

[54] **CUFF MAKING METHOD**

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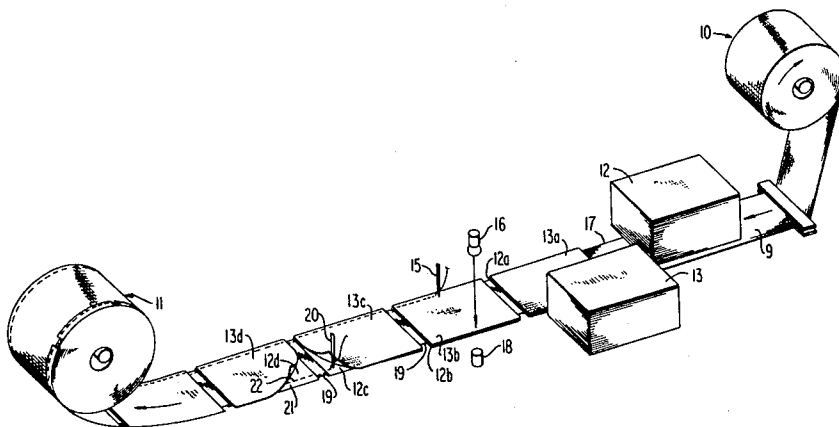
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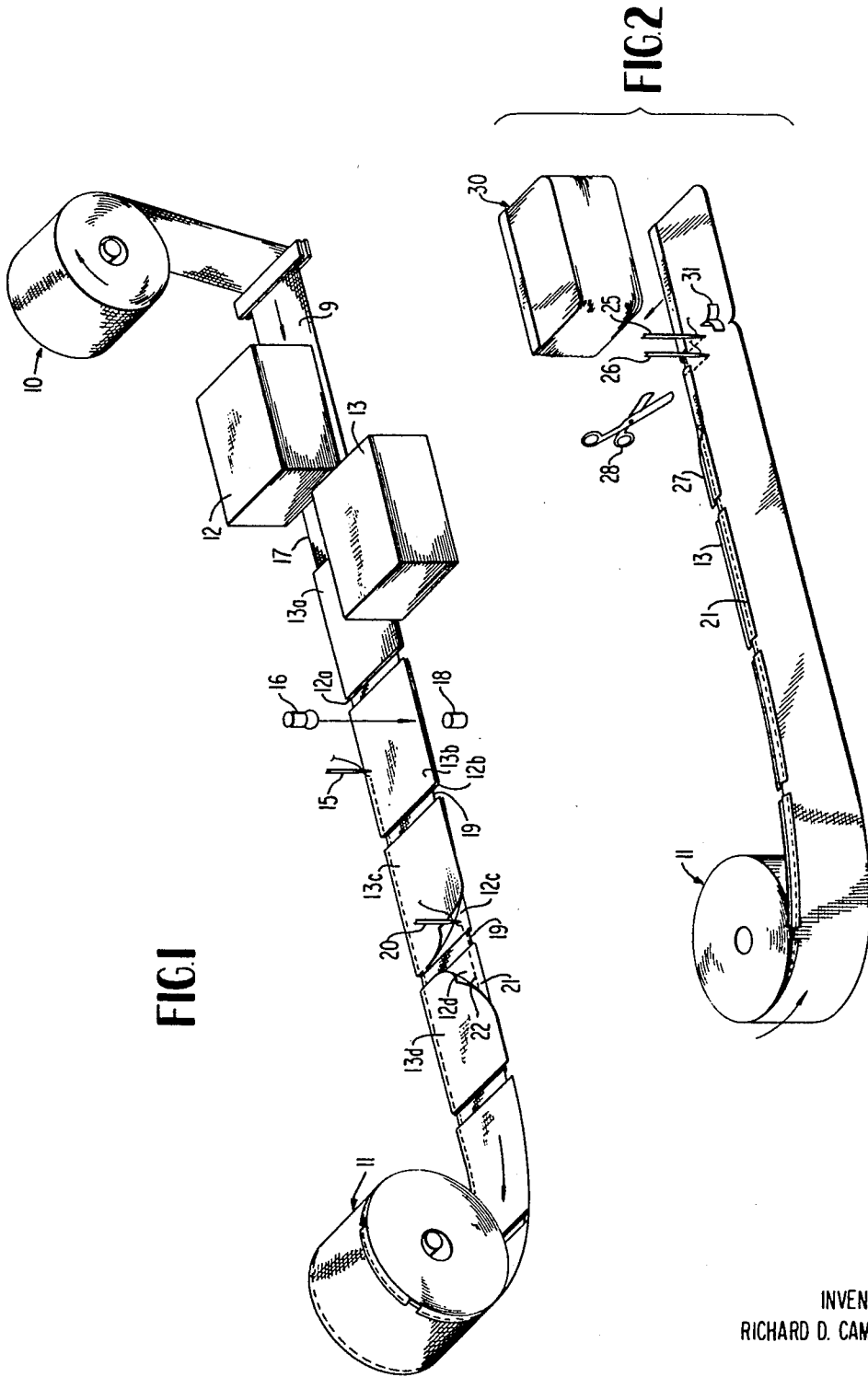
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[57] **ABSTRACT**

