Aug. 11, 1964 A. F. BECKER 3,143,936

MANUFACTURE OF BAGS

Original Filed Sept. 26, 1961 3 Sheets-Sheet 1

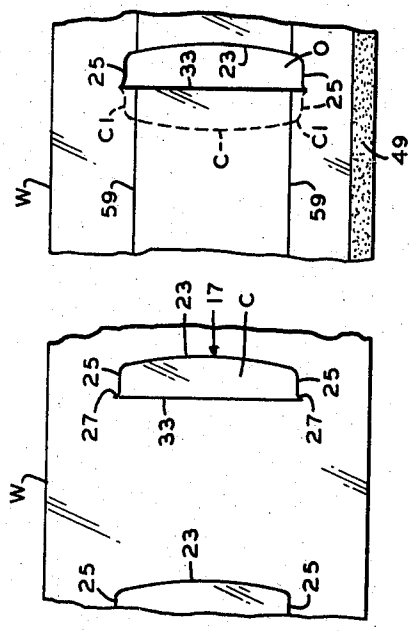


FIG. 6

FIG. 5

FIG. 1

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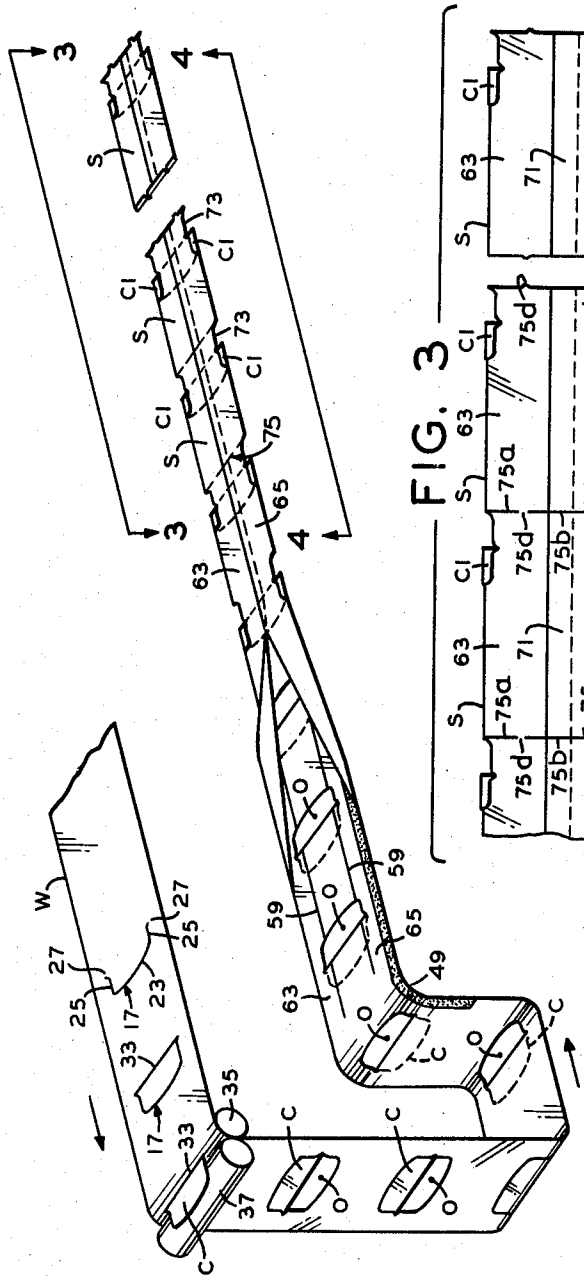


