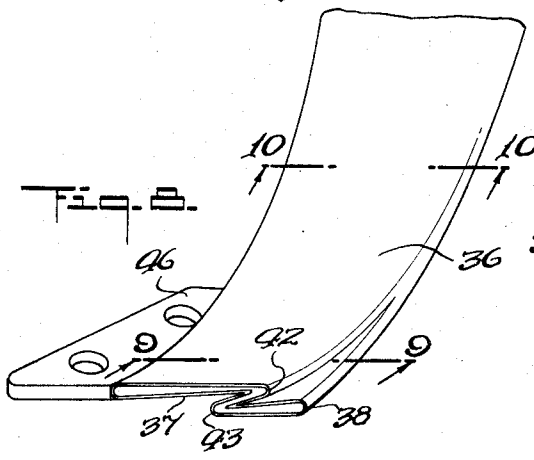

Fig. 8.

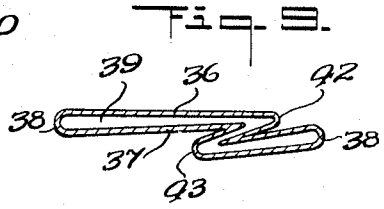

Fig. 9.

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APPARATUS FOR MAKING PIPED OR BOUND EDGINGS

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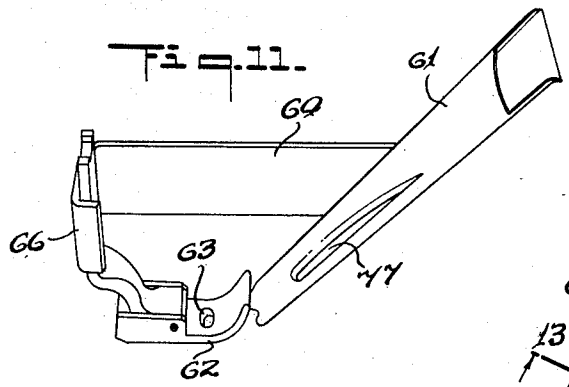
Fig. 11.



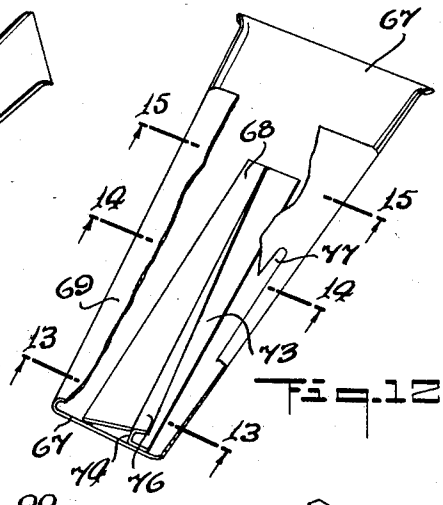


Fig. 12.

Fig. 13.

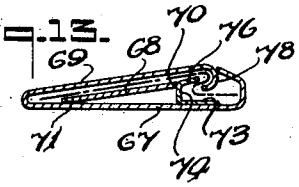


Fig. 14.

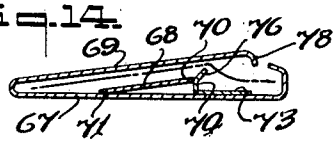


Fig. 15.

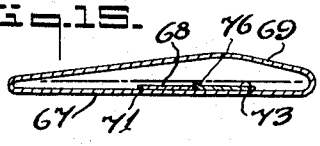


Fig. 20.

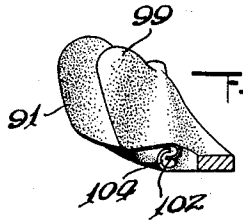


Fig. 17.

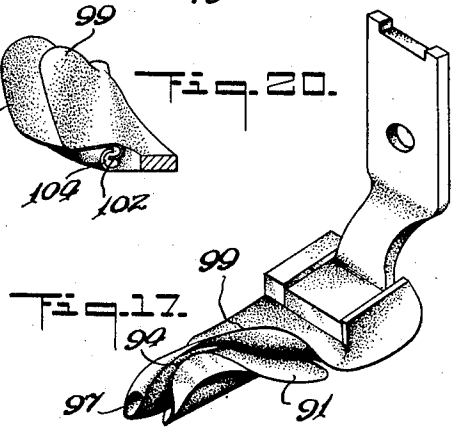
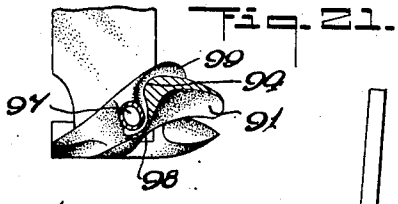


Fig. 21.



