United States Patent [19]

Bolling et al.

[11] **3,929,275**

[45] ***Dec. 30, 1975**

[54] **BAGS WITH FILM LINERS AND METHOD OF MAKING**

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[73] Assignee: **Union Camp Corporation,** Wayne, N.J.

[*] Notice: The portion of the term of this patent subsequent to Feb. 11, 1992, has been disclaimed.

[22] Filed: **June 28, 1974**

[21] Appl. No.: **484,110**

Related U.S. Application Data

[62] Division of Ser. No. 269,755, July 7, 1972, abandoned.

[52] **U.S. Cl.** ..... **229/55;** 93/8 W; 93/355 B; 229/14 B

[51] **Int. Cl.²** **B31B 39/00**

[58] **Field of Search** .... 93/35 R, 355 B, 8 W, 36.01, 93/8 R, 14, 17, 18, 19, 20, 26, 27; 229/55, 58, 14 B

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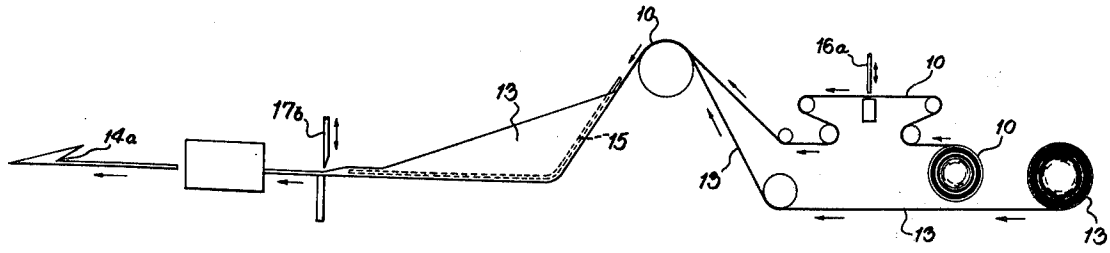
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Primary Examiner—James F. Coan
Attorney, Agent, or Firm—Charles P. Bauer

[57] **ABSTRACT**

Paper bags which contain a liner of flat non-gusseted plastic film tubing, heat sealed at the bottom to provide a leakproof container for various types of materials, and the method of producing such bags.

5 Claims, 25 Drawing Figures



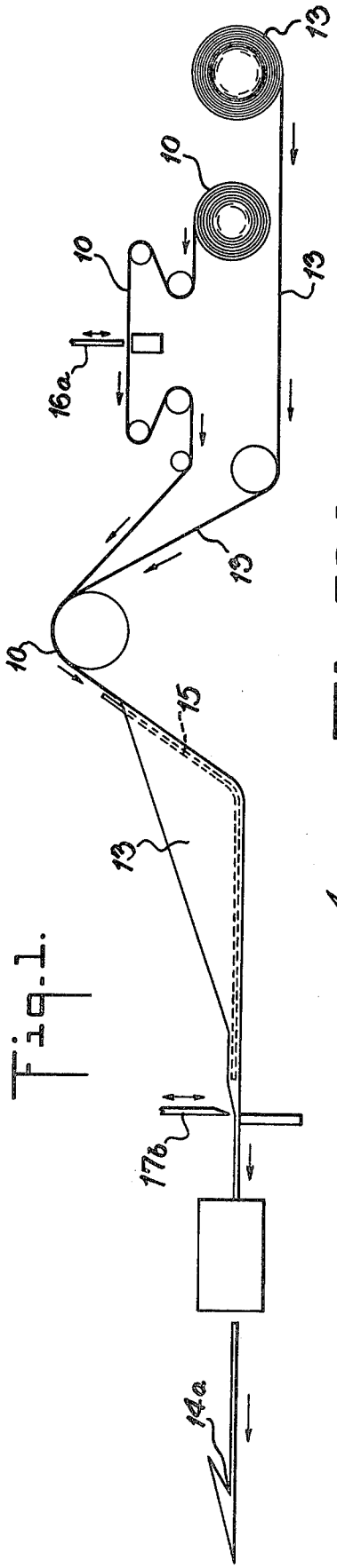


Fig. 1.