FIG. 2

FIG. 3

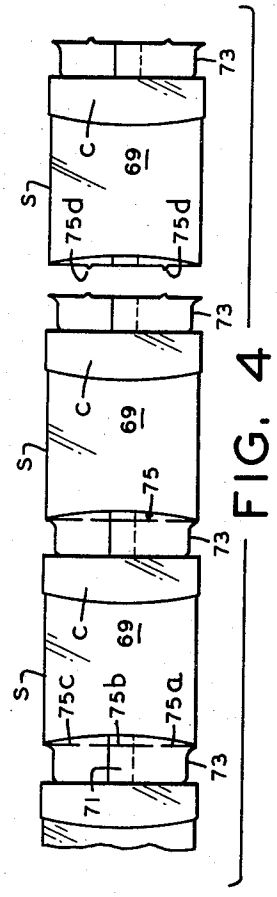


FIG. 4

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MANUFACTURE OF BAGS

Original Filed Sept. 26, 1961 3 Sheets-Sheet 3

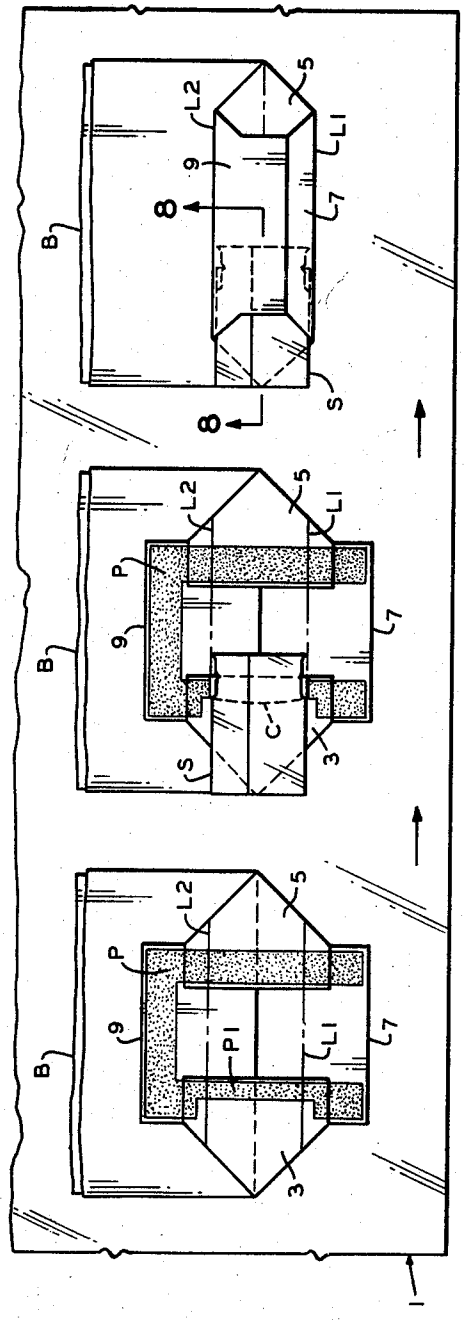


FIG. 7

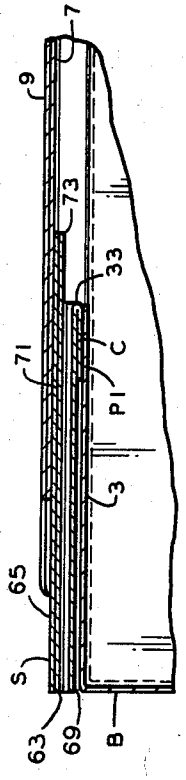


FIG. 8

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3,143,936

MANUFACTURE OF BAGS

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Original application Sept. 26, 1961, Ser. No. 140,810. Divided and this application Sept. 10, 1962, Ser. No. 222,277

4 Claims. (Cl. 93—35)

This invention relates to the manufacture of bags, and more particularly to a method of manufacturing valve sleeves for pasted valve bags.

This application is a division of my copending application Serial No. 140,810, filed September 26, 1961, entitled Bags, issued as U.S. Patent 3,129,871, April 21, 1964. In said parent application there is disclosed and claimed an improved tuck-in valve sleeve for pasted valve bags, which sleeve has a cuff providing ample space for tuck-in of the sleeve after the bag has been filled. This divisional application relates to a method of manufacturing such cuffed sleeves for application to bags being fed through a bottomer, its object being the economical manufacture of these sleeves in quantity production, from a continuous web of sleeve material and in such manner that the sleeves as completed may be combined with bags in a continuous operation. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the methods hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

FIG. 1 is a schematic side elevation showing the manufacture of bags in accordance with this invention;

FIG. 2 is a perspective illustrating certain steps performed in FIG. 1;

FIG. 3 is a top plan view of a string of sleeves made according to FIGS. 1 and 2 and showing a sleeve segmented from the string;

