April 17, 1951 E. A. DE MARCO 2,549,294

APPARATUS FOR FORMING BUTTONHOLES

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Fig. 1.

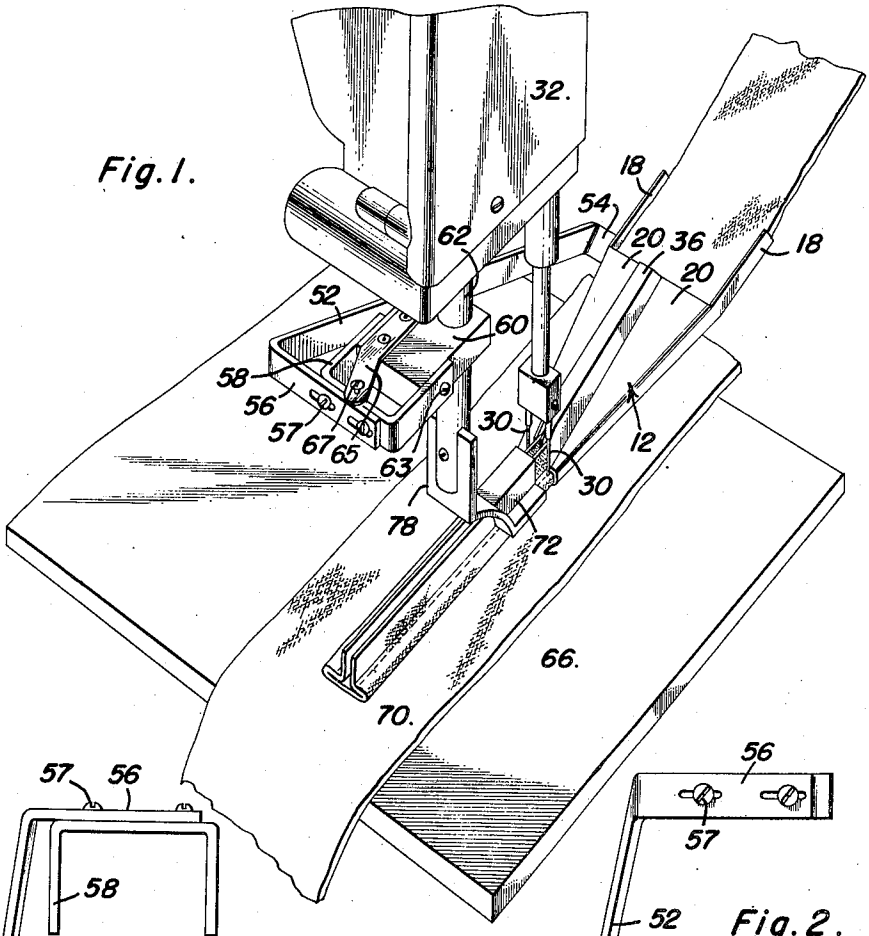
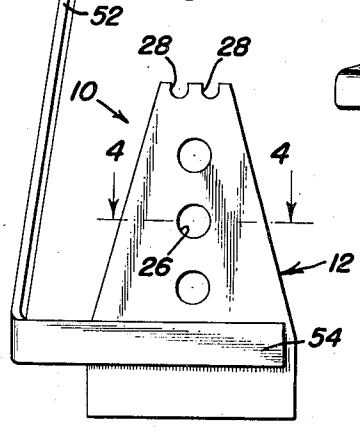


Fig. 3.



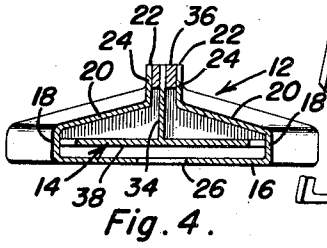


Fig. 4.

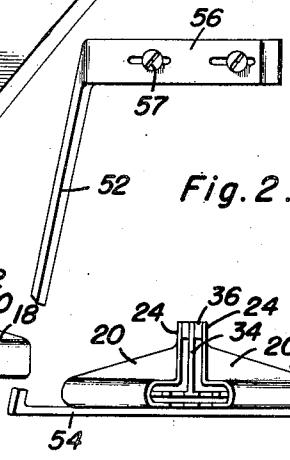


Fig. 2.

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Fig. 5.