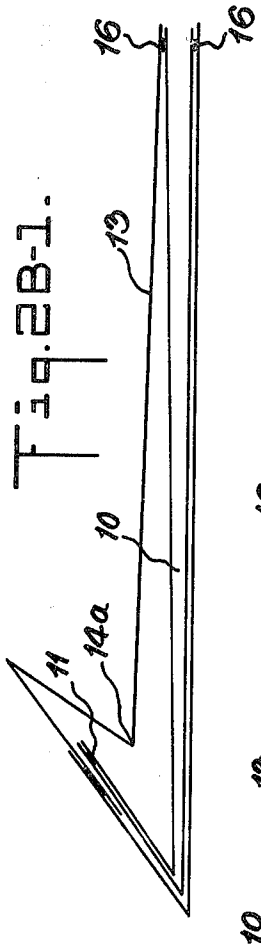


Fig. 2B-1.

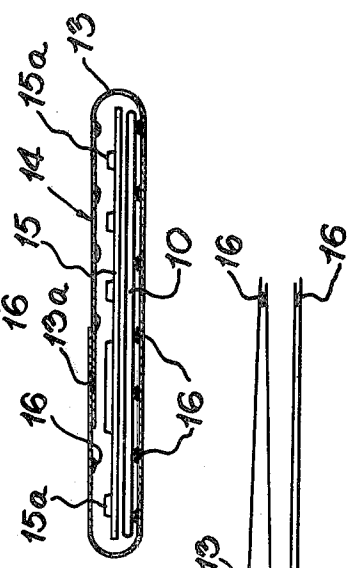


Fig. 2C.

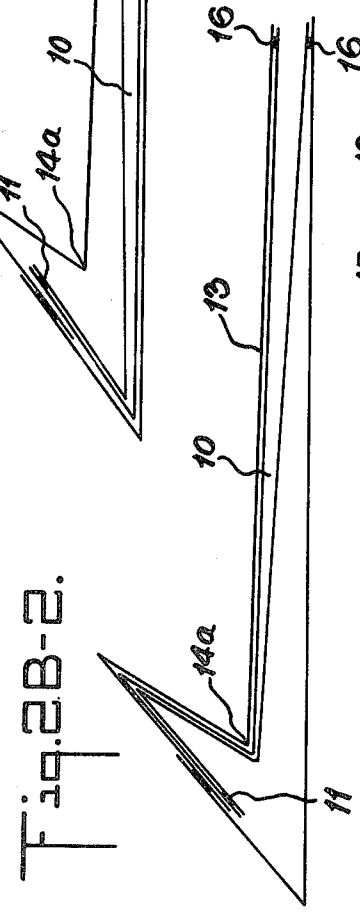


Fig. 2B-2.

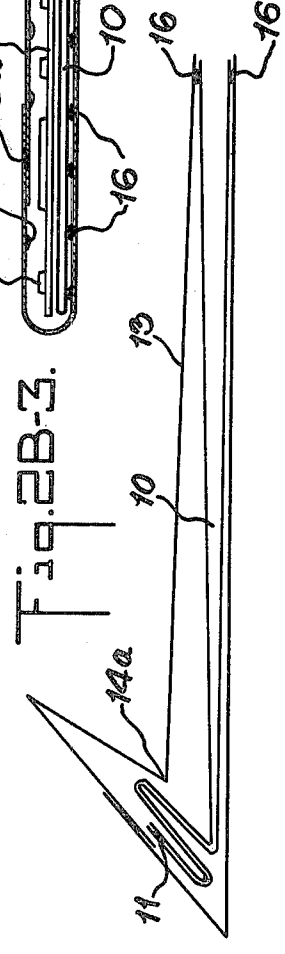


Fig. 2B-3.

