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B. LIEBOWITZ

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FOLD LINES

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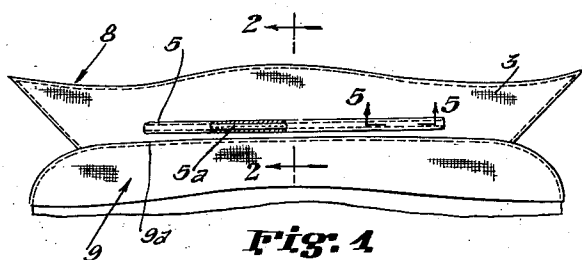
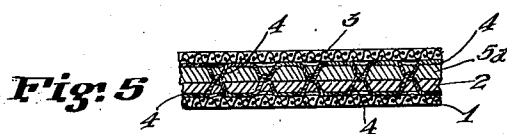
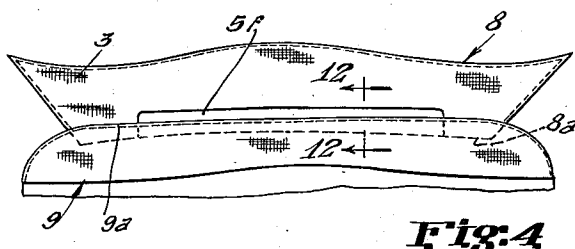
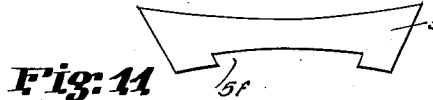
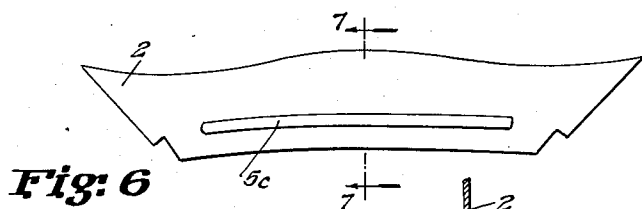
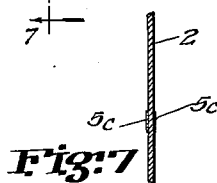
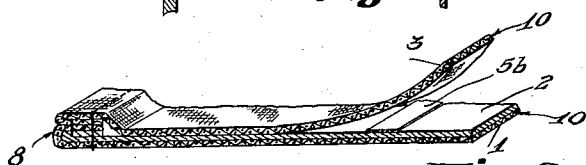
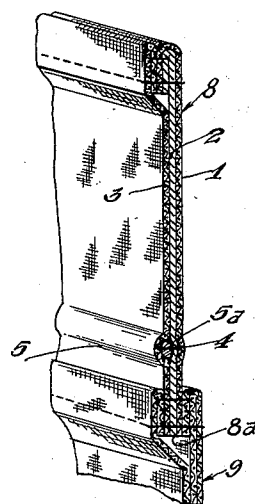


Fig. 2

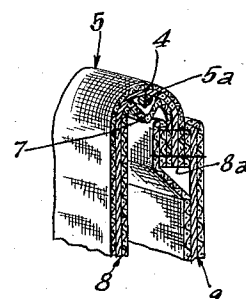


Fig. 3

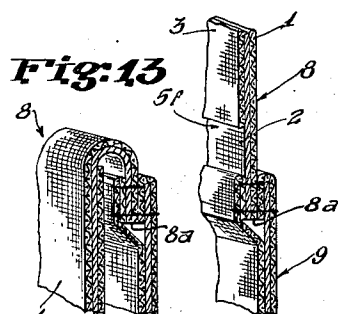


Fig. 13

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FOLD LINES

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14 Claims. (Cl. 2—143)

My invention relates to apparel, and particularly to such garments or garment parts which are stiffened by the adhesive union of a plurality of plies, and which have a fold or fold line where the garment is folded over. A particular application of this invention is to collars of the fold-over or turn-down type, such as is described in my patents, Numbers 1,968,409 and 1,968,410, where the separate plies of the collar are permanently united by adhesive means.

In these patents I have described collars or other articles of apparel in which the adhesive material is incorporated in the lining in a dry state, and said lining is then interposed between an outside ply and an inside ply, or as referred to hereinafter, between a top ply and a bottom ply. Adhesion is developed by subjecting the assembly to the action of a softening agent or solvent, and then pressure with heat to evaporate the solvent. After the adhesion is obtained, the resulting three plies have a considerable degree of stiffness, even after many launderings. Because of this stiffness, special provision is desirable in the fold zone where the garment part is folded over.

