

United States Patent

Breitkopf et al.

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[54] **METHOD OF MAKING DISPOSABLE GARMENTS**

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[52] U.S. Cl. 2/243 R

[51] Int. Cl. A41d 13/00

[58] Field of Search.....2/243, DIG. 7

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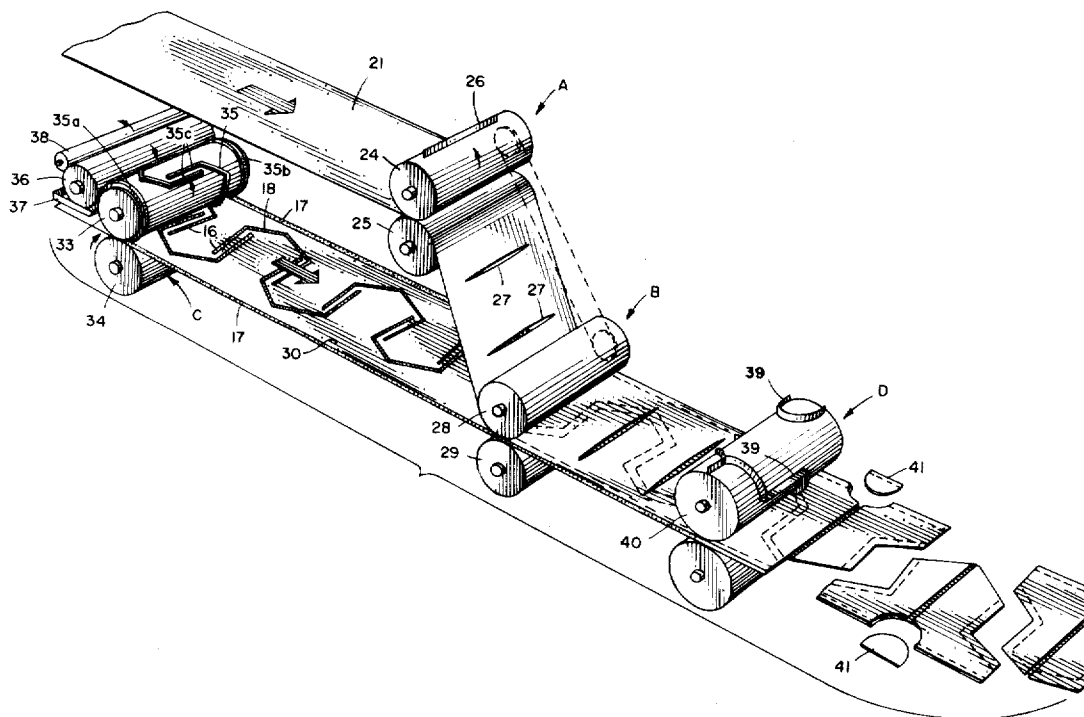
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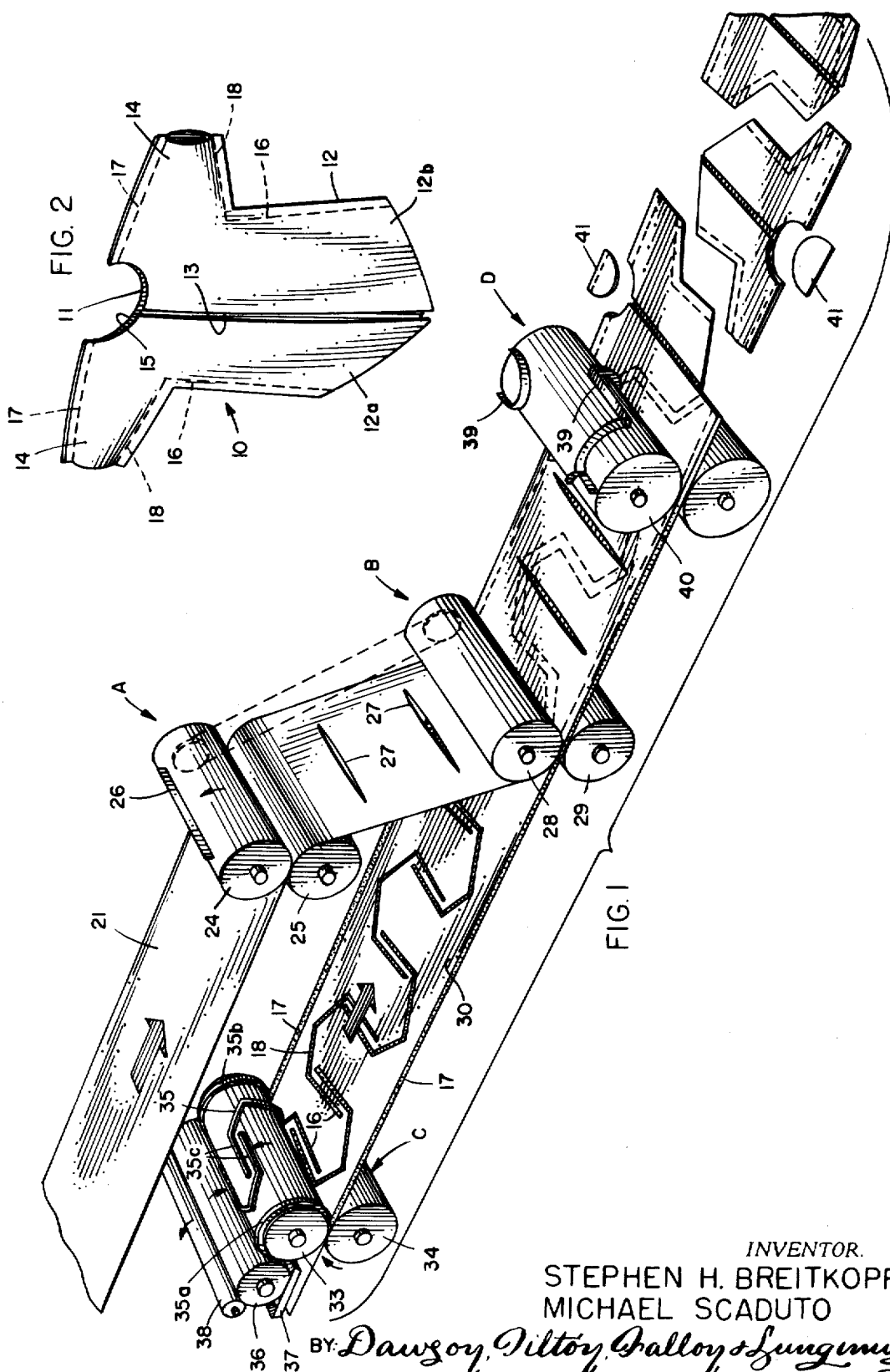
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ABSTRACT