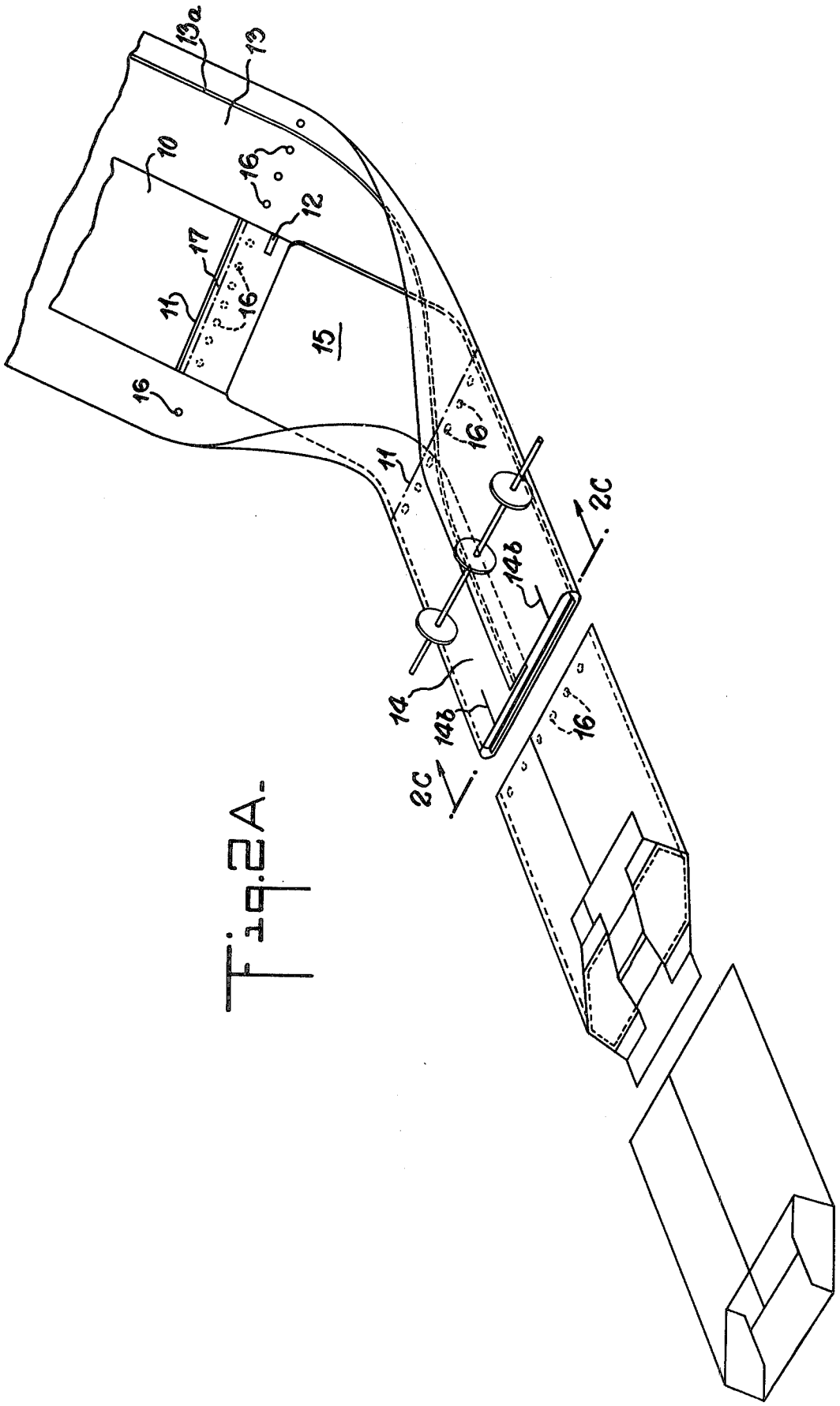
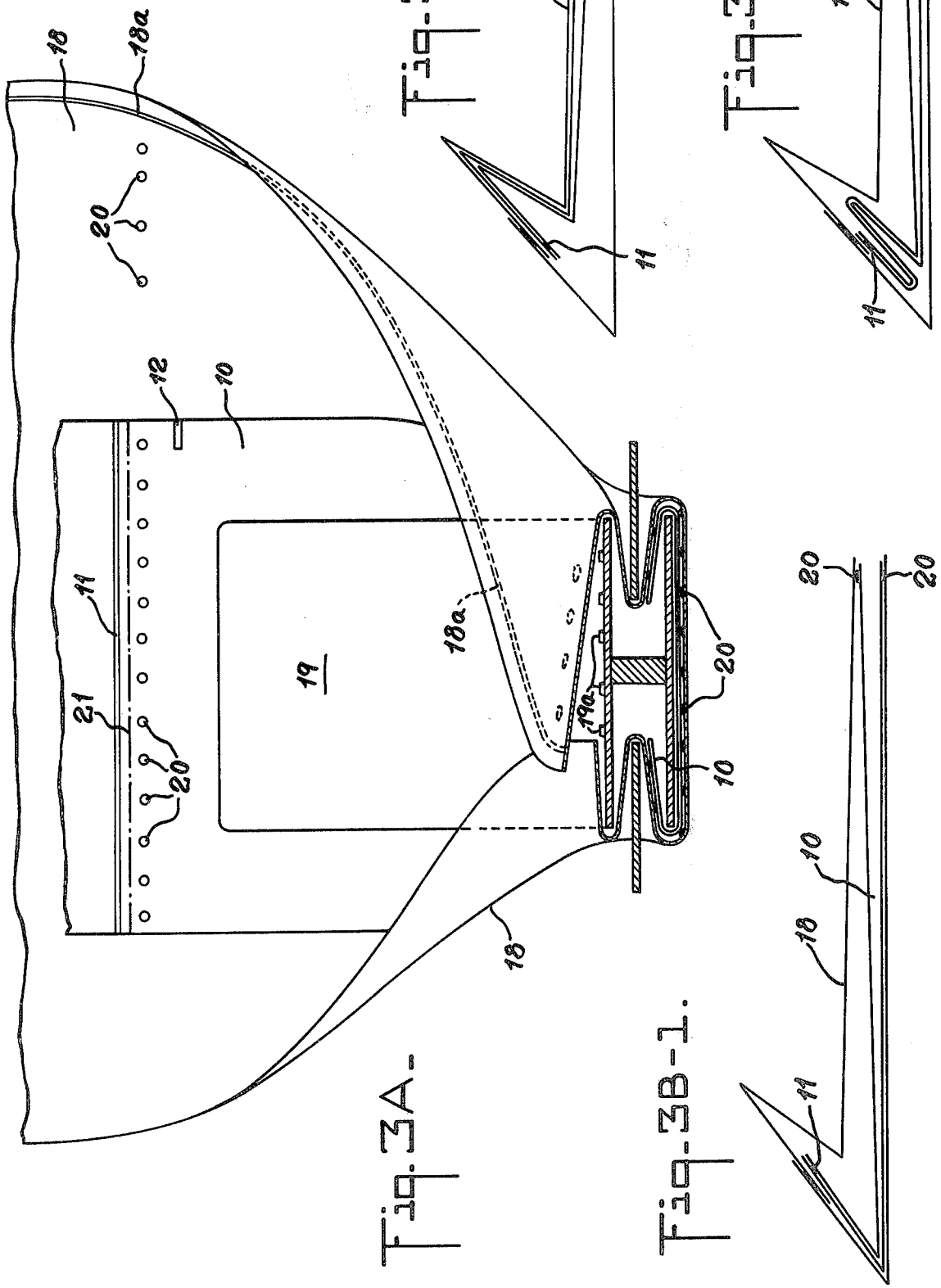