FIG. 4 is a bottom plan of FIG. 3;

FIGS. 5 and 6 are enlarged detail views;

FIG. 7 is a schematic plan view showing bag tubes being fed through a sidewise bottomer and having sleeves applied thereto; and

FIG. 8 is an enlarged section through a completed bag taken in effect on line 8—8 of FIG. 7.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, there is generally indicated at 1 in FIGS. 1 and 7 a bag bottomer of a type such as is referred to in the art as a sidewise bottomer. It will be understood that in this type of bottomer, flat bag tubes B are fed forward sidewise (as distinguished from lengthwise) one after another, and the ends of each tube are formed with pasted closures. Such a bottomer is shown, for example, in Rawe U.S. Patent 2,707,421. FIG. 7 shows one end of each tube of such a series of tubes being fed forward one after another through the sidewise bottomer, this end being the end including the corner of the tube where a valve is to be formed and a valve sleeve S applied. As shown for the tube at the left of FIG. 7, the end of the tube is opened up to form end flaps 3 and 5 and first and second side flaps 7 and 9, and a pattern of paste P is applied. End flap 3 may be referred to as the valve flap, being located at the valve corner of the bag tube. The paste pattern includes stripes extending across flaps 3 and 5 lengthwise of the bag and a stripe extending across side flap 9 transversely of the bag. The stripe extending across valve flap 3 has a relatively narrow portion P1 extending closely adjacent the inner end edge of flap 3 between lines L1 and L2 on which

flaps 7 and 9 are subsequently folded to complete the closure. The flaps 3 and 5 are oriented lengthwise as regards the direction of feed of the bag tubes. The bag tubes are fed forward from left to right as viewed in FIGS. 1 and 7 (as indicated by the arrows in FIG. 7), at a predetermined speed, with the bag tubes equally spaced. As the bag tubes are fed through the bottomer, and after the end of each bag tube is opened up and paste P applied, a valve sleeve S is applied to valve flap 3. In FIG. 7, a sleeve S has been applied to the bag tube at the center. Then, as shown for the tube at the right of FIG. 7, side flap 7 is folded over on line L1 on the sleeve S and end flap 5, and side flap 9 is folded over on line L2 on side flap 7 to complete the formation of the closure.

Sleeve S is a tuck-in sleeve, i.e., a sleeve which extends out of the bag at the valve corner of the bag, an outer part of the sleeve being folded under and tucked in between the remainder of the sleeve and valve flap 3 after the bag has been filled. In accordance with this invention, sleeve S is also a so-called cuffed sleeve, having a cuff C by means of which it is secured by pasting to the inner end of the valve flap 3 in such manner as to provide ample space underneath the sleeve for tucking in the folded outer portion of the sleeve.

As shown in FIGS. 1 and 2, sleeves S are formed from a continuous web W of suitable valve sleeve material, which, for example, may be creped kraft paper. At 11 in FIG. 1 is indicated a draw roll for drawing the web from a supply roll R. Idler rolls such as indicated at 13 are provided for guiding the web around the draw roll. The web has a width somewhat greater than twice the width of the sleeves to be formed therefrom. From the second idler roll 13, the web passes through a cuff cutter generally indicated at 15 which functions to make cuff cuts such as generally indicated at 17 in the web recurring at valve sleeve length intervals longitudinally of the web. Each cuff cut defines a cuff C. The cuff cutter essentially comprises a rotary knife 19 and a fixed knife 21 formed to make cuff cuts of the desired shape, as next described.

As shown in FIGS. 2 and 5 each cuff cut 17 is generally of broad U-shape, including a curved base cut 23 extending transversely of the web, relatively short side cuts each designated 25 extending generally longitudinally of the web, and outwardly curved wing cuts 27 at the ends of side cuts 25. The latter trail the base portion 23 as regards the direction of travel of the web, which is indicated by an arrow in FIGS. 1 and 2, and wing cuts 27 are at the trailing ends of the side cuts. The side cuts 25 are spaced transversely of the web a distance somewhat greater than the width of the sleeves S to be formed from the web, and are equally spaced on opposite sides of a line corresponding to the longitudinal center line of the sleeves.