A disposable garment which is formed from foldable sheet material supplied from two converging webs, one web providing the material primarily for the back panel of the garment and the other web providing the material primarily for the garment's front panel. As the webs converge, they are sealed together along lines defining the outline of the desired garment. Immediately prior to the sealing step, one of the webs is transversely slit, the length of each slit being less than the width of the web and terminating short of the web's longitudinal edges. After the sealing step has taken place, both webs are cut just beyond the sealing lines to free the finished garment, the cutting lines of such final step intersecting the previously formed slit with the result that the finish garment has a divided rear (or front) panel.

23 Claims, 7 Drawing Figures





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FIG. 3

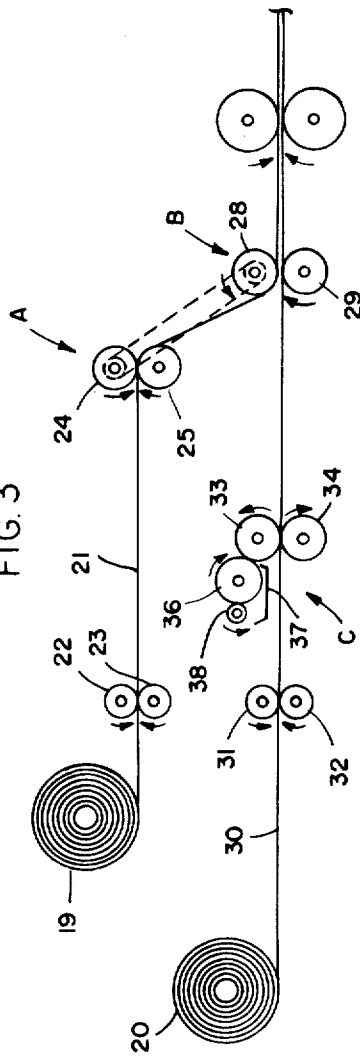
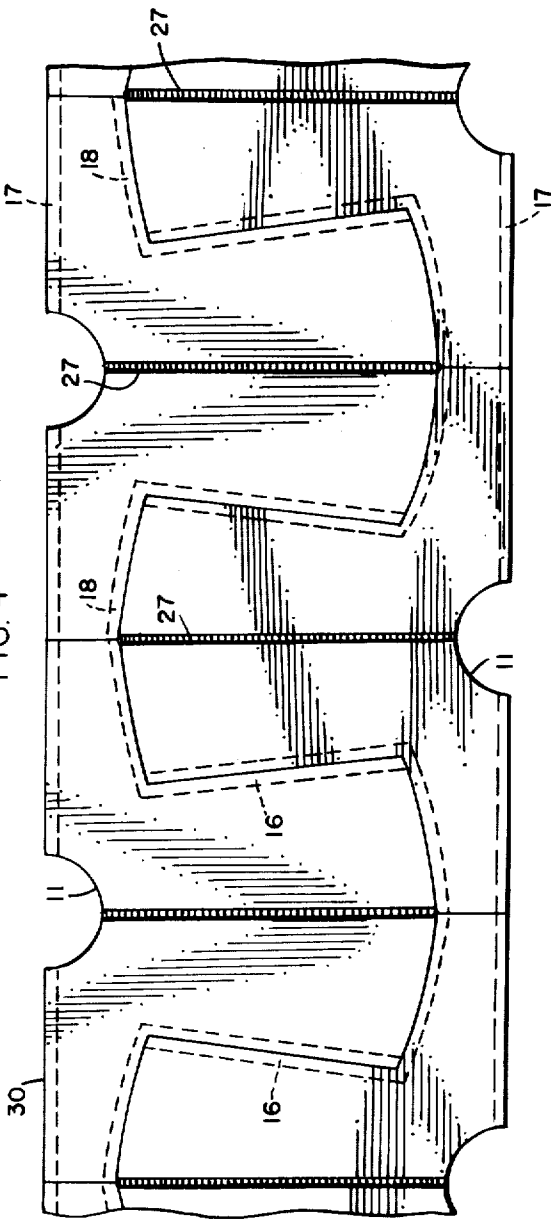


FIG. 4



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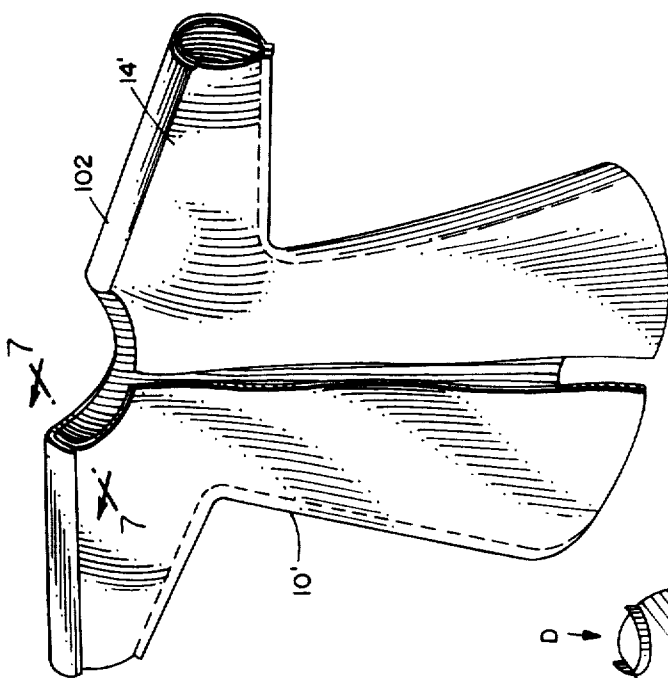