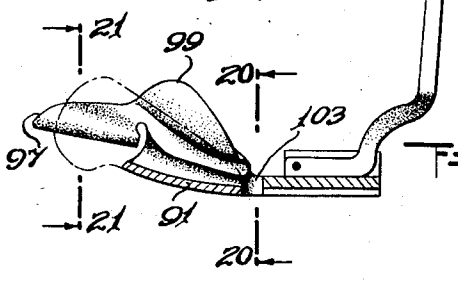


Fig. 19.

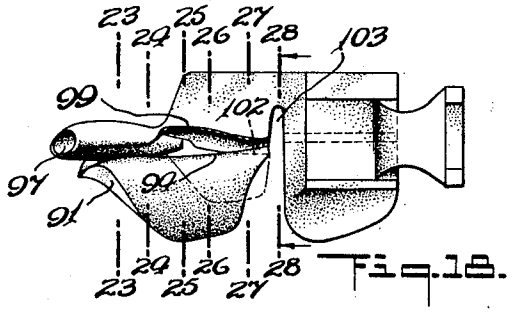


Fig. 18.

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APPARATUS FOR MAKING PIPED OR BOUND EDGINGS

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Fig. 22.

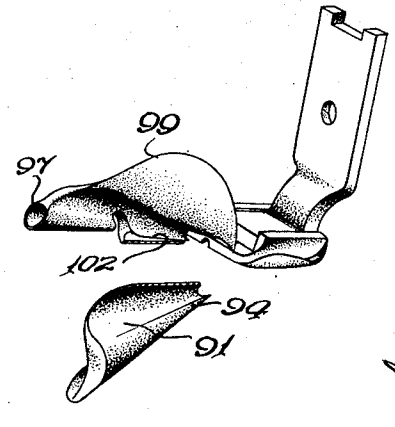
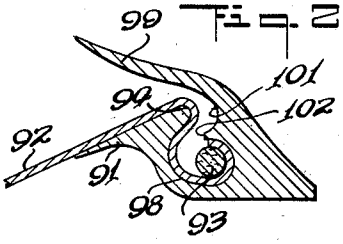


Fig. 26.



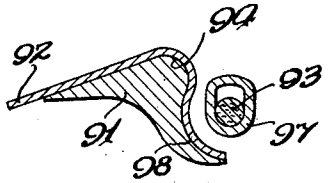
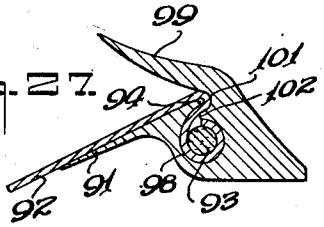


Fig. 23.

Fig. 27.



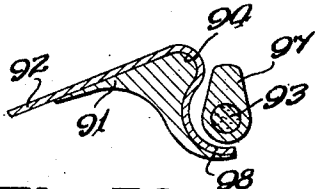


Fig. 24.

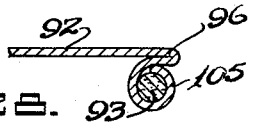


Fig. 28.

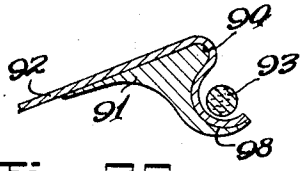


Fig. 25.

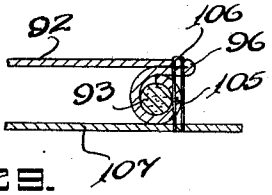


Fig. 29.

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Patented Apr. 27, 1954

2,676,557

UNITED STATES PATENT OFFICE

2,676,557

APPARATUS FOR MAKING PIPED OR BOUND EDGINGS

George Silverberg, Brooklyn, N. Y.

Application March 24, 1950, Serial No. 151,603

3 Claims. (Cl. 112—147)

1

The present invention relates to a method and apparatus for making piped or bound edgings, such as for button holes, pockets or the like, for garments for either men or ladies. In these edgings the usual edge stitching is omitted and the edges are finished and reinforced by folds of a separate piping fabric or self or contrasting material extending therealong. For convenience, the invention will be illustratively described with respect to bound buttonholes although not limited thereto. These piped buttonholes have heretofore been made only by skilled operators, by free hand, constituting an expensive operation presently forming a considerable part of cost of a garment using such buttonholes.