Fig. 2A.


18
18a
20
12
10
11
21
19
18a
19a
20
10
18
Fig. 3A-
Fig. 3B-2.
Fig. 3B-3.
Fig. 3B-1.

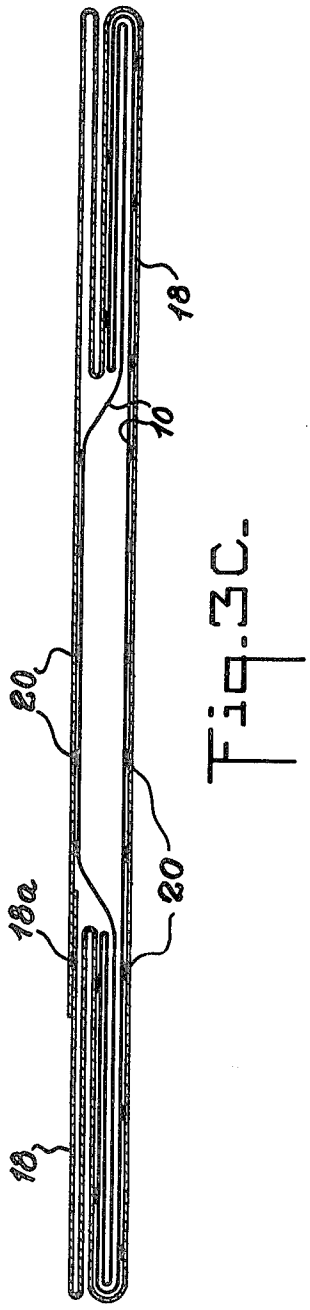


Fig. 3C.