From the cuff cutter 15 the web W (now having cuff cuts 17 therein) passes through a creaser comprising upper and lower rotary creasing members 29 and 31 (see FIG. 1) which function to form a crease 33 (see FIG. 2) extending transversely across the web between the ends of the wing cuts 27 of each cuff cut. As shown in FIGS. 1 and 2, web W travels horizontally through the creasing members, and thence passes around a horizontal idler roll 35 and vertically downward. In passing downward around idler roll 35, it passes between idler roll 35 and a cuff-folding roll 37. As appears from FIG. 2, when the web W changes direction from horizontal to vertical in passing around idler roll 35, each cuff C tends to continue on in horizontal direction and, for a brief instant, projects out over the cuff-folding roll 37. Then, as the cuff travels down with the web, it is folded upward on the respective crease 33 and flattened back against the

web. As a result of folding back the cuffs, openings O are left in the web.

The web W, with the folded-back cuffs C, then travels around an idler roll **39** from which it passes to an adjustable cuff register roll **41** and thence to a paster generally indicated at **43**. This paster comprises a paste wheel **45** rotating in a paste reservoir **47** and adapted to apply a stripe of paste **49** (see FIG. 2) to one margin of web W. At **51** in FIG. 1 is generally indicated an endless belt conveyor trained around pulleys **53** and **55** to have an upper reach inclined downward in forward direction. Pulley **53** is located adjacent the paste wheel **45**. The web travels upward between the paste wheel and pulley **53**. The latter is positively driven to drive the belt conveyor in the direction indicated by the arrow on the conveyor in FIG. 1. The web passes around the portion of the conveyor trained around pulley **53** and under a rotary creaser **57**. Pulley **53** is formed as a female creaser and rotary creaser **57** acts in conjunction therewith to form two longitudinally extending creases **59** (see FIGS. 2 and 6) in the web and in each cuff C located slightly inward from side cuts **25** of the cuff cuts **17**. These creases **59** define the width of sleeves S. The upper reach of the conveyor passes over a table **61**. As the web travels along with the upper reach of the conveyor over the table, the side portions **63** and **65** of the web lying outward of creases **59** are folded over at these creases by folding means such as indicated at **67** in FIG. 1 to bring the margins of the web into overlapping relation and to cause them to become pasted together by the stripe of paste **49**. The web is thereby converted into a series or string of integrally connected valve sleeves S. In the string, each sleeve S comprises a flat tube, one wall of which is constituted by side portions **63** and **65** and the other wall of which is designated **69**. Creases **59**, on which portions **63** and **65** are folded over, define the side edges of the sleeve or tube S. The sleeve or tube S has a longitudinal tube seam **71** where the margins of the web are overlapped and adhered together by paste **49**. At one end (the leading end) of each sleeve or tube S is the cuff C, which is folded back upon the sleeve or tube S. Cuts **25** are located in wall **63**, **65** of the sleeve or tube S, on opposite sides of the longitudinal seam **71**, and the cuff C extends from one cut **25** around one side edge **59** of the sleeve or tube S, across wall **69** of the tube, and around the other side edge **59** of the sleeve or tube S to the other cut **25**. The narrow end portions of the cuff which lie on the outside of wall **63**, **65** are designated **C1**. Wall **63**, **65** of each sleeve or tube S has an extension **73** projecting beyond the cuffed end of the sleeve or tube S, each extension **73** being integrally connected along a line such as indicated in phantom at **75** in FIGS. 2–4 to the next sleeeve or tube S in the string.

The string of valve sleeves S travels off the leading end of the upper reach of conveyor **51**, passes under an idler roll **77** and between a pair of draw rolls **79**. Thence it passes through a cutter generally indicated at **81** which functions almost completely but not fully to sever the string on lines **75**. For example, cutter **81** functions to cut the string at **75***a*, **75***b* and **75***c* as indicated in FIGS. 3 and 4, leaving narrow tongues of the web material such as indicated at **75***d* interconnecting the individual sleeves S in the string. Cutter **81** essentially comprises a rotary knife **83** and a fixed knife **85** formed to make incomplete cuts as described.