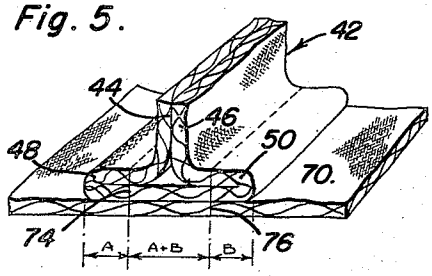


Fig. 6.

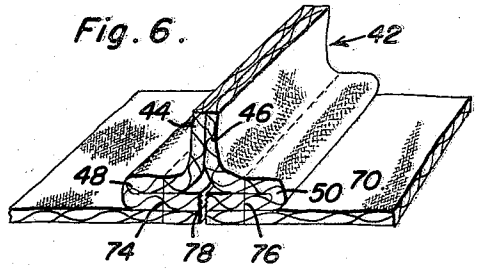
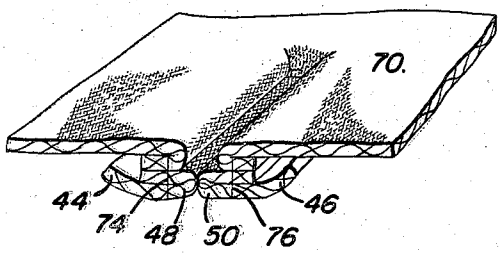


Fig. 9.



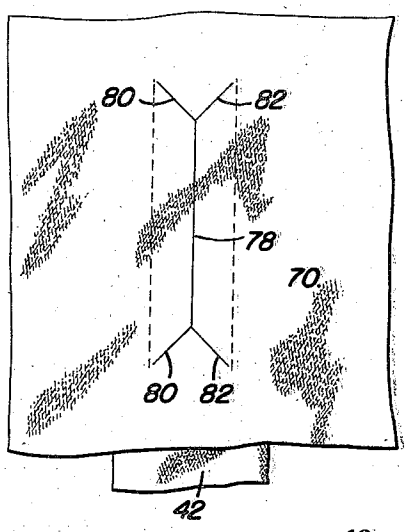


Fig. 7.

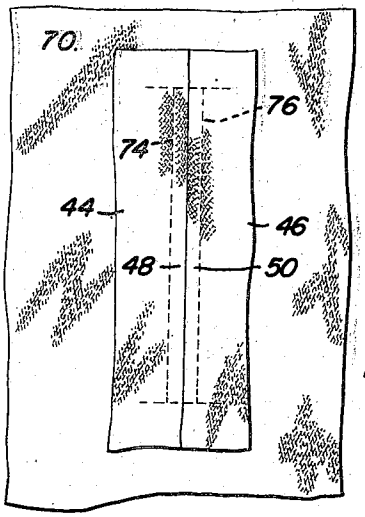
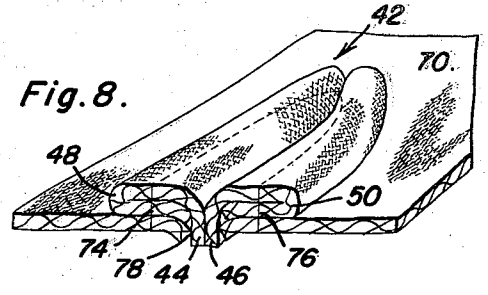


Fig. 10.

Fig. 8.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FORMING BUTTONHOLES

Edward A. De Marco, New Brunswick, N. J.

Application October 21, 1949, Serial No. 122,712

5 Claims. (Cl. 112—147)

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This invention relates to new and useful improvements in attachments for sewing machines and the primary object of the present invention is to provide a cloth folder that will fold a strip of material into a hollow, inverted T-shaped strip that will permit the making of button holes in a minimum time.

Another very important object of the present invention is to provide a method and apparatus for forming button holes, reinforcing slits and the like that will obviate the commonly employed method of stitching a first channel strip to a garment, then reversing the garment to apply a second channel strip to the garment parallel to the first strip, by the production of a single strip that is secured by two rows of stitching, made at the same time, without the necessity of having an operator reverse the garment or gauge the spacing between two channel strips in order to obtain a neat, strong and attractive button hole or reinforced slit.

Yet another object of the present invention is to provide a cloth folding attachment or die for sewing machines that is so constructed as to permit cloth to be fed therethrough without binding or bunching.