The present invention has for its object, among others, to provide a simplified method of making such buttonholes or other edgings so as to decrease materially the time consumed by the operator, if made by hand; to provide apparatus usable in conjunction with standard sewing machines for further simplifying the fabrication of such button holes or other edgings; and to insure greater uniformity and accuracy in manufacture. This is done without in any way impairing the appearance of such button holes and retains the important feature that the hand-finished appearance of the completed garment is preserved and all seams are completely concealed at the face of the garment.

In particular, in the customary method of making such button holes as now known to me, short strips of piping material must be cut in advance and two such strips are sewn along either side of the slit forming the buttonhole. The necessity of handling such small pieces, which have to be folded very near one edge, and of cutting them to size, is an awkward procedure which is eliminated by the present invention, which provides a method and apparatus whereby the piping material can be supplied in a continuous reel which may be suitably mounted on or near the sewing machine itself, providing a continuous supply of piping fabric at the exact point where it is utilized, and permitting easy use of sewing machines for making such button holes. In particular, such buttonholes or bound edges can be made with or without a cord filler, where desired, and the present invention may be used on conventional automatic buttonhole machines, such as the Singer GG series.

These and other objects and advantages of the present invention will be more clearly understood from the following description of preferred

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modes of carrying it into effect, as illustrated in the accompanying drawings, in which—

Figure 1 is a cross-sectional view showing the initial attachment of piping fabric to the main fabric of a garment or the like, illustrated as for a button hole;

Figure 2 is a plan view of the subject matter of Figure 1;

Figure 3 is a view similar to Figure 1 at an intermediate stage in the manufacture of the buttonhole, showing the beginning of the turning of the buttonhole;

Figure 4 is a view similar to Figure 3 showing the turning at a more advanced stage;

Figure 5 is a perspective view, partially in cross-section, showing the completed piped buttonhole;

Figure 6 is a plan view of the subject matter of Figure 5;

Figure 7 is a perspective view of a portion of a sewing machine and attachments therefor for carrying out the present method;

Figure 8 is a perspective view of the piping fabric guide used in Figure 7;

Figures 9 and 10 are transverse cross-sectional views of the device of Figure 8 taken along lines 9—9 and 10—10 respectively;

Figure 11 is a perspective view of a modified form of the guide of Figures 7 to 10;

Figure 12 is a perspective view partially broken away of the guide of Figure 11;

Figures 13 to 15 are cross-sectional views of the guide of Figures 11 and 12;

Figure 16 is a perspective view of a combined guide and presser foot;

Figure 17 is a perspective view of still another form of the present invention, adapted to insert a cord into the bound edge produced;

Figure 18 is a top view of the device of Figure 17;

Figure 19 is a side view, partly in section, of the device of Figures 17 and 18;

Figures 20 and 21 are cross-sectional views along lines 20—20 and 21—21 of Figure 19;

Figure 22 is a further perspective view of the device of Figures 17 to 21 with a part folded back; and

Figures 23 to 29 are cross-sectional views along lines 23—23 to 28—28 of Figure 18, showing the progressive folding of the fabric and wrapping of the cord of the device of Figure 17.

Referring first to Figures 1 to 6, the main fabric in which the buttonhole is to be formed is shown at 21. Two pieces of piping fabric 22 and 23 are sewn, in the manner to be de-

scribed, on opposite sides of the slit 24 forming the hole for the buttonhole. Each of the pieces of piping fabric 22 and 23 is folded in a double fold having a folded edge 26 and a second folded edge 27, the portion 28 of the piping fabric 22 extending beyond the fold edge 26 toward the slit 24 as shown in Figure 1.

In fabrication, folded piping fabric piece 22 is placed along the slit line 24 and then is sewn to the main fabric 21 by preferably zigzag stitching, shown at 29 and 30 in Figure 2, so that one line of needle holes extends along the portion 28 of the piped fabric and sews only portion 28 to the fabric 21, while another line of needle holes extends through the edge of fold 26 as well as through portion 28. These latter stitches are preferably "blind," that is, they pierce the fold 26 in such manner that when unfolded no stitching is visible. However, straight stitching can also be used.