FIG. 5

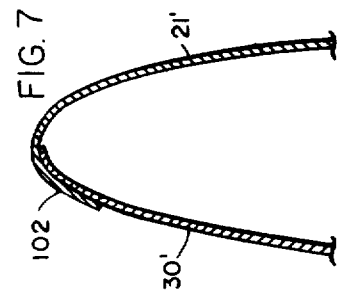


FIG. 7

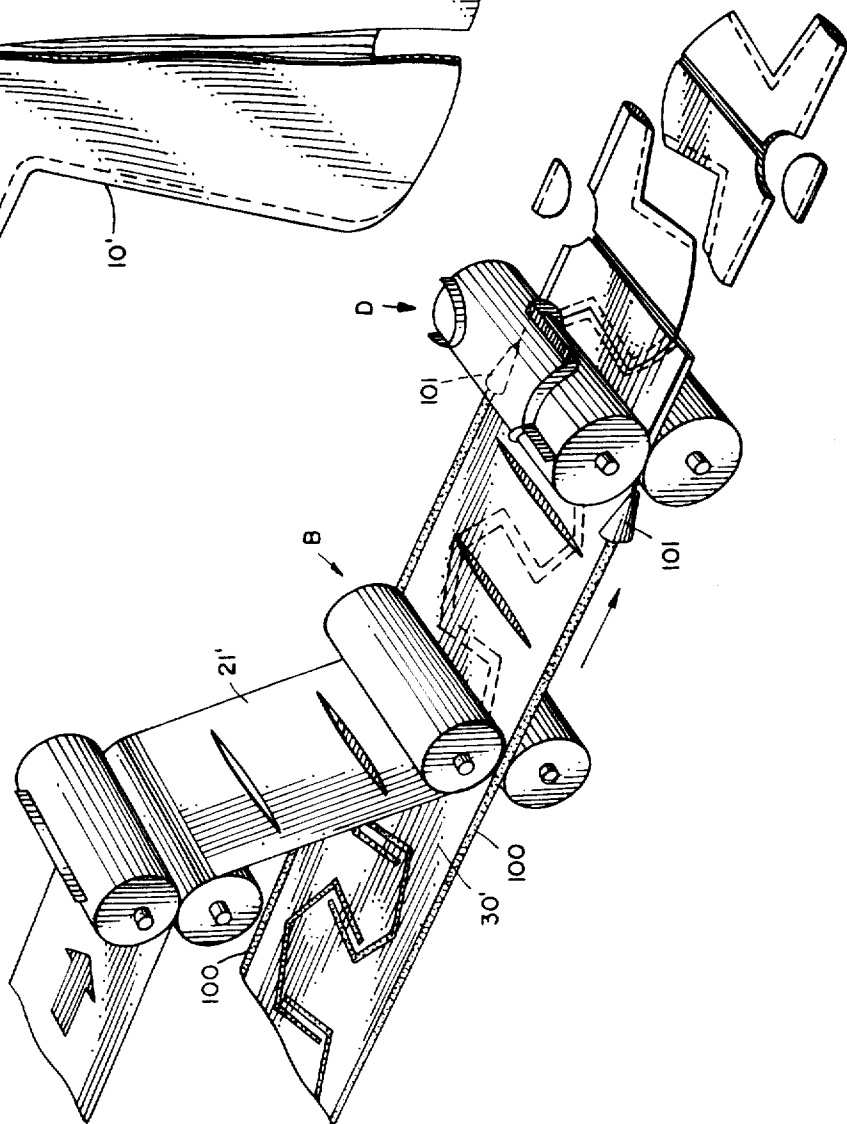


FIG. 6

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METHOD OF MAKING DISPOSABLE GARMENTS