A shirt sleeve cuff making method and apparatus wherein a continuous length of cuff lining material is passed through tandem sewing heads, and pairs of cuff panels are placed upon the lining material and are sewn along their aligned edges to one edge of the lining material by one sewing head and the overlying edge of the lower cuff panel of each pair is folded downwardly about the opposite edge of the lining material and sewn thereto by the other sewing head. The continuous lining material with the cuff panels sewn thereto are then passed to a second sewing station where the lining material is cut between the pairs of cuff panels and the edges of the cuff panels adjacent the cut in the lining material are sewn to the lining material.

**7 Claims, 5 Drawing Figures**





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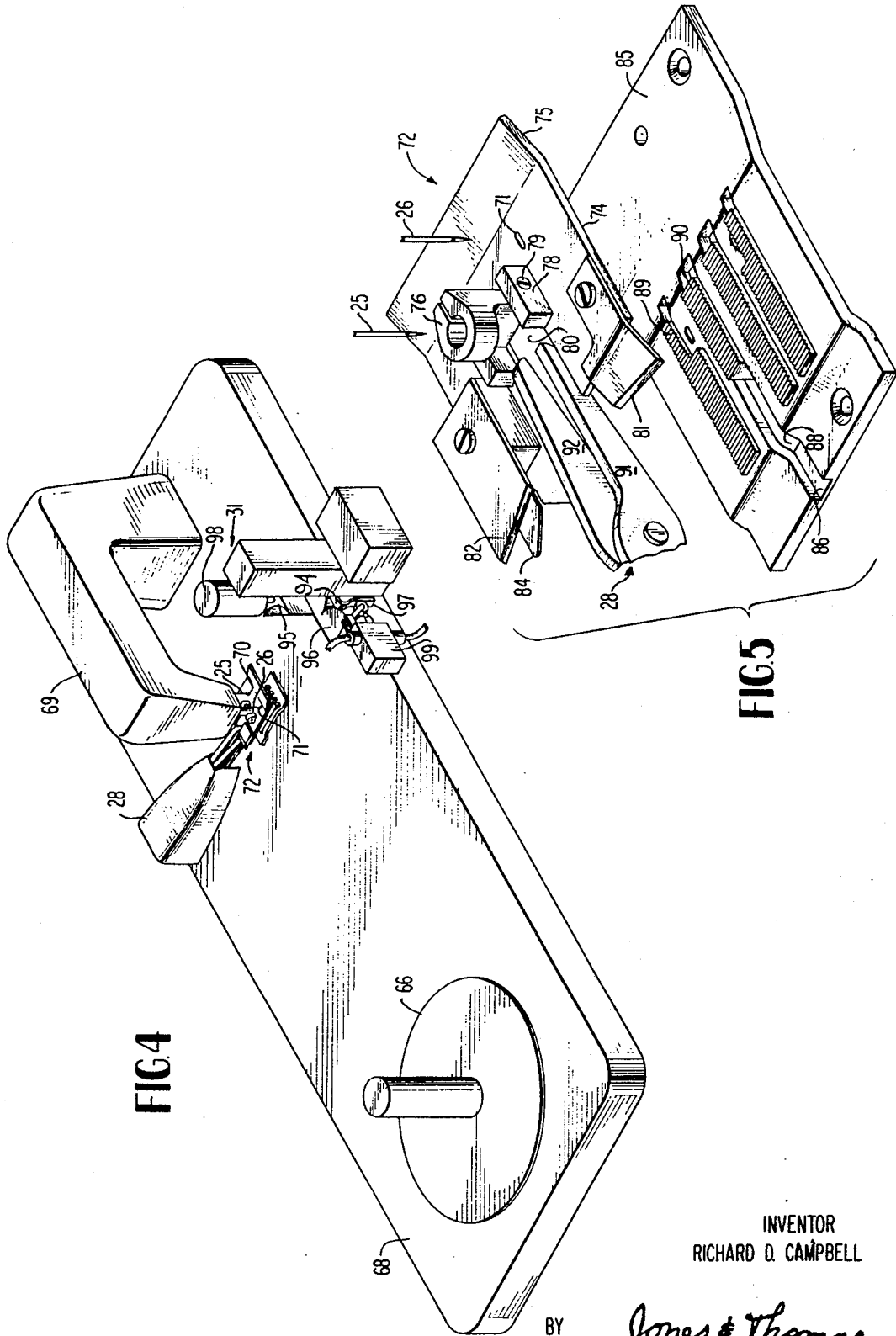