A further object of the present invention is to provide a cloth folder embodying a novel and improved means for attaching the same to a sewing machine for vertical swinging movement to permit a strip of foldable material to be inserted into the folder in a convenient manner.

A still further aim of the present invention is the provision of a cloth folder that is simple and practical in construction, strong and reliable in use, neat and attractive in appearance, small and compact in structure, relatively inexpensive to manufacture, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the present invention applied to a sewing machine and showing the strip, formed through the use of the instant cloth folder, being stitched to a garment;

Figure 2 is a front elevational view of the present cloth folder;

Figure 3 is a bottom plan view of Figure 2;

Figure 4 is an enlarged transverse vertical sectional view of the present cloth folder taken substantially on the plane of section line 4—4 of Figure 3;

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Figure 5 is a perspective view showing the inverted T-shaped strip, formed by the present cloth folder, applied to a garment;

Figure 6 is a view similar to Figure 5 and showing the second step in forming a button hole, the step being the formation of a slit in the garment and strip;

Figure 7 is a plan view of Figure 6 to show the pairs of diverging slits at the end of the main slit made in the garment and the strip;

Figure 8 is a perspective view showing the longitudinal edges of the T-shaped strip extended through the slit made in the strip and the garment prior to the final step in forming the button hole;

Figure 9 is a perspective view showing the final step in forming the button hole by tacking the ends of the strip to the garment and,

Figure 10 is a bottom plan view of Figure 9.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents the cloth folder or die, generally, including an outer guide 12 and an inner guide 14.

The outer guide 12 is elongated and comprises a forwardly tapering end portion from which the folded strip is discharged. The outer guide 12 is constructed from a single blank of material and includes a bottom wall 16, a pair of forwardly converging side walls 18, and a pair of upwardly and inwardly sloping upper wall sections 20 whose inner edges 22 are turned upwardly to provide spaced parallel flanges 24. The rear edges of the upper wall sections 20 terminate adjacent and forwardly of the rear edges of the side walls 18 and the bottom wall 16 to permit the observation of cloth being fed into the die 10.

The bottom wall 16 is provided with a plurality of longitudinally spaced apertures 26 to reduce the amount of friction between a strip fed into the die and the bottom wall 16 and to permit a user to insert his fingers or a suitable tool therethrough to prevent the cloth from binding or bunching in the die. The forward end of the bottom wall 16 is formed with a pair of transversely spaced notches or recesses 28 that will receive the pair of complemental sewing needles 30 of a suitable sewing machine 32.

The inner guide 14 is substantially T-shaped in cross section and includes a vertical flange or stem 34 that is suitably fixed between the upstanding flanges 24 of the upper wall sections 20 by welding, solder or the like 36. The lower or inner edge of the vertical flange 34 is integrally formed with or fixedly secured to the longitudinal

center and upper face of a lower flange, plate or cross member 38 having forwardly converging side edges that are spaced parallel to the side walls 18 of the outer guide 12. The plate 38 is also spaced parallel to the bottom wall 16 of the outer guide 12.

The die 10, formed as aforedescribed, will receive at its open rear end an elongated, flexible, strip of material, such as a cloth strip 40. As the strip 40 is fed through the die 10, the side edges of the cloth will be folded inwardly, then upwardly to form a hollow, inverted substantially T-shaped strip 42 composed of spaced parallel longitudinal edges 44, 46 and side channels 48, 50 that extend laterally from the edges 44, 46.

Means is provided for detachably securing the die 10 to a part of the sewing machine 32 so that the reciprocating needles 30 will enter the notches 28 and this means comprises an attaching arm 52 having inner and outer lateral projections 54 and 56. The inner projection 54 is suitably fixed to the undersurface of the bottom wall 16 whereas the outer projection 56 is slidably secured, as at 57, to the web portion of a substantially U-shaped attaching clip 58.

The clip 58 yieldingly embraces a block 60 that is suitably held on the pressure-foot supporting post 62 of the machine 32 and is detachably and pivotally secured thereto by fasteners 63. The upward pivotal movement of the arm 52 and hence the die 10 is limited by an arm 65 attached to the block 60 and having a depending lug or stop 67 threaded thereto for engaging the clip 58.