BACKGROUND

While disposable garments formed of paper, plastic, or relatively inexpensive cloth are becoming increasingly popular for a wide variety of uses, a particularly important application for such garments is found in the medical and hospital field where disposability (by incineration) means reduced dangers of cross contamination. However, even for that application it is important that the costs of using disposable gowns and other garments compare favorably with the costs for conventional reusable counterparts; otherwise patients may be deprived of the increased safety and other important advantages which disposability affords solely because of economic considerations.

SUMMARY

The present invention is therefore directed to a relatively low cost method for producing large quantities of disposable gowns and other disposable garments. In that connection, it is a specific object to provide a method for producing a gown or other garment which has one of its panels (either the front or rear panel thereof) divided along its vertical mid line. Consequently, the garment, despite its disposability, is similar in appearance to a conventional reusable garment and has the advantages of relatively conventional design without the disadvantages which reusability entails.

It is a specific object to provide a method in which garments are die cut from two webs of paper or other sheet material which have been secured together along predetermined lines or zones by adhesives or, in the case of some plastic materials, by means of heat sealing. A particularly important aspect of the invention lies in the fact that even though die cutting occurs after the sealing step, one (and only one) of the two panels of each finished gown is centrally divided to facilitate the donning and removal of such garment. Such a result is achieved by preceding the sealing step with a cutting operation in which one of the webs is slit transversely to a limited extent, each slit having a length greater than the mid line opening of the ultimate garment but less than the width of the web. Physical integrity of the web is therefore maintained despite the slitting operation and, because of the retained physical integrity, the web may be subjected to the subsequent sealing and die cutting steps.

Other objects and advantages of the invention will appear as the specification proceeds.

DRAWINGS

FIG. 1 is a somewhat schematic perspective view illustrating a continuous garment-forming method embodying the steps of the present invention;

FIG. 2 is a perspective view of a disposable garment formed by such method;

FIG. 3 is a somewhat diagrammatic side view illustrating the manner in which the two webs are directed and treated;

FIG. 4 illustrates the interrelationship of the finished garments after they have been separated from each other in the final die cutting step;

FIG. 5 is a perspective view of a disposable garment formed by a modification of the method of FIGS. 1-4;

FIG. 6 is a schematic perspective view illustrating the modified method for producing the garment of FIG. 5;

FIG. 7 is a fragmentary sectional view taken along line 7-7 of FIG. 5.

DESCRIPTION

As illustrated most clearly in FIG. 2, the garment to be fabricated by the present method may take the form of a gown 10 having panels 11 and 12. The two panels are identical except that one of them (panel 12 in the illustrated embodiment) is provided with a mid central division or opening 13. Thus, if panel 12 is to be considered a back panel, then gown 10 is an open-back gown having a central vertical opening 13 which divides the rear panel into side sections 12a and 12b. In many applications, no fastening means for the respective side sections is necessary or desired; however, if such fastening means is desired, then any suitable fastener such as pressure-sensitive tape or conventional tie bands may be used. It is to be understood that while panel 12 has been designated as a rear panel, it may just as easily constitute a front panel if a front-opening gown is desired.

In the illustration given, gown 10 is equipped with sleeve portions 14 and a neck recess or opening 15. The two panels are joined adjacent their side edges by lines of attachment 16, and above and below the sleeve portions by lines of attachment 17 and 18.