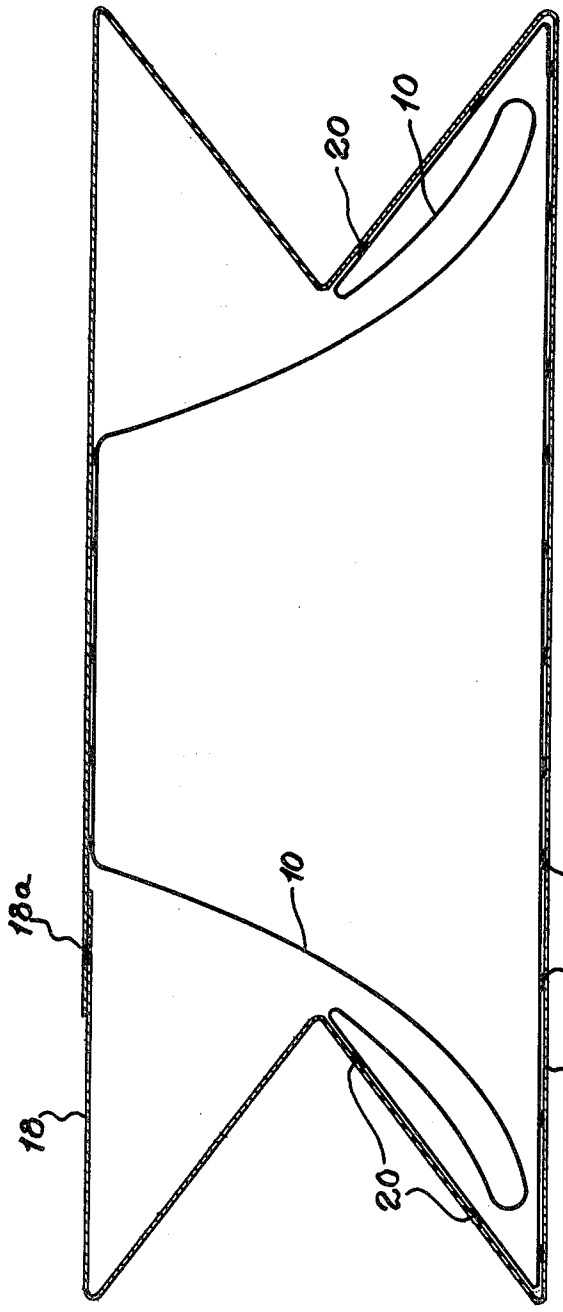


Fig. 3D.

Fig. 4A.

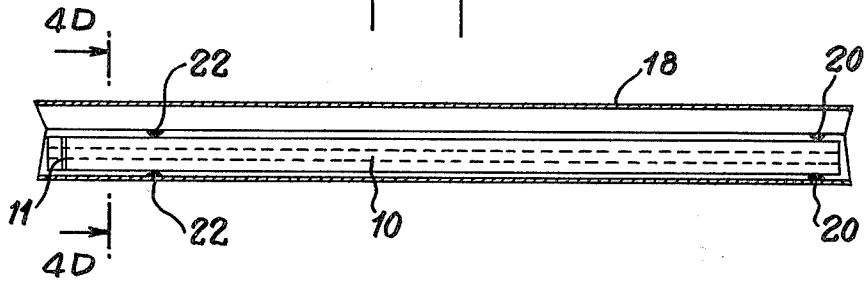


Fig. 4B.

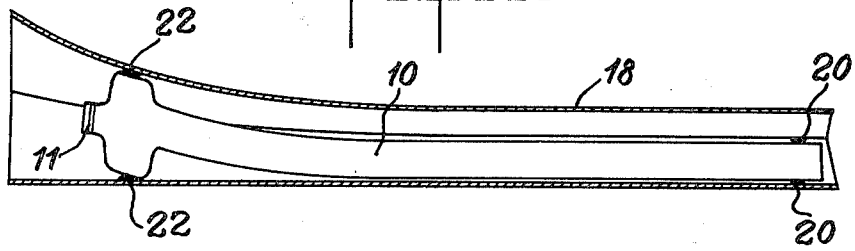


Fig. 4C

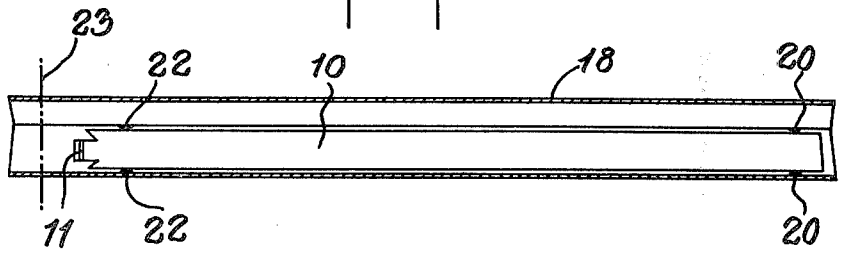


Fig. 4D.