An additional guide means is required to guide the strip 42 after the same has been secured to the garment 70 and which will also tend to guide and prevent lateral movement of the garment 70 during the operation of stitching the strip 42 to the garment. This additional guide means includes a channeled guide 72, of a cross-section similar to the cross-section of the strip 42 but with an opening in its bottom wall since the bottom wall of the guide 72 will not extend beneath the strip 42 due to the fact that the strip 42 is secured by two rows of stitching 74 and 76 to the garment 70. An arm 78 extends from the forward end of the guide 72 and is held within the bifurcated lower end of the post 60.

In order to understand the advantages of the present invention, it is necessary to briefly describe the commonly employed method for forming button holes or reinforcing slits since the instant invention has been introduced through a necessity in reducing the time required for making button holes by the commonly employed method.

Many dies and cloth folding attachments have been heretofore utilized but none will produce a shape as disclosed for the strip 42 and this is the outstanding feature of the instant invention. Heretofore, a first channel strip was secured to one face of the garment, the strip being guided by hand, and secured throughout its length, by stitching, to the garment. Next, the operator would cut the thread at one end of the strip, reverse the garment and strip, then secure a second channel shaped strip to the garment, being sure to gauge by hand, the spacing between the two strips. A failure to properly and accurately gauge the spacing between the two strips would result in a poor button hole or a button hole that was irregular and structurally deficient.

A cut or split was then made in the garment between the two strips and the outer or upper edges of the strips were extended through the cut and the ends of the strips tacked, by stitching, to the garment.

Attention is now directed to Figures 5–10 inclusive, wherein there is disclosed the steps whereby the button hole is made by use of the present invention. As shown in Figure 5, the strip 42 has been stitched to the garment by the rows of stitching 74 and 76. The distance (A+B) between the rows of stitching 74 and 76 is equal to the sum of the distances (A+B) between the rows of stitching 74 and 76 and the outer extremities of the channels 48 and 50. This placement of the rows of stitching 74, 76 is critical for providing the desired reinforced button hole.

The garment 70 and the strip 42 are then cut or slit, as shown at 78 in Figure 6, the slit being parallel to and spaced equally from the rows of stitching 74 and 76. The ends of the split 78, communicate with pairs of diverging slits 80 and 82 so that the finished button hole will be free of bulges or protuberances.

Next, the edges 44 and 46 are extended through the slit 78 (see Figure 8) and the channels 48 and 50 are also pulled through the slit 78 (see Figure 9). The ends of the strip 42 are then tacked to the garment 70 and the finished button hole appears as shown in Figure 9.

The above description has dealt primarily with the forming of button holes but a similar procedure is followed for making pockets or other reinforced slits, splits, cuts or openings in garments. The present invention also anticipates the reinforcing of openings in boat sails, or leather and may be employed with materials when other than stitching is employed, such as two metallic sheets joined by rivets, welding, fasteners or the like.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the construction, operation and advantages of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

Having described the invention, what is claimed as new is:

1. A cloth folding attachment for sewing machines comprising an elongated outer hollow guide having a forward tapering end portion and a pair of upper wall sections, and an inverted T-shaped inner guide fixed and enclosed within said outer guide and including a lower flanged portion having forwardly tapering side edges whereby material fed into said outer guide will be folded into an inverted T-shape as the material passes from the forward end of the outer guide, said upper wall sections sloping upwardly toward each other and including inner upstanding flanges, said inner guide including a relatively thin and high vertical portion fixed between and spaced from the upstanding flanges of said inner guide.

2. A cloth folding attachment for sewing machines including a die that will receive a strip of flexible material to fold the material into an inverted T-shaped element, said die comprising an elongated hollow outer guide having a pair of forwardly converging side walls, a pair of upper wall sections and a bottom wall, and an inner

guide fixed and enclosed within said outer guide and including a plate spaced parallel to the bottom wall of said outer guide, said plate having forwardly converging side edges that are spaced parallel to the side walls of said outer guide, said upper wall sections sloping toward each other and including upstanding flanges, said inner guide including a relatively thin and high vertical portion fixed between and spaced from the upstanding flanges of said upper wall sections.

3. The combination of claim 2 and means carried by said die for attaching the same to a part of a sewing machine for holding the die at a vertically inclined position to permit a strip of flexible material to be fed into said die.

4. The combination of claim 3 wherein said means for attaching the die to a part of a sewing machine includes an arm secured to said die and having a laterally projecting portion.

5. The combination of claim 2 wherein the bottom wall of said outer guide includes a plurality of apertures therein facilitating the movement of material through said die.

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