It will be understood that the pieces of piping fabric 22, 23 may either be pre-cut to the desired size or may be cut after being stitched to the main fabric 21. In the latter case, and according to a preferred form of the invention described herein below, the piping fabric may be taken from a continuous reel or roll and cut as it is used after stitching.

The second piece of piping fabric 23 is folded and sewn in exactly the same manner as piece 22. Thereafter the slit 24 is cut between the two pieces of piping fabric 22 and 23, and the outer portions 31 of the piping fabric are then folded back through the slit 24, as shown in Figures 3 and 4, until the portions 31 extend beneath and parallel to the main fabric 21 as shown in Figure 5. If desired, the slit 24 could be made before sewing on the pieces of piping fabric. It will be understood that this figure is highly magnified and that, after pressing in the customary manner, the portions 31 of the piping fabric will lie very flat against the main fabric 21. It will be seen that the slit 24 at its ends may have V-shaped slit extensions 32 which define the width of the completed outer portion of the buttonhole. As shown in Figures 5 and 6 the folded edge 27 then forms the actual edges of the piped buttonhole, and all stitching is concealed beneath the fabric 21.

The use of the double fold 26, 27 for the piping fabric shown in Figure 1 is if extreme advantage in the present method. According to prior methods, only a single fold, such as 27, was utilized whereby the portion 31 of the piping fabric overlay the slit 24. When this was the case, it became awkward and cumbersome to sew the second piece of piping fabric 23 on the other side of the slit 24 since both the slit 24 and the place where the piece 23 is to be sewn were then covered by the edge 31 of the piece 22. This is completely obviated by the present invention by its use of the double fold shown, which constitutes an important part of the invention.

In addition, according to another important aspect of the present invention, a special guide is provided which automatically folds the fabric into the double fold shown in Figure 1. This guide is illustrated in Figure 8, and constitutes a piece of smooth sheet metal of flat tubular form having at one end the cross section shown in Figure 10 comprising flat parallel sides 36 and 37 connected by arcuate ends 38. The width of the opening 40 within this end of the guide is only slightly greater than the thickness of the piping fabric, and its length is substantially equal to the width of the piping fabric used. At

the other end, the cross section of the guide is that shown in Figure 9, in which the top and bottom walls 36 and 37 are bent to provide a cross section aperture 39 of the double fold type corresponding to the desired folded condition of the piping fabric. The guide itself forms a smooth transition between its two end configurations.

In using this guide a flat tape of piping fabric of a width of the aperture 40 of Figure 10 is fed into the guide. As it passes through the guide it is gradually and smoothly turned into a double fold by the smooth transition between the aperture 40 at one end of the guide and aperture 39 at the other end. It will be understood that the total length of the aperture 39 is the same as that of aperture 40 so that the fabric fits smoothly within this aperture, whereas the upper and lower surfaces 36 and 37 of the guide are spaced apart only slightly more than the thickness of the fabric, just enough to give clearance and to prevent bunching. In this way the fabric is prevented from folding or wrinkling anywhere except at the bends 42 and 43, which produces the folds 26 and 27 respectively.

The guide of Figure 8 is preferably set in position immediately in front of the needle 44 of the sewing machine shown in Figure 7 (which is preferably of the zigzag stitching type to produce the stitches shown in Figure 2) so that the piping fabric emerges from the guide in folded condition just before the needle 44 and is then drawn through the guide by the feed mechanism of the sewing mechanism as it is sewn in place.

In Figure 7, the guide is shown as having a bracket 45 mounted on a plate 47 secured to the bed 48 of the sewing machine by means of a suitable knurled set screw 49 cooperating with a slot 51 in the plate 47. The piping fabric 22 is mounted on a reel 52 which in turn is supported on a bracket 53 either from the head 54 of the sewing machine or from the bed 48 thereof in any suitable manner. An aligning guide 56 may be utilized to line the tape 22 with the folding guide 35.

Figures 11–16 illustrate another form of the fabric guide, forming an important part of the present invention, and which is simpler in construction.

As shown in Figure 11 the guide 61 is mounted in position directly in front of the presser foot 62 on an incline so that the piping fabric may be fed from a reel, such as 52 in Figure 7, through the guide 61 directly under the needle, which passes through the opening 63 in the presser foot 62. For this purpose the guide 61 is mounted on an arm 64 having a bracket 66 which is fixed together with the presser foot 62 to the presser foot bar of the machine (not shown). Alternatively, as shown in Figure 16, the guide 61 may be made integral with the presser foot 62 or may be rigidly joined thereto, obviating the necessity for the arm 64 and bracket 66. In either event, it will be understood that the flat piping fabric tape is fed in at the upper end of the guide 61 and is folded into the required double fold by means of the guide 61 and is then presented under the needle in the proper folded condition for practice of the method already described.