Heretofore it has been proposed to obtain predetermined fold lines in the case of permanently stiffened articles of apparel by weakening the zone of the fold line by elimination of the adhesive material. This creates a soft zone along which the article will readily fold. For example, the patent to Van Heusen, Number 1,479,565, dated January 1, 1924 and the patent to Tully, Number 1,668,744, dated May 8, 1928, disclose adhesive material completely omitted in a narrow zone along the fold line, and said narrow zone in the case of a collar extends the complete length of the collar top. In my own patents, Numbers 1,968,409 and 1,968,410, I disclosed how a fold line may be obtained by stopping the lining of the collar top before it enters into the band so as to leave a residuum of two uncemented plies of the collar where it enters the band, and also along the narrow zone adjacent to the band.

These methods of providing a very soft fold line by omission of adhesive material or of lining containing the adhesive material along said fold line or adjacent to said fold line, have important disadvantages. In the first place, manufacturing tolerances required for maintenance of a uniform width of said soft zone, are so close that I have heretofore found it impracticable to put such methods into commercial operation; the results which I have been able to obtain so far by this method, using competent operatives, and

competent cutting and stitching technique, have been unsatisfactory because of the variable width of said softened zone. Furthermore, a completely softened zone adjacent to a stiff zone is open to the objection that it creates a zone of mechanical weakness due to the abrupt change in stiffness at the boundary between the stiffened material and the very soft material forming the zone for the fold line. In many instances, this results in rapid wear at the fold line.

Also, where the region of the fold line is very soft compared with the regions adjacent to the fold line, I have found that one does not get a smooth curve in the collar after it is folded down and bent around to conform with the neck, at least in some cases depending upon the variations in width of said fold line. Moreover, in these previous forms of fold line, the fold line has extended practically the full length of the collar top and has conformed exactly to the curve of the band of said collar. I have found it desirable, however, for reasons which will be clear to those skilled in the art, to have a predetermined fold line which will stop short of the ends of the collar by at least one or two inches, and which may be perfectly straight, or in any event, less curved than the edge of the band adjacent to the collar top.

I have discovered through experiments on fold lines that a more satisfactory fold is obtained when the fold line itself, while more flexible than the regions adjacent to the fold line, is not "dead soft". In other words, a certain amount of stiffness in the fold line itself is desirable, but this stiffness must be substantially less than the stiffness of the part of the collar top adjacent to the fold line.

It is an object of this invention to provide in an article of apparel, a fold line which shall be permanent, which shall create a zone of relatively increased flexibility, but still having some stiffness, and which will tend to form a smooth curve after the garment part is turned down along the fold line and bent around into a curve.

Another object of this invention is to provide a fold line of this kind which is simple to apply in commercial production of the articles of apparel and which can be manufactured without requiring impracticable close tolerances.

A further object of this invention is to obtain the desired fold line without eliminating the adhesive material along the fold line, which elimination involves considerable difficulty and expense, and which would also involve the use of extremely close tolerances in manufacture.

Another object of my invention is to provide a flexible fold line of some stiffness by preventing the binding ply from adhering to one of the external plies along a predetermined line to form a fold line.

Another object of my invention is to provide means for and methods of manufacturing collars and specifically the fold lines thereof.

Still a further object of my invention is to provide a process of manufacturing collars which comprises preparing the fold line after the collar has been assembled and prior to the application of the adhering process.

Still a further object of my invention is to provide a process of manufacturing apparel in which the fold line is oriented with respect to formed edges of the apparel.

I accomplish these and other objects, as will hereinafter be brought out, by preventing adhesion between the lining and the bottom external ply of the collar in the zone which forms the fold line, without eliminating the adhesive material from said zone, leaving the other external ply, viz., the face ply, and the lining ply adhered throughout, thus forming a narrow zone of reduced stiffness. I may also, though it is less desirable, prevent adhesion between the face ply and the lining, as will hereinafter be disclosed in connection with the drawing, in which:

Figure 1 is a plan view of a collar top attached to its collar band, illustrating one method for forming a fold line.

Figure 2 is a sectional perspective along 2—2 of Figure 1.

Figure 3 shows the view of Figure 2 with the collar top bent over along the fold line.