FIG 4

FIG 5

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## CUFF MAKING METHOD

## BACKGROUND OF THE INVENTION

In the past, the process of making shirt sleeve cuffs has required a plurality of alignment and sewing functions that are onerous for the machine operators to perform, and the assembly of cuffs has been difficult to control because of the multiple number of plies of outer material and inner lining required to form a cuff and because the panels of material are relatively small and can be easily misplaced. For example, a typical cuff making process required both the outer cuff panels and inner lining material to be cut in the cutting room as by die cutting or clicking, and the outer panels and liner panels were tagged in the cutting room and then transferred to the sewing stations in the sewing room. At the first sewing station an operator aligned an inner liner panel with a first cuff panel, folded the overlying edge of the cuff panel over an edge of the liner panel, and sewed through the fold to form a hem in the cuff panel about the edge of the liner panel. The plurality of partially completed cuffs formed in this manner were connected together by a chain stitch and accumulated at the first sewing station. After a batch of partially completed cuffs had been passed through the first sewing station the batch was transferred to a second sewing station where the second cuff panel was aligned in overlying relationship with the first cuff panel and folded about the hem of the first cuff panel, and the operator then stitched about an end of the fold and around the unstitched edges of the inner liner and cuff panels and over the other end of the fold to complete the cuff. The cuffs were again connected together by chain stitching as they left the second sewing station and when the batch of cuffs had been passed through the second sewing station they were transferred to a processing station where the cuffs are inverted, pressed, separated and stacked.

The procedure required not only the cuff panels, but the liner to be cut to shape in the cutting room so that a substantial amount of liner material as well as cuff panel material was wasted. Also, the slow process of aligning the edges of cuff panels and liner panels was required at both the first and second sewing stations, and careful control had to be maintained over both batches of cuff panels at the first and second sewing stations so that there was a substantial likelihood of one or both operators incorrectly matching cuff panels in a cuff structure from different plies of material and forming cuff structures having mismatched colors.

## SUMMARY OF THE INVENTION

Briefly described, the present invention comprises a shirt sleeve cuff making method and apparatus which does not require the spreading and cutting of the cuff inner lining material in the cutting room and which requires only one operator to align the cuff panels and lining material. The lining material is received at the first sewing station in the process in the form of a continuous roll or length of lining material, and the lining material is fed through a pair of spaced tandem sewing machines which are arranged to sew along the opposite edges of the lining material. The pairs of cuff panels are stacked along the lining material with one edge of each cuff panel aligned with an edge of the lining material and the opposite edge of each cuff panel overlying the opposite edge of the lining material, and the aligned edges are passed through the first sewing machine which sews the cuff panels and lining material together. The lower cuff panel of each pair is then folded about the opposite edge of the lining material and the upper cuff panel is moved away from the lower cuff panel as the second sewing machine functions to sew a hem in the lower cuff panel. The partially completed cuffs are maintained on the continuous length of lining material and passed to a second sewing station, where the continuous length of lining material is cut between the cuff panels and the ends of adjacent cuff panels along the lining material are sewn to the lining material. If a rounded cuff structure is desired, the continuous series of partially completed cuffs are die cut or

clicked at the second sewing station to form the rounded edges.