The actual construction of the guide 61 is illustrated with respect to Figures 12–15. In this instance the guide 61 is formed of a flat member having a bottom 67 to which two further members 68, 73 are secured as by welding, soldering or the like. As shown in the successive cross-

sections of Figures 13 to 15, member 68 is a flat strip of generally converging sides which is substantially flat against the bottom 67 at the upper end of guide 61, and has one edge with gradually greater separation from the base 67, while the other edge 71 is secured throughout its length to the bottom 67. The second member 73 is also formed of a flat strip of generally rectangular or other similar shape which is so arranged as to have a wall 74 extending transversely of the bottom 67 and of gradually increasing height from zero height at the upper end of guide 61 to maximum height at the lower end, the sloping edge 70 of the member 68 being secured at or near the upper edge of the transverse wall 74.

In addition to the transverse wall 74, member 73 has a flange 76, which generally forms an extension of the slanted member 68, as shown most clearly in Figures 13, 14 and 15. This flange 76 also tapers, having its widest dimension at the lower small end of the guide 61, tapering to practically zero width at the upper end of the flange 76.

Guide 61 also has an upper wall 69 preferably integral with the bottom 67, which forms a tubular enclosure with bottom 67. The upper wall 69 is generally parallel to the slanting element 68 for most of its length. A portion of the upper wall 69 is slitted, as at 77, and is then curled down as shown at 78 in Figure 13 and Figure 14 to form a further guide surface.

In Figures 13, 14 and 15 the position of the fabric is illustrated by the heavy dash lines and it will be seen that the various elements just described constrain the fabric to form the double fold, characteristic of the present invention, element 76 forming one fold and element 78 forming the second fold. It will be appreciated that the guide of Figures 12 to 15 may be fabricated more simply than those previously described since it is readily made up of flat sheet elements which are merely bent in the desired shapes and then may be soldered or welded together or otherwise suitably secured.

The above forms of the invention are highly suitable for use in making regular bound or piped buttonholes, edgings or the like. In some instances, especially where the fabric being worked is extremely sheer, it is desirable to reinforce such piped or bounded edges. This is normally done by the use of cords contained within folds of the fabric to give them greater body and strength. The present invention is also adapted for use in making such corded edgings and Figures 17 to 29 illustrate one form of device which both produces the double fold or its equivalent and at the same time causes the fabric to roll up around a cord type of core.

As shown generally in Figures 17 and 22 this device is also built integrally with the presser foot, although it will be appreciated that it can be made separately and mounted either as shown in Figure 11 or as in Figure 7, or in any other suitable manner, so long as it is properly positioned relative to the sewing machine needle.

This form of guide is made up of two joined guiding surfaces both of complex curved shape best illustrated by reference to the successive transverse cross sections of Figures 23 to 29 which illustrate both the guiding surfaces and the position of the fabric within the guide.

The lower guiding surface 91 is adapted to support the underside of the piping fabric 92 and both produces a fold in it and also wraps the piping fabric 92 around the reenforcing cord 93. For this purpose, the cross section of the lower surface 91 has a bend 94 which progressively sharpens as shown in Figures 23 to 27, so that the fabric 92 is gradually sharply folded, as at 96 as it leaves the guide.

In addition, the guide is provided with a cord-receiving channel 97 extending only part way from the front edge of the guide (away from the needle position). The lower guiding surface cross section is also provided with a reverse bend 98 which, as the fabric progresses through the guide, gradually wraps the fabric around the cord 93. It will be understood that the cord channel 97 has its side walls of tapering thickness, and terminates just before the fabric 92 completes its wrap about the cord 93.

As shown in Figures 26 to 29, the upper guide surface 99 has its surface curved complementarily to that of lower surface 91, including a bend 101 opposite lower surface bend 94. Bend 101 gradually merges into a vane or fin 102, shown in Figures 20 and 26–28, which assists both in completing the wrap of fabric 92 about cord 93, and also forms the fold 96.