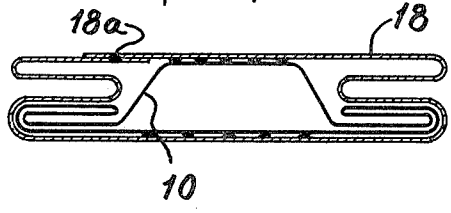


Fig. 5A.

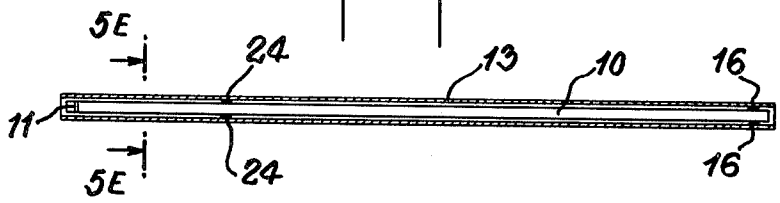


Fig. 5B.

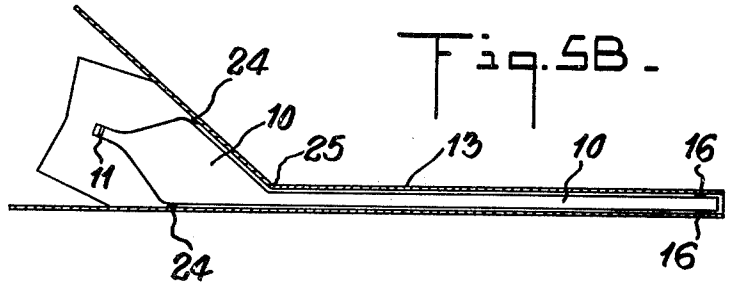


Fig. 5C.

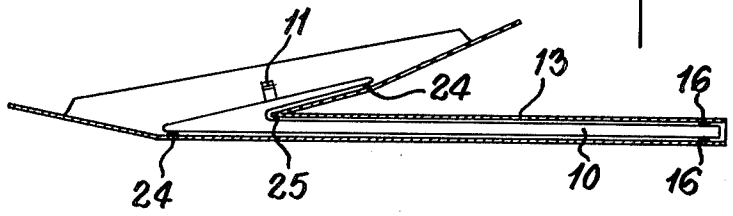


Fig. 5D.

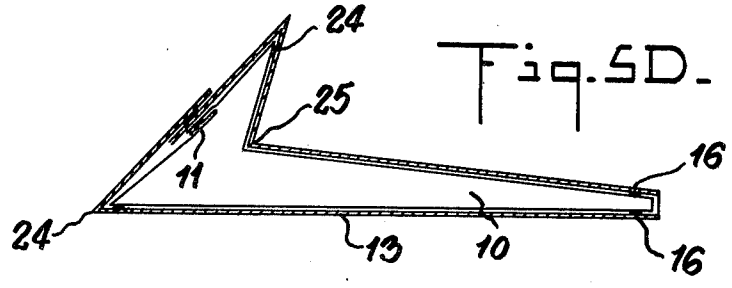


Fig. 5E.

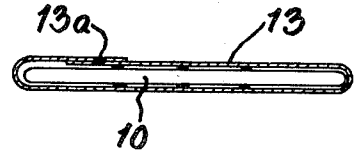


Fig.6A.

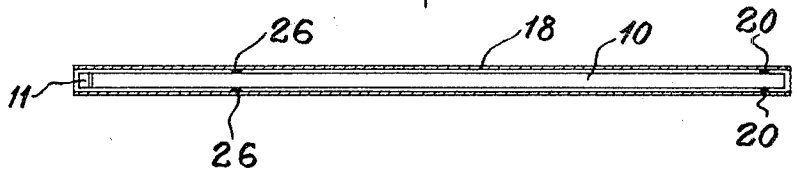
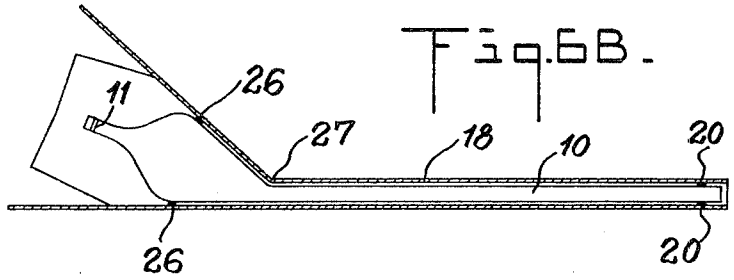


Fig.6B.