Thus, it is an object of this invention to provide a shirt sleeve cuff making method and apparatus which reduces the time and labor required to form cuffs.

Another object of this invention is to provide a method and apparatus for making shirt sleeve cuffs in a reliable manner and which makes cuffs at a high rate of speed and with a minimum of waste material.

Other objects, features and advantages of the present invention will become apparent upon reading the following specification when taken into conjunction with the accompanying drawing.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a progressive schematic illustration of the process performed at the first sewing station in the cuff making process.

FIG. 2 is a progressive schematic illustration of the process performed at the second sewing station in the cuff making process.

FIG. 3 is a perspective view of the cuff making apparatus at the first sewing station.

FIG. 4 is a perspective view of the cuff making apparatus at the second sewing station.

FIG. 5 is an expanded perspective view of the presser foot and throat plate assembly at the second sewing station.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in more detail to the drawing, in which like numerals indicate like parts throughout the several views, FIG. 1 shows a roll or supply 10 of cuff lining material which is fed along a predetermined path toward take-up roll 11. The stacks 12 and 13 of precut shirt sleeve cuff panels are maintained along the path of generally continuous lining material 9 extending between rolls 10 and 11, and the top cuff panel from stack 12 is placed over the path of the continuous lining material as indicated at 12a and the top cuff panel from the stack 13 is stacked upon or placed on top of cuff panel 12a as indicated at 13a. Cuff panels 12a and 13a are then moved toward sewing machine 15 along the path of the continuous lining material with one of their edges aligned with a first edge 17 of the lining material and the sewing machine functions to sew along the aligned edges of the cuff panels and continuous length of lining material, as indicated by cuff panels 12b and 13b.

A light source 16 is positioned above the path of the continuous lining material, and a photocell 18 is positioned on the opposite side of the path at the edge of the lining material, so that the gaps between adjacent pairs of cuff panels are detected and the drive mechanism of the sewing machine is disabled and the operation of sewing machine 15 is terminated after each sewing operation. Of course, when a subsequent pair of cuff panels are placed upon the continuous lining material the light to photocell 18 will be blocked and the sewing machine will be able to function again.

As cuff panels 12b and 13b move away from sewing machine 15, the overlying opposite or free edge of the lower cuff panel 12b is folded about second edge 19 of the lining material, the overlying opposite or free edge of upper cuff panel is lifted away from the lower cuff panel, and second sewing machine 20 sews along the second edge 19 of the lining material through the fold of the lower cuff panel, as indicated at 12c and 13c, to form a hem 21 with stitching 22. The free edge of upper cuff panel 13c is then allowed to fall back on the lower cuff panel as indicated at 12d and 13d, and the partially completed cuff structures are then rolled onto take-up roll 11.

As is indicated in FIG. 2, the take-up roll or roll of partially completed cuff structures 11 are then transferred to a second sewing station where the continuous series of cuff structures is fed from the roll 11 to a sewing machine having a pair of laterally spaced apart sewing needles 25 and 26 and a cutting

mechanism 28. The free edge 27 of the upper cuff panel (now on the bottom) is folded over the hem 21 of lower cuff panel 12 and adjacent ones of the partially completed cuff structures are processed through the sewing machine and cutter mechanism 28 in a manner that causes the cutter mechanism 28 to cut the lining material between adjacent ones of the cuff structures and the needles 25 and 26 to tack the ends of the fold of the upper cuff panel 13 to the cuff structure and to sew along the ends of adjacent ones of the cuff panels at the cut being made in the lining material. The result of this function is that a completed cuff structure is formed which has stitching formed about its raw edges, a hem formed in the lower cuff panel and an overlapping open hem formed in the upper cuff panel. The cuff structures are placed in the stack 30 where they are available for delivery to a cuff inverting and pressing station (not shown).