As the fabric 92 leaves the guide, just before the needle aperture 103 in the presser foot, it is in the form shown in Figure 29, having the sharp fold 96, and with a portion wrapped around the cord 93. The exit aperture 104 of the guide is so located before the needle, that the needle pierces fold 96 and the side of the wrap-around section 105, to produce the stitching 106 shown in Figure 29. This stitching 106 also pierces the main fabric 107 on which the edging is being made. By comparing Figure 29 with Figure 1, it will be seen that the fold 94 corresponds to fold 26, while fold 27 is modified only by inserting the cord 93 and bending the fabric back around the cord, to provide the necessary cord wrapping. Otherwise the finished edging of Figure 29 is performed in the same manner as in Figure 1.

It will be understood that, in using the apparatus shown, the piping fabric is continuously available for use by the operator in folded condition at a point immediately adjacent to the needle. It is merely necessary for the operator to place the fabric to be worked upon in proper position under the presser foot and then the already folded piping fabric is fed under the needle by means of the presser foot, to be sewn to the main fabric along the position of the slit 24 as shown in Figures 1 to 6. The normal feed mechanism of the sewing machine pulls the piping fabric tape through the guide 35 as the sewing progresses, so that the fabric tape is delivered in properly folded condition as it is used. At the end of the sewing the operator merely releases the pressure foot and cuts the tape, as with a pair of scissors and the sewing is completed. The same procedure is followed on the other side of the position of the slit 24.

By use of this apparatus, therefore, the operator is completely relieved from the necessity of handling the piping fabric, and especially need not perform the job of folding it as was formerly done by hand. In this way the time taken for making a piped buttonhole or edge can be materially reduced, and may be cut in half or more thereby greatly reducing the cost of such edges. Also, a lower degree of skill is necessary on the part of the operator, and greater accuracy is attained, since the folding operation is done completely automatically and the operator need merely guide the sewing machine and

tape along the edge which is a conventional type of sewing operation.

While the term "fabric" has been used above, it will be understood that the method can be employed with any suitable pliable sheet material as desired, whether textile or woven, or not. Also, the slit 24 may be formed before sewing, if desired. This method and apparatus are also suitable for use in forming piping for pockets or other openings, as well as buttonholes, as will be readily apparent to those skilled in this art.

While the method of making edgings described above has included the use of zigzag stitching, which is a preferred form, it will be understood that the method can also be performed by an ordinary sewing machine so that by use of a guide according to the present invention, the piped edgings can be readily made, even in the home, by relatively simple operations. When this is done the row of stitches will pierce both the fold 26 and the portion 28 of the piping fabric shown in Figure 1, or as shown in Figure 29. Preferably the stitching occurs as close to the edge of fold 26 or 96 as is practicable so that when the deging is completed the portion 31 of the piping fabric will lie substantially flat against the main fabric 21.

Accordingly, the present invention has provided a method and apparatus for producing the piped buttonholes or other bound edgings in which all stitching is concealed and the fabrication of such buttonholes or edgings is materially facilitated.

It will be understood that the above description is intended to be illustrative only, and does not limit my invention in any way, the invention being defined solely by the appended claims.

What is claimed is:

1. A guide for sewing machines for making bound reenforced edgings formed by a reinforcing cord encircled once by a fabric strip with a free edge of said strip abutting the remainder of said encircling strip and with said fabric reversely folded substantially at the line of said abutting, said guide having a pair of adjacent non-planar surfaces joined at one side for part of their length and open at the opposite side for receiving said fabric strip, said surfaces defining a fabric-accommodating channel, said guide also having means integral with one of said surfaces defining a cord-receiving bore extending generally axially of said guide, said channel-defining surfaces being formed with gradually and progressively varying shapes along the length of said guide causing said channel gradually to substantially encircle said bore and extending beyond said bore to form a substantially complete cylindrical surface surrounding the axis of said bore except for a narrow slit, the other of said first-mentioned surfaces having a convex portion gradually sharpening along the length of said guide to a fold-forming ridge extending along one edge of said slit for producing a longitudinally extending reverse fold in said fabric strip adjacent the cord-encircling portion of said fabric strip as said fabric is fed longitudinally through said channel.

2. Apparatus for making bound reenforced edgings comprising in combination a guide as in claim 1 and a sewing machine having a needle in the path of said encircled reenforcing cord as it leaves said guide, said needle being substantially aligned with one edge of said cord so as to sew together said reverse fold and a portion of said fabric strip encircling said cord.

3. Apparatus as in claim 2 wherein said sewing machine is of zig-zag stitching type in which said needle alternates between two positions, in one position of which the needle passes through said reverse fold and said encircling strip, and in the other position of which said needle passes only through said reverse fold.

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