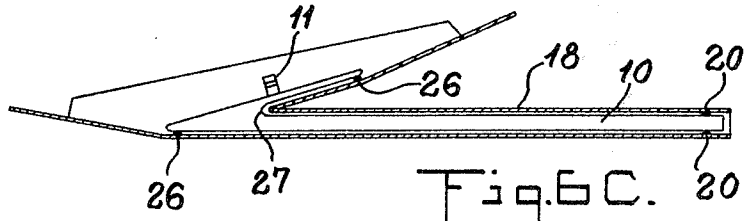


Fig.6C.

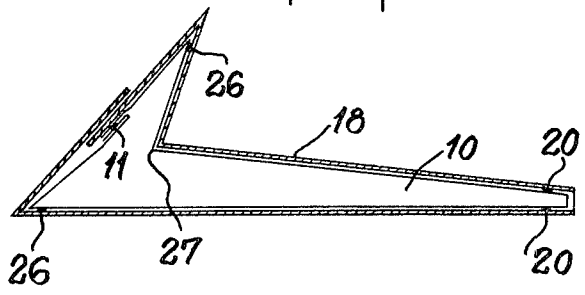


Fig.6D.

BAGS WITH FILM LINERS AND METHOD OF MAKING

This is a division of application Ser. No. 269,755, filed July 7, 1972, and now abandoned.

BACKGROUND OF THE INVENTION

The paper bags of the present invention can be made in different styles, but each style embodies the same type of non-gusseted plastic film tubing. Such styles which are all open mouth at the top or filling end may be either (1) pasted satchel bottom bags, flat pasted bags, or flat sewn tubes, all formed from a flat paper tube, or (2) automatic bags, square bags or gusseted sewn tubes, all formed from a gusseted paper tube.

The plastic tubing in continuous roll form is heat sealed transversely and fed into the inside of the paper tube during the conventional formation of the paper bag. In combining the tubing with the paper, various forms of adhesive patterns are used depending on the style of the bag and its ultimate use. The method is simple and economical to perform.

SUMMARY OF THE INVENTION

It is an object of this invention to provide bags in different styles, each of which contains a liner or pouch of flat non-gusseted plastic tubing, heat sealed at the bottom to provide a leakproof container.

It is a further object to provide a bag having an inner plastic pouch which pouch, filled with product and sealed, can be separated intact from the outer paper bag.

It is a further object to provide an open mouth gusseted bag which has the plastic liner so adhered to the paper bag at the open end that the liner opens easily for rapid filling of the liner within the bag.

It is a further object to provide a method whereby flat non-gusseted plastic film tubing heat sealed transversely at tube length intervals can be combined with the web or webs of paper in a conventional bag machine to form a paper bag with a film liner.

It is a further object to provide a method of adhering the plastic film tubing to the inside of a gusseted paper bag so that the bag and liner open easily for filling.

It is a further object to provide a method of adhering the plastic film tubing to the inside of the paper bag so that the liner filled with product and sealed can be completely removed from the paper bag.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects and advantages will become apparent from the following detailed description which is to be taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a plan view in elevation showing the steps in the method of the present invention;

FIG. **2A** is a perspective view showing the combining of the film tubing with the paper web on the former of a bag tuber and the formation of the bottom of a satchel bottom bag;

FIGS. **2B-1, 2B-2,** and **2B-3** are cross sectional longitudinal views of the finished unopened satchel bottom bag of FIG. **2A** showing different possible configurations of the film tubing inside the bottom of the bag;

FIG. **2C** is a cross sectional view along the line **2C—2C** of FIG. **2A** but with the top spot pasting added to show how it will look in the top of the bag;

FIG. **3A** is a view similar to that of FIG. **2A** showing the combining of the non-gusseted film tubing with the paper web on the former of a bag tuber and the formation of a gusseted paper tube;

FIGS. **3B-1, 3B-2,** and **3B-3** are cross sectional longitudinal views of the tube of FIG. **3A** with the bottom end formed into an automatic style bag with different possible configurations of the film tubing inside the bottom of the bag;

FIG. **3C** is an end view of the unopened top end of the gusseted style tube of FIG. **3A;**

FIG. **3D** is an end view similar to that of FIG. **3C** showing the top end of the bag partially opened;