If the edges of the cuff structures are to be rounded to form a rounded edge cuff, the edge of the lining material and the corners of the cuff panels are die cut or clicked by cutting blade 31 prior to the movement of the cuff structures to needles 25 and 26 and cutter mechanism 28. As the needles 25 and 26 of the sewing machine approach the rounded corners of the cuffs, the operator twists or rotates the cuff structures to cause the stitching to be formed in a curve around the curved corners.

As is illustrated in FIG. 3, the first sewing station comprises a work table 32 upon which first and second sewing machines 34 and 35 are mounted. Lining material guide means 36 extends along work table 32 and includes a guide tray 38 having a bottom wall 39 and upwardly extending side walls 40 and 41. Guide flange 42 is positioned inwardly of side wall 41 and extends along the length of guide tray 38. The length of lining material 9 is fed through guide tray 38 between guide flange 42 and side wall 40.

Loading tray 44 is positioned generally within the confines of guide tray 38 and is generally flat except for upwardly extending wall 45. Loading tray 44 includes an aperture 46 at its end adjacent supply roll 10 and positioning pin 48 extends upwardly from work table 32 through the aperture to properly locate loading tray 44 in guide tray 38. Spacer 49 surrounds positioning pin 48 beneath loading tray 44 and maintains the loading tray in spaced relationship above bottom wall 39 of guide tray 38. Also, support feet 50 are located in alignment with side wall 40 of guide tray 38 at spaced intervals as necessary to support the rear portion of the loading tray 44 and the portion of loading tray 44 adjacent sewing machine 34 rests upon guide flange 39 so that the loading tray 44 is spaced from the bottom wall 39 of guide tray 38 and provides a space for the path of the continuous lining material 9.

The forward end of loading tray 44 adjacent sewing machine 34 includes a slot or cut out 51 leaving an extension 52 that is bent in a slightly downward direction toward bottom wall 39 of guide tray 38 to form a slide. A second slot 54 is defined in the edge of loading tray 44, and a photoelectric cell 18 (not shown in FIG. 3) is positioned below work table 32 beneath slot 54, so that loading tray 44 does not block the photocell.

Folding housing 55 includes an upper wall or folding tray 56 which overlaps the end of loading tray 44. The side wall 58 of folding housing 55 is curved inwardly at 59 to form a folding curvature so that the side wall 58 terminates at a point ahead of and slightly to the side of the presser foot of second sewing machine 35.

Lifting tine 60 extends in a curved and upwardly inclined direction from the surface of folding tray 56 toward second sewing machine 35. Air tube 61 communicates with a source of air under pressure (not shown) and projects from beneath work table 32 up onto the upper surface of folding tray 56, then is turned generally toward the curve 59 in side wall 58 of folding housing 55 and enters the folding housing so that a stream of air is directed generally toward curve 59 within folding housing 55.

Sewing machine 34 is arranged to stitch along first edge 17 of the continuous lining material 9 at the end of slide 52 and second sewing machine 35 is arranged to sew along the second edge 19 of the lining material at the end of folding housing 55. Sewing machines 34 and 35 are driven from a common power source (not shown) and the operation of the two machines is coordinated or maintained in timed relationship by timing belt 64 so that each machine takes a stitch simultaneously and feeds simultaneously. The power source also functions to rotate take-up roll 11 through a pulley connection 65 and a sliding clutch (not shown). The arrangement is such that tension is maintained in the lining material from second sewing machine 35 to pick-up roll 11 during the operation of the sewing machines.