The string passes from the cutter **81** between so-called forwarding rolls **87** and thence between so-called snap-off rolls **89**. Both the forwarding rolls and the snap-off rolls are positively driven, but the snap-off rolls **89** are driven at a faster speed than the forwarding rolls **87** so as to cause each successive sleeve S exiting from the nip of the forwarding rolls to be snapped off at the line **75**, the narrow tongues **75***d* tearing apart as appears in FIGS. 2–4. Thus, the sleeves S are segmented from the string.

At **91** is indicated an endless chain trained around sprockets **93**, **95**, **97** and **99**. This chain is driven in the direction indicated by the arrow in FIG. 1. It carries a series of sleeve gripper units each generally indicated at **101**. Three such gripper units are shown in FIG. 1. These are spaced at equal intervals along the length of the chain. Each gripper unit comprises a jaw **103** carried by the chain and fixed against movement relative to the chain, and a jaw **105** pivoted at **107** on the chain for pivotal movement relative to the chain between open and closed position realtive to the jaw **103**. The sprockets are so located that the chain has a lower forwardly travelling reach generally aligned with the path of the string of sleeves S. As each gripper unit **101** comes around with the chain around the sprocket **93** at the trailing end of the lower reach of the chain, the pivoted jaw **105** of the unit is open as appears in FIG. 1 and the leading end of a sleeve S segmented from the string as previously described enters the gripper unit, the sleeve being forwarded for entry of its leading end into the gripper unit by a lower forwarding section **109** and an upper forwarding roll **111**. The latter is coaxial with sprocket **93**. The leading end of the sleeve comes under the fixed jaw **103**. Then the pivoted jaw **105** swings closed to grip the sleeve. The action of the pivoted jaw may be under control of any suitable means, such as a fixed cam track cooperating with a cam follower on the pivoted jaw.

A sleeve S gripped by a gripper unit **101** on chain **91** is carried along with the lower reach of the chain and delivered into position on end flap **3** of the partially formed closure on one of the series of bags B being fed forward through the bottomer **1**. When the sleeve has been carried into proper position on the end flap **3**, the pivoted jaw **105** of the gripper unit opens to release the sleeve, and the gripper unit travels up and away with the chain around sprocket **95**. An endless belt **113** trained around pulleys **115** and **117** (the former being coaxial with sprocket **99**) holds the sleeve in position on the end flap **3** after the pivoted jaw **105** has opened.

The sleeve forming and delivering means above described is driven in synchronism with the bottomer **1** for delivering a sleeve S for each bag tube B fed through the bottomer, with the delivery of the sleeves phased with the feed of bag tubes so that each sleeve is delivered onto valve flap **3** of a bag tube with the cuff C of the sleeve overlying the inner end margin of the valve flap **3**, i.e., with the crease **33** substantially in register with the inner end edge **119** of the valve flap **3**. It will be observed that each sleeve is delivered with its wall **69** and cuff C on the bottom for this purpose. Also, the path of the web W and the string of sleeves S into which the web is formed, and of the individual sleeves segmented from the string, is registered with the path of the bag tubes being fed through the bottomer so that the longitudinal center line of each sleeve delivered to a bag tube is substantially in register with the center line of the valve flap **3**.

Draw roll **11**, rotary knife **19**, rotary creaser members **29** and **31**, cuff-folding roll **37**, rotary knife **83** and forwarding rolls **87** are all driven, in synchronism with bottomer **1**, at such speed as to produce one sleeve for each bag tube fed through the bottomer. The drive for these elements may be via a change gear from the bottomer, permitting change of speeds by changing gears for producing sleeves of different length. Paste wheel **45**, pulley and female creaser **53**, draw rolls **79** and draw roll **11** are driven off the output of the change gear via a variable speed drive which enables adjustment of tension on the sleeve material. Snap-off rolls **89**, forwarding section **109** and forwarding roll **111**, chain **91** and belt **113** are driven at a speed such as to deliver the sleeves at the same speed as the speed of bag tube feed through bottomer **1**. Cuff register roll **41** is adjustable for varying the length

of sleeve material between cuff cutter **15** and sleeve cutter **81** to provide for proper registration of cuff cut and sleeve cut. Draw rolls **79**, cutter **81** and forwarding rolls **87** are part of a unit **121** which may be adjusted in position so that the distance between forwarding rolls **87** and snap-off rolls **89** may be varied for various sleeve lengths.