Figure 4 is a plan view of a collar top attached to its collar band, illustrating another method for forming a fold line.

Figure 5 is a sectional view showing the attachment of the cord used in the construction of the fold in the method of Figures 2 and 3.

Figure 6 is a plan view of a collar top lining showing the application of still another method of forming the fold line.

Figure 7 is the sectional view 7—7 of Figure 6.

Figure 8 is a modification of Figure 7.

Figure 9 is a sectional perspective of a collar top illustrating a further modification of forming the fold line.

Figure 10 is a plan view of a collar top lining showing a still further modification of a fold line.

Figure 11 shows the plan view of the bottom ply of the collar top in the method of forming the fold line corresponding to Figure 4.

Figure 12 is the sectional perspective 12—12 through Figure 4.

Figure 13 is a sectional perspective corresponding to Figure 12, showing the collar top bent over along the fold line.

Referring to the drawing, 1 indicates the outside or top ply of a collar, 2 indicates the lining ply, and 3 the bottom ply or inside ply of the collar. These three plies together comprise the collar top 8, shown in Figure 1, which is attached to the collar band 9. Adjacent to this collar band 9 is the fold line 5 which I have shown as being straight and as extending lengthwise along the middle portion of the collar top but not reaching to the ends of this collar top. The drawing being diagrammatic, it will suffice to point out here that I prefer that the curvature of the fold line 5 shall be less than the curvature of the edge 9a of the band 9, and I also prefer that the fold line 5 shall stop short of the end of the collar by

approximately an inch or more, depending on the styling effect desired. It will be understood that stopping the fold line short as indicated tends to give a roll effect at the ends of the collars, which is desired.

In order to provide a zone in predetermined position and of reduced stiffness, I prevent adhesion between the bottom ply 3 and the lining ply 2 along the fold line 5 by inserting a cord 5a, or other means, between the bottom ply 3 and the lining 2 as indicated in Figures 2 and 3, along a line 5 which is intended to form the fold line. This cord 5a may be attached to the lining ply 2 by the stitches 4 before the lining ply is incorporated into the collar, as indicated in Figure 5. By using a so-called double lock stitch or other similar stitches giving a "cord-like" effect in a machine properly adjusted for this purpose, the effect of the cord 5a can also be obtained by the stitch 4 without requiring a separate cord element 5a. Experiments made with a row of stitches produced on a Union Special double lock stitch machine, using rather heavy cotton thread for bottom and with rather loose adjustment, have resulted in fairly good fold line effects.

Instead of using either the stitch, or a stitch in combination with a cord, I have obtained even better results using a very thin sheet of tissue paper in place of the cord 5a. This is indicated at 5b in Figure 9.

The tissue paper may be attached to the lining ply by stitching, same as 4 in Figures 2 and 3, or may be attached by pasting merely by wetting the tissue paper 5b with solvent, when the adhesive material is incorporated in the lining 2.

In order to understand how this prevention of adhesion along a fold line creates a region of increased flexibility, I have shown in Figure 3 the form taken by the collar top 8 when the collar is folded over along the fold line. It will be seen that the bottom ply 3 at the fold line frees itself from the lining ply and forms a loop 7, which loop, being entirely free of the lining ply and having no appreciable amount of adhesive material therein, offers no appreciable resistance to bending. It will be seen, therefore, that a region of considerably increased flexibility is obtained but at the same time, due to the adhesion of the plies 1 and 2, this region is not "dead soft" and functions in a very satisfactory manner, from the standpoint of both appearance and durability.

Referring to Figure 6, I have shown a modification in which the lining ply 2 is the same as before, but the fold line is obtained by incorporating on the surface of said lining a substance which will prevent adhesion. For example, wax may be run along the region 5, either on one side of the lining or on both sides, as shown in Fig. 7. A rather thick soap solution may also be used for this same purpose, or other materials. Instead of residing on the surface this material may go through and through the lining, as indicated at 5d in Figure 8. Instead of putting the material 5c on the lining ply, it can equally well be put on the bottom ply 3. Any substance which may be applied to any one of the plies in this manner so as to prevent adhesion in the subsequent cementing operations may serve. It is understood that the adhesive material is already present and the substance applied serves merely to prevent the penetration of this adhesive material into the bottom ply or, if a softer fold line is desired, into the top ply also.