The machine operator at the first sewing station will normally place one stack of cuff panels 12 on loading tray 44 in abutment with the upright wall 45 and the other stack of cuff panels 13 on work table 32 in a convenient location. Loading tray 44 and folding tray 56 form a loading or working surface over the path of continuous lining material 9 adjacent first sewing machine 34, and the machine operator retrieves the top ply or cuff panel from the stack 12 and places it on loading tray 44 and slides it beneath folding tray 56 toward the needle of sewing machine 34, with an edge of the cuff panel adjacent the side wall 40 of guide tray 38. The operator then retrieves the top ply from the stack of cuff panels 13 and places it on top of the first or lower cuff panel and aligns its edge with the edge of the lower cuff panel at sidewall 40 and aligns the forward and trailing edges with the forward and trailing edges of the lower and cuff panel. The second cuff panel from stack 13 will have approximately one-half its length resting upon folding tray 56, so that the bottom and top cuff panels are maintained separate from each other at their overlying free edges along second edge 19 of the length of lining material. The operator then slides both of the cuff panels further toward sewing machine 34 until the cuff panels block light opening 57 in folding tray 56 whereupon sewing machine 34 and 35 are armed and can be actuated with the conventional foot pedal (not shown) by the operator.

As the shirt cuff panels move toward sewing machine 34, the edges thereof adjacent sidewall 40 of guide tray 38 will move down slide 52 of loading tray 44 toward the needle of sewing machine 34. The operator can press with her fingers against the cuff panels in the vicinity of slot 51 of loading tray 44, so that when the operator presses her foot pedal to energize sewing machines 34 and 35, and the sewing machine functions to feed lining material 9 along its path through guide means 36 the shirt cuff panels will tend to move with the lining material and be sewn by sewing machine 34. As the top and bottom shirt cuff panels move through sewing machine 34, they are sewn along their edges at the first edge 17 of lining material 9, and the bottom shirt cuff panel progresses through folding housing 55, whereupon the overlying free edge of the bottom cuff panel is folded about the second edge 19 of the lining material by the folding curve 59 of housing 55 and by the flow of air through air tube 61. In the meantime, lifting tine 60 will cause the free edge of the upper cuff panel to be lifted away from the needle of second sewing machine 35 so that the second sewing machine functions to sew through the folded edge of the bottom cuff panel and form a hem therein while the overlying edge of the upper cuff panel remains free. After the upper cuff panel passes by the needle of second sewing machine 35 it is allowed to fall back into its overlying relationship with the bottom cuff panel, and the series of partially completed shirt cuffs is retrieved by take-up roll 11.

As is illustrated in FIG. 4 the series of partially completed shirt cuff panels is mounted on a rotatable spindle 66 of work table 68 at the second sewing station. Sewing machine 69 is supported by work table 68 and comprises a pair of laterally spaced apart needles 25 and 26 movable through needle holes 70 and 71 defined in presser foot 72. As is illustrated in FIG. 5, presser foot 72 includes foot plate 74 having an upwardly inclined flange 75 to guide the material beneath the presser

foot and the foot plate 74 is hingedly supported by boss or shank 76 which is connected to support tabs 78 by means of pivot pins 79. A slot 80 is formed in the rear of foot plate 74 beneath shank 76, and thread cutting blades 81 and 82 are positioned on opposite sides of foot plate 74 beside slot 80. Thread holder 84 is positioned below thread cutter 82.

Throat plate 85 is positioned below presser foot 72 and is of conventional construction except for slot 86 which extends back from the opening 88 for a tread of feed dog 89. Tread 90 is foreshortened to effectively lengthen slot 86.

Cutter mechanism 28 includes stationary blade 91 that fits into slot 86 of throat plate 85 and oscillating blade 92 that is movable in the space of slot 80 beneath shank 76 of presser foot 72. Thus, cutting mechanism 28 is moved up into the space between throat plate 85 and presser foot 72 and functions to form a cut in the material immediately after it has been sewn by needles 25 and 26.

As is illustrated in FIG. 4, a die cutter or clicker 31 is supported from work table 68 and faces sewing machine 69. Clicker 31 includes a rounded V-shaped cutting block 95 that is movable into platen 96 with a guillotine action under the influence of pneumatic ram 98. When the operator presses a pedal (not shown), pneumatic ram 98 functions to move cutting block 95 in a downward direction toward platen 96 and when the cutting block has been received in the opening of the platen, cam 94 that moves with cutting block 95 actuates bleed valve 99, causing ram 98 to lift the cutting block. Thus, cutting block 95 cuts with a plunging motion and is normally maintained in its retracted position.