Gown 10 may be formed of paper, plastic, cloth, or any other suitable sheet material having the necessary properties of foldability, strength, and durability. Soft paper is particularly effective because of its "breathability" or permeability to air and because it may be produced to have characteristics similar to cloth. If necessary, its strength may be increased by incorporating reinforcing fibers therein, and other properties such as wet strength, moisture resistance, fire resistance, etc. may be imparted by suitable coatings.

The paper or other sheet material is supplied from two rolls 19 and 20 as illustrated in FIG. 3. Web 21 is unwound from roll 19, passing first between a pair of draw rollers 22 and 23 and then to a slitting station A where it passes between rollers 24 and 25. In FIG. 1 it will be observed that roller 24 is provided with at least one blade 26 which extends longitudinally of the roller and which has a length less than the width of web 21. Roller 25 has an outer surface layer formed of polyurethane, rubber, or any other suitable resilient material, and serves as a resilient platten for the slit cutting roller 24.

Since the slits 27 formed in web 21 by blade 26 are shorter than the width of the web, and since they terminate well short of the longitudinal edge of the web, web 21 maintains its physical integrity despite the transverse slits formed therein. Following the formation of the slits, the web 21 passes between guide rollers 28 and 29 where it is urged into contact with the second web 30 unwinding from supply roll 20.

Since the two webs come into contact and are joined together as they pass between rollers 28 and 29, station B may be regarded as a bonding station even though preliminary steps may be performed to make such bonding possible. Thus, if the webs are to be bonded or

joined by adhesive, then the prior application of adhesive to web 30 is necessary. Such an adhesive applying station C is illustrated in FIGS. 1 and 3.

Referring to FIG. 3, it will be seen that web 30 first passes between draw rolls 31 and 32. When it reaches the adhesive applying station C, it advances between applicator roller 33 and platten roller 34. As shown in FIG. 1, applicator roller 33 is provided on its cylindrical surface with an arrangement of adhesive applying strips 35 arranged in a selected pattern. It will be observed that the specific pattern illustrated is the pattern of attachment lines 16-18 previously described in connection with the garment of FIG. 2; in other words, strips 35 are arranged to contact web 30 and apply adhesive thereto in a pattern which defines a portion of the outline of the garment ultimately to be formed. Such strips may be formed of rubber, urethane, or any other suitable (resilient or rigid) material. For purposes of economy, the garment is designed so that the outlines are applied to the web in alternating apposition, thereby keeping material waste to a minimum. Strip portions 35a and 35b apply glue lines 17 to opposite side edge portions of the web, whereas strips 35c apply glue to the web 30 to form attachment lines 16 and 18.

The term "glue" and "adhesive" have been used interchangeably herein and it is to be understood that any suitable adhesive may be used or, as already described, other bonding means such as heat sealing may be provided. Where adhesives are used, they may be thermosetting, or may be pressure-sensitive, or may be liquid adhesives of the air-drying type. Thus, a thermosetting resin might be applied at station C and then be activated by heat at station B or, alternatively, a thermoplastic resin might be applied at station C and then maintained in a liquid or semi-liquid state until after the webs have been brought together at station B. On the other hand, a pressure-sensitive adhesive might be applied at station C and then served to bond the webs together when they come into contact at station B. Any conventional pressure-sensitive adhesive such as rubber cement might be used. Similarly, any of a variety of conventional thermosetting or thermoplastic adhesives might be effectively utilized. Particularly effective results have been achieved, however, by using a conventional water soluble glue or adhesive, such as ordinary starch glue.

The manner in which the liquid glue or adhesive is applied to roller 33 is conventional. Strips 35 of roller 33 engage the surface of feed roller 36 which is partially immersed in the liquid adhesive carried in supply trough 37. A metering roll 38 engages the surface of roller 36 to squeeze excess fluid from that roller and to insure an even application of fluid to strips 35.