I have heretofore described in this specification, the application of the fold line forming 75

means to the lining or to the bottom ply of the collar before the assembly of said plies to form the collar top. This involves an important difficulty however, viz., variations in the location of the resulting fold line 5 on the finished collar after the banding operation. The fold line forming means can be applied to any one of the plies with sufficient accuracy at the start but after the stitching and turning operations, there is a certain amount of unavoidable shifting of these plies relative to the other, which displaces the fold line forming means from its desired location, and when to this the small errors in collar banding are added, the result is a fold line whose position does not generally come within the desired tolerance with respect to the edge of the band 9a. One of the chief sources of error involved in this procedure is the shifting of the plies in turning the collar inside out.

These errors can be very considerably reduced by adopting the following procedure: First, assemble the plies to form the collar top 8 as shown in Figure 9, then trim the edge 10 so that the three plies 1, 2, and 3, are uniform along said edge 10. Then fold back the bottom ply 3 and apply the fold line forming means 5b (in this case a thin sheet of tissue paper) by gauging the position of same from said edge 10.

Since this same edge 10 forms the gauging edge for banding the collar, it will be seen that the location of the fold line forming means and the location of the band with reference to the collar are both gauged from the same line 10. In this way smaller tolerances are obtained and the distance between the fold line 5 and the edge 9a becomes more uniform.

To assist still further in locating the adhesive preventing material on the lining ply, or on the bottom ply, and in order to obtain other desired effects, I may apply this material 5e, shown in Figure 10, in the form of a wider strip extending to the edge of the lining ply 2, thereby preventing adhesion all the way from the fold line edge to the edge of the collar, which is inside the band. One of the principal advantages of the scheme shown in Figure 10, is that it permits of a different curvature for the fold line and the edge of the collar, which, as indicated above, is desirable. This is by no means necessary, however.

Instead of using a cord 5a, or a paper 5b or 5e, or a line, 5c, of wax or other substance, etc., there are a wide variety of other means for preventing this adhesion. For example, I may use a strip of "Cellophane". However, it is to be noted that a strip of fabric tape replacing the cord element 5a is not desirable. Any material which is applied in the forming of 5a or 5b, etc., adds to the stiffness where it contacts the lining ply 2. In the case of the cord, the middle zone of the fold line will be just as stiff or probably stiffer than the collar proper, but due to the breaking away of the bottom ply 3 at the loop 7, (see Fig. 3) narrow zones on either side of this cord will have increased flexibility as desired. If a tape is used, the results will be less satisfactory. On the other hand, using a thin piece of tissue paper is sufficient to prevent adhesion and at the same time adds a minimum of foreign material which would tend to increase the stiffness. The same results can be accomplished without inserting any foreign material whatever by cutting away the bottom ply 3 as shown at 5f in the bottom plan view of Figure 11.

Referring to Figures 11 and 12: It will be understood from these figures that adhesion be-

tween the bottom ply and the lining is prevented not by adding any foreign material, but merely by cutting away of the bottom ply as shown particularly at 5f in Figure 12. In order to reduce the errors in forming the fold line in the manner indicated in Figures 11 and 12, I prefer to cut the blanks for the collar somewhat wider than is required by the finished collar, assembling these blanks to form the finished collar, and, before the cementing operation is performed, I prefer to trim the edge 8a, of the completed collar top, using as a gauge for this trimming operation, the edge of the elongated notch 5f in the bottom ply 3. The method shown in Figures 11 and 12 has the disadvantage that it exposes a portion of the lining ply so that there will be some contamination of the padded surfaces of the processing machines. The disadvantages from this contamination can be avoided, however, in various ways, as by covering said slotted portion 5f, with thin tissue paper, etc., at the time of or before the cementing operation.

Still another modification consists in preventing access of the solvent to the adhesive material in the cementing operation. This can be done by applying to the bottom ply a thin strip of Cellophane, for example, in the position shown at 5 in Fig. 1. The success of this method will depend to a considerable extent on how the solvent is applied to the collar, but if the solvent is applied from the bottom side only, the method of preventing adhesion by applying a strip of some material which will prevent access of the solvent will function to best advantage. Instead of using a strip of Cellophane, I may apply material such as a proper wax or waxy substance, or may prevent the access of the solvent to the lining ply 2 in any other convenient manner.