The operator at the second sewing station retrieves the free end of the continuous series of partially completed cuffs from spindle 66 and places the cuff structures in an inverted position with the space between adjacent cuffs in alignment with cutter mechanism 28. The operator folds the free ends of the top cuff panels (now on the bottom) of adjacent pairs of cuff structures over the hems in the bottom cuff panels, and then starts the sewing and cutting function. As the operator feeds the cuff structures through sewing machine 69, needles 25 and 26 sew the ends of the folded portions of the upper cuff panels and then form stitching along the adjacent edges of the pairs of cuff panels. Cutting mechanism 28 operates simultaneously with sewing machine 69 and functions to cut the continuous lining material between adjacent cuff structures. When both ends of a cuff structure have passed through the sewing machine in this manner, stitching will be formed along the raw edges of the cuff structures, the bottom (now inner) cuff panel will have a hem stitched to the lining material, and the upper (now outer) cuff panel will have an open hem tacked at its ends to the liner about the hem of the inner cuff panel. The cuff structures are now complete and will be placed in a stack 30 where they will be subsequently retrieved and moved to a cuff inverting and pressing station (not shown).

If it is desirable to form cuffs with rounded corners, clicker 31 will be utilized by the operator to form the rounded slots in the continuous lining material and to round off the square edges of the cuff panels. When the machine operator sews across the cuff structures, she will twist the cuff structures as their rounded edges approach needles 25 and 26, to sew along the rounded edges.

While this invention has been described in detail with particular reference to preferred embodiments thereof, it will be

understood that variations and modifications can be effected within the spirit and scope of the invention as described hereinbefore and as defined in the appended claims.

What is claimed is:

1. A process of making shirt sleeve cuffs or the like comprising:

- passing a generally continuous length of cuff lining material along a predetermined path,
- continually placing pairs of cuff panels in stacked alignment with each other in overlying relationship on the cuff lining material with an edge of the pairs of cuff panels aligned with an edge of the lining material at first position along the path,
- sewing the cuff panels and lining material together along the aligned edges of the cuff panels and lining material at a second position along the path,
- folding the free edge of the lower cuff panel of the pairs of cuff panels across from the stitched edge of the lining around the unstitched edge of the lining material at a third position along the path, and
- sewing the folded edge of the lower cuff panels to the lining material at a fourth position along the path with a sewing motion generally in timed relationship with the sewing motion at the second position along the path.

2. The process of claim 1 and wherein the step of passing the cuff lining material along the path comprises moving the cuff lining material along the path during the sewing steps at the second and fourth positions along the path and terminating the movement of the cuff lining material upon the termination of the sewing steps.

3. The process of claim 1 and further including the step of rolling the stitched shirt cuff panels and lining material in a roll.

4. The process of claim 1 and further including the steps of folding the edge of the upper cuff panel of the pairs of cuff panels at the folded edge of the lower cuff panel about the folded edge of the lower cuff panel, and simultaneously cutting across the lining material between adjacent pairs of cuff panels along the lining material and sewing the edges of the pairs of cuff panels adjacent the cut across the lining material.

5. The process of claim 4 and further including the step of cutting away with a curved cut the corners of the pairs of cuff panels across from the folded edges of the pairs of cuff panels, and wherein the step of sewing the edges of the pairs of cuff panels adjacent the cut across the lining material includes sewing adjacent the curved cut of the cuff panels.

6. A process of making shirt sleeve cuffs comprising: passing a continuous length of cuff lining material with pairs of cuff panels stitched thereto at closely spaced intervals to a cutting and sewing station, simultaneously cutting across the cuff lining material between adjacent ones of the pairs of cuff panels and sewing the edges of the pairs of cuff panels adjacent the cut across the lining material to the lining material along the cut across the lining material.

7. The process of claim 6 and further including the step of cutting into the lining material and adjacent pairs of cuff panels with a curved cut across from the edges of the pairs of cuffs and lining material which are first sewn and cut by the simultaneous cutting and sewing steps.

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