Webs 21 and 30 converge at the bonding station B, web 21 being brought into contact with the adhesive-treated surface of web 30 in such a way that slits 27 extend along the mid line of each garment outlined by the adhesive lines 16-18 on web 30. It is apparent, therefore, that webs 21 and 30 must be advancing at precisely the same speed and that the parts must be proportioned so that slits 27 are formed and spaced to coincide properly with the garment outlines defined by the glue adhesive lines 16-18. Synchronization of all rollers is essential. Since methods and structure for the synchronization or coordination of power-operated rollers

are well known in the paper (or plastic) handling art, and because the illustration of the power driving means for the rollers and its coordinating and synchronizing elements would tend to obscure the invention rather than clarify it such structure has been omitted from the drawings.

The final cutting station is designated generally by the letter D. To facilitate drying or curing of the adhesive, suitable heating means (not shown) may be provided between stations B and D. When thermosetting adhesives are used, or when heat sealing techniques are considered desirable, one or both of the rollers at station B may be heated. In any case, the webs 21 and 30 are bonded together along selected lines as they approach cutting station D. At that station, cutting blades or edges 39 secured to the cylindrical surface or roller 40 cut through both of the webs along the outline of the garment and just beyond the lines of adhesion, particularly lines 16 and 18. In addition, both of the webs are cut by the cutting elements of roller 40 to define the bottom edges of the garment and the neck opening 11. With the formation of the neck opening, a small section 41 of waste material is cut free. The cutting of the neck opening and the simultaneous cutting which forms the ends of the sleeves 14 results in the separation or detachment of side sections 12a and 12b from each other. Thus, it is only at the final cutting station that the opening 13 first initiated by the formation of slit 27 is finally completed. The result is an open-back (or open-front) gown which has been formed in an uninterrupted sequence of steps starting with the formation of a slit which is shorter than the width of the web in which it is formed but longer, or at least as long as, the final opening 13 in the finished gown.

The embodiment of the invention illustrated in FIG. 6 is similar to the process already described except that webs 21' and 30' are of unequal width. In the particular form illustrated, web 30' is the wider of the two, having lateral marginal portions 100 which extend a short distance beyond each of the longitudinal edges of web 21' when the two webs are brought together at station B. As the webs approach station D, the adhesive-coated marginal portions 100 of web 30' are rolled or folded inwardly by curved and tapered folding devices 101. The result is that the upper edges of the sleeves 14' of the garment 10' are reinforced with an extra thickness of material in the form of attachment portions 102, thereby strengthening the sleeves and enhancing the appearance of the garment. Except for the reinforcing fold 102 along the upper edges of the sleeves, garment 10' is identical to the garment 10 previously described.

While in the foregoing two embodiments of the invention have been disclosed in considerable detail for purposes of illustration, it is to be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

We claim:

1. In a method of making a disposable garment having front and rear panels, one of such panels having a generally vertical opening extending through its mid zone to facilitate the putting on and removing of such garment, the steps of forming a slit across a first sheet of foldable material and terminating said slit short of opposite edges of said sheet, then securing said first

sheet to a second sheet of foldable material along bonding lines partially defining the outline of a garment having front and rear panels formed by such sheets, said bonding lines being oriented so that said slit generally extends through the mid zone of one of said panels, and thereafter cutting through both of said sheets along said outline and outwardly of said bonding lines, such line of cutting intersecting said slit, whereby, said slit becomes an opening in one of said panels of the finished garment to facilitate putting on and removing of said garment.

2. The method of claim 1 in which said slit is substantially straight.

3. The method of claim 1 in which said foldable material is soft pliable paper and said bonding lines are formed by adhesive.

