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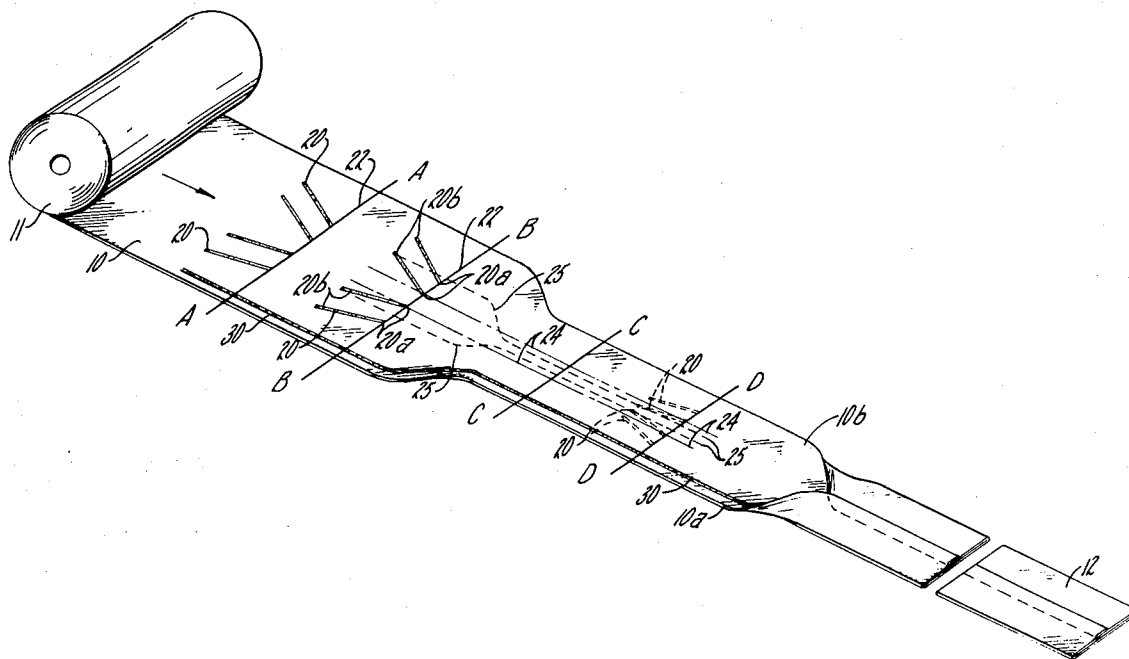
[54] **METHOD FOR PREFORMING A TAPERED SLEEVE FOR USE IN DISPOSABLE GARMENTS**  
11 Claims, 4 Drawing Figs.

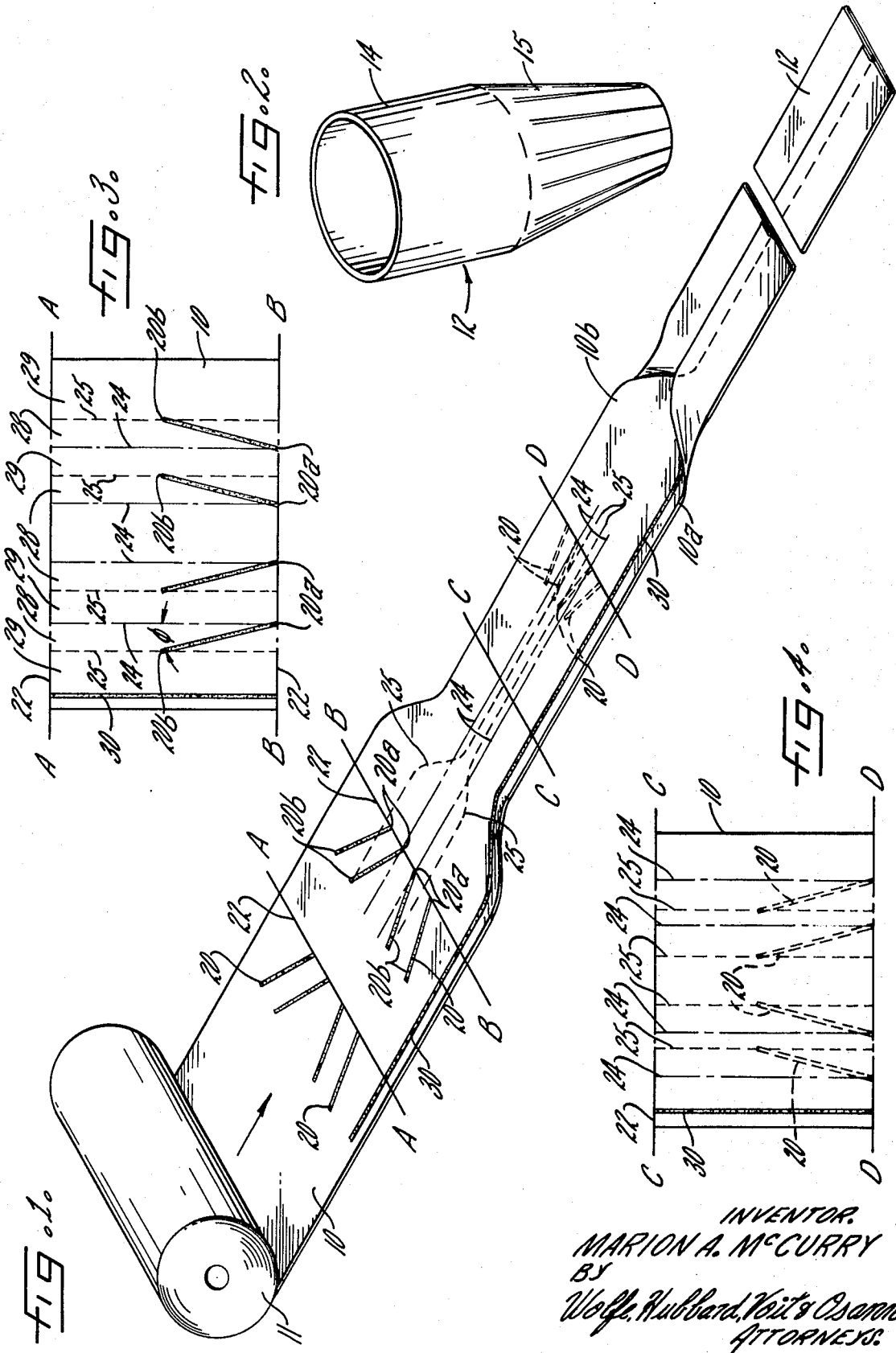
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[56] **References Cited**  
**UNITED STATES PATENTS**