From the above, it will be apparent that each completed bag has a closure at one end comprising the inwardly directed end flaps **3** and **5** and the first and second side flaps **7** and **9**, with end flap **3** constituting a valve flap. Sleeve S, which is a tuck-in sleeve, and which comprises a flat tube, overlies the valve flap **3**. The first side flap **7** is folded over on the outer wall **63**, **65** of the sleeve on tube S and the end flap **5**, and the second side flap **9** is folded over on the first side flap **7** and adhered thereto by paste P. The sleeve or tube S has the pair of cuts **25** extending inward from one end thereof defining the cuff C, this cuff being folded back on the outside of the sleeve or tube S. The sleeve or tube S is positioned on valve flap **3** with cuff C overlying the margin of flap **3** at the inner end of flap **3** (see FIG. 8) with the sleeve or tube S extending outward over the flap **3**. Cuff C is adhered to the flap **3** by the paste at **P1**.

More particularly, the cuts **25** are located in the outer wall **63**, **65** of the sleeve or tube S, and the cuff C extends from one cut **25** around one side edge **59** of the sleeve or tube S, across the inner wall **69** of the sleeve or tube S, and around the other side edge **59** to the other cut **25**. The sleeve or tube S actually consists of a rectangular section of the valve sleeve material W folded to form the sleeve or tube S with overlapping adhered-together margins in the outer wall **63**, **65** forming the longitudinal seam **71**, cuts **25** being located on opposite sides of this seam (see FIGS. 2 and 3). The folding back of the cuff leaves extension **73** of wall **63**, **65** projecting inward beyond crease **33** which is located at the inner edge of flap **3**.

The bag is adapted to be filled by entering a filling spout in the sleeve S and blowing the material with which the bag is to be filled (such as a pulverized or granulated material) into the bag through the spout. After the bag has been filled, it is taken off the spout, and the outer half of the sleeve S is folded under and tucked in underneath the inner half of the sleeve. With the cuff C, full tuck-in to the point where the original outer end of the sleeve is entered between the cuff C and the overlying portion of the inner wall (the wall **69**) of the sleeve is readily accomplished. That is, the cuff C provides space for tucking the sleeve in as far as the inner end edge of flap **3** conceivably to the point where the end of the sleeve would engage crease **33**. In this respect, it will be observed that the paste **P1** is applied in a relatively narrow band (see FIG. 7) no wider than cuff C, and does not extend outward beyond the edge of the cuff so as to avoid having the bottom wall of the sleeve as viewed in FIG. 8 stuck to flap **3**. If it were stuck to flap **3**, full tuck-in of the sleeve would be blocked.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above methods without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. The method of forming cuffed valve sleeves for application to bags fed through a bottomer, comprising feeding a continuous web of valve sleeve material in a predetermined path, forming cuff-defining cuts in the web at sleeve length intervals in the web, each cuff-defining cut including a base cut extending transversely of the web and side cuts extending in trailing direction from the ends of the base cut, folding back the cuffs defined by the cuts, folding over side portions of the web on lines located inward of the side cuts to bring the side margins of the web into overlapping relation and adhering said side margins together thereby to form a continuous string of integrally connected flat tubular valve sleeves each having a folded-back cuff at one end, and segmenting each individual valve sleeve from the string for application to a bag by forming a line of weakness across the string at the trailing end of the leading sleeve of the string and snapping off the leading sleeve at said line of weakness by accelerating it relative to the speed of web feed.

2. The method of claim 1 wherein the cuffs are folded back by feeding the web over a guide and changing the direction of web travel at the guide to cause the cuffs to project out from the web and then causing the cuffs to engage a member which folds them back on the web.

3. The method of claim 2 further including the step of forming creases in the web extending transversely of the web between the ends of the side cuts to facilitate folding back the cuffs.

4. The method of claim 3 further including the step of creasing the web on the lines located inward of the side cuts after the cuffs have been folded back.

References Cited in the file of this patent

UNITED STATES PATENTS

971,780	Parrish	Oct. 4, 1910
2,216,212	Potdevin et al.	Oct. 1, 1940
2,955,517	Honsel	Oct. 11, 1960