Although I have preferred to describe in detail various modifications and methods for producing a fold line in collars, it will be obvious that other articles of wearing apparel such as cuffs, etc., may be similarly treated. It is also evident that more than one fold line may be applied to any one article. These methods may equally well be applied to a different material construction than the material with two fabric plies and an intermediate binder lining ply which I have preferred for illustration. Other variations may be formed within the scope of my invention and I do not intend to be limited except as set forth in the following claims.

I claim:

1. In an article of apparel, a pair of external fabric plies, an intermediate lining ply adhesively secured to each of said external plies, and means disposed between the lining ply and one of the external plies to prevent adhesion of said plies along the narrow zone constituting a fold line along which the article may be repeatedly folded and unfolded.

2. In an article of apparel, a pair of external fabric plies, an intermediate lining ply adhesively secured to each of said external plies, and a cordlike element interposed between the lining ply and one of said external plies to prevent adhesion of said plies along a narrow zone constituting a fold line along which the article may be repeatedly folded and unfolded.

3. In an article of apparel, a pair of external fabric plies, an intermediate lining ply adhesively secured to each of said external plies, and a strip of material interposed between the lining ply and one of said external plies to prevent adhesion of said plies along a narrow zone con-

stituting a fold line along which the article may be repeatedly folded and unfolded.

4. In an article of apparel, a plurality of fabric plies adhesively united, and shielding means disposed between at least two of said plies to prevent adhesion along a narrow zone of increased flexibility constituting a fold line, said plies being flat and smooth when unfolded.

5. In a folded garment part of the character described having a predetermined fold line, a front ply, a lining ply, a back ply, a predetermined distribution of adhesive material, and an element interposed between the lining ply and the back ply to prevent adhesion along the fold line, all of said plies being adhesively united except where said element prevents adhesion between the back ply and the lining ply.

6. In a turn down collar having at least three plies of fabric united by an adhesive, a narrow zone containing said adhesive but along which the ply that constitutes the inner ply when the article is folded is unadhered to the adjacent ply to provide a fold line of increased flexibility.

7. In a turn down collar having at least three plies of fabric united by cellulose derivative adhesive contained in at least one of said plies, a narrow zone containing said adhesive but along which the ply that constitutes the inner ply when the article is folded is unadhered to the adjacent ply to provide a fold line of increased flexibility.

8. A collar comprising a plurality of plies of fabric united by an adhesive and having a narrow zone containing said adhesive but along which the ply that constitutes the inner ply when the collar is folded is unadhered to the adjacent ply to provide a fold line of increased flexibility, said collar being adapted to be ironed smooth and flat when unfolded.

9. A collar of the fold-over type comprising a fold-over top consisting of an interliner and inner and outer plies fused thereto, the interliner having along the fold line and disposed therebetween and one of said other plies, means for maintaining free and unfused from the interliner said other ply whereby to facilitate folding of the top.

10. A collar of the fold-over type comprising a fold-over top consisting of an interliner and in-

ner and outer plies fused thereto, the interliner having along the fold line and disposed therebetween and said inner ply, means for maintaining free and unfused from the interliner said inner ply whereby to facilitate folding of the top.

11. A collar of the fold-over type comprising a fold-over top consisting of an interliner and inner and outer plies fused thereto, the interliner having along the fold line and disposed therebetween and one of said other plies, means for maintaining free and unfused from the interliner said other ply whereby to facilitate folding of the top, said means comprising a relatively narrow strip of sheet-like material interposed between the two plies.

12. A collar of the fold-over type comprising a fold-over top consisting of an interliner and inner and outer plies fused thereto, the interliner having along the fold line and disposed therebetween and said inner ply, means for maintaining free and unfused from the interliner said inner ply whereby to facilitate folding of the top, said means comprising a relatively narrow strip of sheet-like material interposed between the interliner and inner ply.

13. In an article of apparel which has a predetermined fold line along which said article is adapted to be folded and which comprises a plurality of plies at least one of which includes adhesive material which unites said ply to an adjacent ply, means disposed between said two plies along said fold line for maintaining said two plies free and unfused from each other whereby to facilitate folding of the article.

14. A method of manufacturing collar tops comprising a plurality of plies adhesively united and having a predetermined folding zone of increased flexibility, which comprises first cutting a lining ply containing adhesive material and two outer plies, assembling said plies into a completed collar top, and after said assembly interposing an element between the lining ply and one of said outer plies along said predetermined folding line to prevent adhesion between said lining ply and said outer ply, and thereafter subjecting the assembled collar top to the fusing operation.

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