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**ABSTRACT:** A method of continuously preforming tapered sleeves for use in the manufacture of garments. Rows of transversely spaced adhesive strips are successively applied to a continuous web with each strip extending at an angle to the longitudinal axis of the web. The web is then folded along longitudinal lines passing through the leading and trailing points of each strip with the longitudinal line through the leading point of each strip being folded over the longitudinal line through the trailing point. The side portions of the web are then folded inwardly and secured together to form a flat tubular web shape. The web is then cut to sleeve length along successive transverse lines passing through the leading points of each row of adhesive strips with the row of adhesive strips of each length creating a tapered section in the sleeve.





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# METHOD FOR PREFORMING A TAPERED SLEEVE FOR USE IN DISPOSABLE GARMENTS

## DESCRIPTION OF THE INVENTION

The present invention relates generally to garment manufacturing methods, and more particularly, to an improved method of preforming tapered sleeves for use in the manufacture of disposable garments.

In the manufacture of disposable garments, such as surgical gowns, the sleeves are generally preformed and are then applied to the garment in an automated process. While it is often desirable to provide tapered sleeves to such garments, prior methods of preforming tapered sleeves often have been cumbersome or inefficient, or have not been adaptable to automated manufacturing processes.

It is a primary object of the present invention to provide an improved method for efficiently and economically preforming tapered sleeves for use in the manufacture of garments.

Another object is to provide a method for preforming tapered sleeves which is readily adaptable to automated production. A more particular object is to provide such a method which preforms tapered sleeves from a single continuous web of garment material.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

FIG. 1 is a perspective and partially schematic view of a method of preforming tapered garment sleeves in accordance with the present invention;

FIG. 2 is a perspective of a finished preformed tapered sleeve manufactured by the method illustrated in FIG. 1;

FIG. 3 is an enlarged plan view of a portion of the web of garment material shown in FIG. 1 taken between lines A-A and B-B with dashed lines indicating where the web is to be folded; and

FIG. 4 is an enlarged plan view of a portion of the web of garment material shown in FIG. 1 taken between lines C-C and D-D showing the web after it has been folded along the lines indicated in FIG. 3.

While the invention is susceptible of various modifications and alternative constructions, certain illustrative embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed but, on the contrary, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention.