4. The method of claim 1 in which said foldable material is a non-rigid plastic.

5. The method of claim 1 in which said foldable material is cloth.

6. In a method of making a disposable garment consisting substantially entirely of front and rear panels, one of such panels being divided along its vertical mid line, the steps of forming a slit across a first sheet of foldable material and terminating said slit short of opposite side edges of said sheet, then superimposing said first sheet with respect to a second sheet of foldable material and securing the same together along bonding lines partially defining the outline of a garment having front and rear panels formed by such sheets, said bonding lines being oriented so that said slit generally extends along the mid line of one of said panels, and thereafter cutting through both of said sheets along said outline and outwardly of said bonding lines, such line of cutting intersecting said slit at its opposite ends, whereby, said slit divides said one of said panels along the full length thereof for facilitating the donning and removing of said garment.

7. The method of claim 6 in which said slit is formed along a substantially straight transverse line.

8. The method of claim 6 in which said bonding lines are defined by the application of adhesive.

9. In a method of making a disposable garment having front and rear panels, one of such panels having an opening extending from the top to the bottom thereof to facilitate the donning and removing of such garment, the steps of forming a slit across a first sheet of foldable material and terminating said slit short of opposite edges of said sheet, applying adhesive to a second sheet along lines partially defining the outline of a garment, then securing said sheets together along said adhesive lines, and thereafter cutting through both of said sheets along said outline and outwardly of said adhesive lines, such line of cutting intersecting at least one end of said slit, whereby, said slit becomes an opening in one of said panels to facilitate donning and removing of said garment.

10. The method of claim 9 in which said last-mentioned cutting step is along a line intersecting opposite ends of said slit.

11. The method of claim 9 in which said slit is substantially straight and extends along the longitudinal mid line of one of said panels.

12. A continuous method for making disposable garments from two longitudinally advancing webs of foldable sheet material, comprising the steps of transversely

slitting a first web at longitudinally spaced intervals while terminating each of said slits short of opposite side edges of said web to maintain the integrity of said web, advancing the slitted web into superimposing engagement with a second web of foldable sheet material and progressively securing said webs together along bonding lines partially defining garment outlines with each slit extending generally along the mid line of each outline, and thereafter successively cutting through the superimposed webs along said outlines and outwardly of said bonding lines to separate completely said garments from said webs, the lines of cutting intersecting said slits, whereby said slits become openings extending to the upper and lower edges of said garments.

13. The method of claim 12 in which said slits are formed by a blade carried by a roller against which said first web advances.

14. The method of claim 12 in which said slits are longer than the vertical dimensions of the finished garment but shorter than the width of said first web.

15. The method of claim 12 in which each slit is substantially straight.

16. The method of claim 12 in which said step of cutting through said superimposed webs is performed by blades carried by a roller against which said superimposed webs advance.

17. The method of claim 12 in which there is the step, prior to the step of superimposing said webs, of applying adhesive to said second web along lines which thereafter define said bonding lines when said first and second webs are brought into engagement.

18. The method of claim 17 in which said adhesive-applying step is performed by a roller having an adhesive-applying element which contacts said second web as said second web advances.

19. The method of claim 12 in which said first and second webs are brought into superimposing engagement with at least one pair of corresponding longitudinal edges thereof disposed in alignment with each other, said aligned longitudinal edges being bonded during said securing step and defining edge portions of said garments upon completion of said cutting step.

20. The method of claim 19 in which said first and second webs are of substantially the same width and are advanced into said superimposing engagement with the longitudinal edges of said first web in alignment with the corresponding longitudinal edges of said second web.

21. The method of claim 12 in which said first and second webs are brought into superimposing engagement with a longitudinal edge portion of one web projecting laterally beyond the longitudinal edge portion of the other of said webs, said securing step including the step of folding the longitudinal edge portion of said one web over the corresponding longitudinal edge portion of said other web and bonding said edge portions together to define a folded reinforced longitudinal edge, said folded reinforced longitudinal edge defining reinforced edge portions of said garments upon completion of said cutting step.

22. The method of claim 21 in which said garments are provided with sleeves, said folded reinforced edge portions comprising edges of said sleeves.

23. The method of claim 21 in which said first and second webs are of unequal width.

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