Turning now to the drawings and referring first to FIG. 1, a continuous web 10 of garment material is unwound from a roll 11 and advances continuously through successive operating stations to produce completed preformed tapered sleeves 12. The completed preformed sleeve 12 in the illustrated embodiment, shown in an open or usable condition in FIG. 2, includes a cylindrical portion 14 and a tapered section 15. The preformed sleeves 12 may be readily used in automated garment manufacturing processes. Such a process for making raglan-sleeve surgical gowns is described in detail in copending application Ser. No. 827,493, filed May 21, 1969, in the name of David L. Middleton, entitled "Method of Continuously Manufacturing Garments with Raglan Sleeves," and assigned to the assignee of the present application. In such a process, the cylindrical portion 14 of the preformed sleeve 12 is secured to the body of the garment so that when the garment is worn, the tapered section 15 of the sleeve snugly fits the wrist or forearm of the wearer.

In carrying out the method of the present invention, rows of transversely spaced adhesive strips 20 are successively applied at spaced intervals along the length of the web 10. The adhesive strips 20 each are positioned at an angle with respect to the longitudinal axis of the web. In the illustrated embodiment, each row consists of four adhesive strips 20, two strips being parallel and oriented at an angle  $\Phi$  in one direction with respect to the longitudinal axis of the web and

two strips being parallel and oriented at a similar angle  $\Phi$  in the opposite direction from the longitudinal axis of the web. The four adhesive strips 20 in each row have leading points 20a on a common transverse axis 22 of the web 10. A number of different adhesives may be employed for the strips 20 although it is preferred to utilize a hot melt adhesive to facilitate control of the dimensions and of penetration of the adhesive strips.

In accordance with an important aspect of the invention, after the rows of adhesive strips are applied to the web, the web is folded along longitudinal lines passing through leading and trailing points of each strip with the longitudinal line through the leading point of each strip being folded over the longitudinal line through the trailing point so that the portion of the web between said lines is positioned flatly against the portion of said web immediately adjacent said trailing point and is secured thereto along the line of said adhesive strip. In the illustrated embodiment, as best shown in FIGS. 1 and 3, the web 10 is advanced to a station where it is continuously folded along longitudinal lines 24 passing through the leading points 20a of the strips 20 and also along longitudinal lines 25 passing through trailing points 20b of the strips 20. With respect to each strip 20, the longitudinal line 24 through the leading point 20a is folded over the longitudinal line 25 through the trailing point 20b, so that a web portion 28 between the lines 24 and 25 for each strip is positioned flatly against a web portion 29 immediately adjacent the line 25 through the trailing point 20b. The adhesive strip 20 thus secures the web portion 28 to the adjacent web portion 29 along the line of the adhesive strip. As shown in FIGS. 1 and 4, such folding of the web 10 reduces the width of the moving web by the cumulative transverse distance that the four adhesive strips of each row extend, i.e., the cumulative distances between the longitudinal lines 24 and 25 for the four strips in the row. As will become apparent below, the adhesive strips 20 will secure and restrict the folded web to that narrow width only along the transverse lines 22 through the leading points 20a, while the web may be unfolded a progressively greater amount along the adhesive strips up to the trailing points 2b, at which point the web could be completely unfolded.

In order to provide sufficient web material for folding in the above manner, preferably the adhesive strips 20 of each row should be transversely spaced so that the longitudinal lines 24, 25 passing through the leading and trailing points 20a, 20b, respectively, of one strip 20 do not intersect another strip in the row. Moreover, the distance between longitudinal lines 24, 25 passing through the leading and trailing points of each strip should be less than the distance between the longitudinal line 24 passing through the trailing point 20b of any strip and a longitudinal line passing through any point on an adjacent transversely spaced strip.

After folding the web to encompass the adhesive strips 20, the web proceeds to a station where the web side portions 10a, 10b are continuously secured together to form a generally flat tubular shaped web. In the illustrated embodiment, a continuous line 30 of adhesive is applied parallel and in close relation to one side 10a of the web. The web side portions 10a and 10b are then continuously folded inwardly as the web advances with the side portions being brought into slightly overlapping relation and being secured together by the adhesive line 30. As illustrated in FIG. 1, one of the side portions 10b should be folded inwardly slightly ahead of the other side portion 10a so that the overlapping areas of the two side portions do not interfere with each other during the folding operation.

Following the folding and adhesive securing of the side portions 10a and 10b, the flat tubular web is cut to sleeve length along successive cutting lines. In the illustrated method, the continuous web is successively cut through the transverse axis lines 22 passing through the leading points 20a of the adhesive strips 20 of each row. Each sleeve thus includes a single row of adhesive strips.

It will be appreciated that the angularly oriented row of adhesive strips 20 incorporated in the folded sleeve in the above described manner causes the section 15 of the sleeve 12 to be tapered when the sleeve is unfolded or opened from its flat condition shown in FIG. 1 to the useable condition shown in FIG. 2. It will be understood that the length of the tapered section 15 of the sleeve corresponds to the length of the adhesive strips. Thus, in the illustrated case since the adhesive strips 20 do not extend the entire length of the sleeve 12, the section 14 remains cylindrical shaped. Alternatively, the taper may be made to extend the entire length of the sleeve. Moreover, the degree of taper in the sleeve 12 may be controlled by the number of adhesive strips used in each row and by their angular relation to the longitudinal axis of the web. An increase in the number of strips in each row or in their angle to the longitudinal axis will increase the amount of taper.

While the invention has been illustrated in the drawings in connection with one particular embodiment, it will be understood that various modifications may be made within the scope of the invention. For example, individual sleeve-length blanks could be used in forming the sleeves, rather than utilizing a continuous elongated web. In addition, the length of the sleeve members may be varied to provide garments having long sleeves, short sleeves, or any desired length. Furthermore, it will be understood that the sleeves may be manufactured with various desired auxiliary features, such as elastic cuffs and the like.

I claim:

1. A method of forming a tapered sleeve for use in the manufacture of garments, comprising the steps of:

applying a row of transversely spaced adhesive strips to a web of garment material, said adhesive strips each extending at an acute angle with respect to the longitudinal axis of said web;

folding said web along longitudinal lines passing through leading and trailing points of each strip with the longitudinal line through the leading point of each strip being folded over the longitudinal line through the trailing point so that the portion of the web between said lines is positioned flatly against the portion of said web immediately adjacent said trailing point and is secured thereto along the line of said adhesive strip;

securing together the side portions of said web to form a tubular shape, and  
cutting said web to a sleeve length including the row of said adhesive strips.

2. The method of claim 1 in which said adhesive strips are transversely spaced so that the longitudinal lines passing through the leading and trailing points of one strip do not intersect another strip, and the distance between the longitudinal lines passing through the leading and trailing points of each strip is less than the distance between the longitudinal lines passing through the leading and trailing points of each strip is less than the distance between the longitudinal line passing through the trailing point and a longitudinal line passing through any point of an adjacent transversely spaced strip.

3. The method of claim 2 in which said web is rectangular shaped and said strips are applied to said web with leading points along one end of said web and extending less than the entire length of said web.

4. The method of claim 3 wherein the sides of said web are secured together by applying an adhesive strip along one side of said web and folding the side portions over each other in slightly overlapping relationship with said adhesive securing

said side portions together.

5. A method of continuously forming tapered sleeves for use in the manufacture of garments, comprising the steps of:

providing a continuous elongated web of garment material;  
continuously advancing said web while applying successive rows of transversely spaced adhesive strips at spaced intervals along the length of the web, each adhesive strip in each said row extending at an angle with respect to the longitudinal axis of said web, said adhesive strips in each row being transversely spaced so that longitudinal lines passing through the leading and trailing points of one strip do not intersect another strip in said row, the distance between longitudinal lines passing through the leading and trailing points of each strip being less than the distance between the longitudinal line passing through said trailing point and a longitudinal line passing through any point of an adjacent transversely spaced strip;

continuously folding said web along the longitudinal lines passing through said leading and trailing points of each strip with the longitudinal line through the leading point of each strip being folded over the line through the trailing point so that the portion of the web between said lines is positioned flatly against the portion of said web immediately adjacent said trailing point and is secured thereto along the line of said adhesive strip;

continuously securing together the side portions of said web; and

successively cutting said web into sleeve lengths with each length including a row of said adhesive strips which forms a tapered section therein.

6. The method of claim 5 wherein the adhesive strips of each row has a leading point on a common transverse axis of said web, and said web is cut along said transverse axes to form said sleeve lengths.

7. The method of claim 6 wherein said adhesive strips of each row extend less than the entire length of said sleeve so that only a portion of said sleeve is tapered.

8. The method of claim 5 wherein said web is secured together by applying an adhesive strip along one side of said web, and continuously folding the side portions of said web over each other in slightly overlapping relationship with said adhesive securing said side portions together.

9. In the manufacture of a tapered sleeve for garments, the method comprising the steps of:

applying a row of transversely spaced adhesive strips to a length of garment material, said adhesive strips each extending at an acute angle with respect to the longitudinal lengthwise axis of said web and having a first end point on one side of said row and a second end point on the opposite side of said row;

folding said web along longitudinal lines passing through said first and second end points of each strip with the longitudinal line through the first end point of each strip being folded over the longitudinal line through the second end point so that the portion of the web between said lines is positioned flatly against the portion of said web immediately adjacent said second end point and is secured thereto along the line of said adhesive strip; and  
securing together the side portions of said web to form a tubular shape.

10. The method of claim 9 including the step of cutting said length of garment material to sleeve length prior to applying said row of adhesive strips.

11. The method of claim 9 including the step of cutting said length of garment material to sleeve length after said row of adhesive strips is applied.