FIGS. **4A, 4B** and **4C** show the steps in forming the bottom end of the tube of FIG. **3A** into a sewn bottom (gusseted) bag where a bottom adhesive pattern between the plastic tubing and paper is added;

FIG. **4D** is a cross sectional view along the line **4D—4D** of FIG. **4A;**

FIGS. **5A, 5B, 5C** and **5D** show the steps in forming the bottom end of the tube of FIG. **2A** into a satchel bottom (non-gusseted) bag where a bottom adhesive pattern between the plastic tubing and paper is added;

FIG. **5E** is a cross sectional view along the line **5E—5E** of FIG. **5A;**

FIGS. **6A, 6B, 6C** and **6D** show the steps in forming the bottom end of the tube of FIG. **3A** into an automatic (gusseted) bag where a bottom adhesive pattern between the plastic tubing and paper is added.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1** of the drawings, there is shown a roll of flat plastic tubing **10** which is used as the liner for all types of bags covered by this invention. Such tubing is received for use in continuous roll form and may be heat sealed along lines **11** at appropriate tube length repeats with a printed eyemark **12** near each heat seal line for compensation of the paper-film cutoff on the bag machine after the paper and film have been combined into a tube. The plastic tubing width is approximately one-half of the finished bag perimeter. Such flat tubing as shown can be used to produce bags without gussets, such as the satchel bottom style, which has a flat tube, or bags with gussets, such as the automatic style or sewn tube, which has a tube with pleats or gussets. It will be understood that continuous plastic tubing which does not have the heat sealed lines **11** can also be used, in which case the tubing can be heat sealed in line and in register with the final cutoff in the web section of the bag machine. Although seamless flat tubing is preferred, it will be further understood that plastic sheeting can be used in which case a separate tube forming, seaming and heat sealing step will be necessary before the plastic tubing is combined with the paper webs. Such operation can be performed preceding and in tandem with the bag-forming section of the bag machine.

FIGS. **1** and **2A** illustrate the combining of the plastic tubing **10** with the paper web or webs **13** to form a flat style tube **14** (FIG. **2C**), such as would be used for a pasted bottom bag or sewn bottom bag. The paper portion is handled in conventional manner, i.e., one or more webs of paper are folded around a former **15** with the longitudinal edges of each web overlapped and adhered along line **13***a* into a tube formed of two flat paper layers secured along the side edges. A flat former is shown but it will be understood that any other type of

forming device, such as wheels, may be used. As shown in FIGS. 1 and 2A, the flat plastic tubing 10 is fed from an unwind stand into the machine stack or fabricator along with the web 13 or webs. Spot or cross pasting 16 has been applied by a paster 16*a* to the paper before the tubing is laid on the paper for securing the film to the paper adjacent a cutoff line 17 which will be the top or open end of the bag. It will be understood that the pasting referred to can be either sports, bars, or continuous lines across the width of the bag. Such line 17 is between the line of spot pasting 16 and the heat seal band 11. The plastic tubing 10 is centered laterally on the face (side opposite the seam side) portion of the paper web 13 between the side creases and is fed along with the paper web to the tube former plate 15. The tubing is fed under the former plate and does not wrap the former. The paper web or webs are formed into a tube around the plastic tubing so that in the finished bag the tubing constitutes a liner ply spot pasted all around at the top. To prevent the paste from adhering to the former, ribs 15*a* are provided on the top of the former to ride between the pasting. In some cases additional spot pasting will be applied in selected areas, adjacent the main crease for pasted bottom bags, or just above the sewing line for sewn bottom bags, as will be explained hereinafter. After the tube has been cut into the proper lengths by cutting knife 17*b* it is ready to have the bottom end formed into the desired bottom.

In producing the pasted bottom style bag (satchel bottom), shown in FIG. 2A, the paper portion of the bottom, which has been slit in the web (slits 14*b*), is opened on the bottoming cylinder and the heat sealed end of the plastic tubing is folded or drawn back out of the way of the adhesive pattern so that it is free and unattached in the finished bag in the bottom area (see FIGS. 2B-1, 2B-2 and 2B-3). This can be accomplished by several methods, i.e., mechanical fingers, air jets, suction, or folding the tubing with the inner flap of the bottom paper portion. When the bag is opened for use, the very flexible film readily opens out into the bottom area and nests against the paper and is supported by the paper in the bottom. For pasted bottom bags, the vertical position of the heat seal line 11 at the bottom end of the plastic tubing after cut off must be positioned between the cutoff and the bottom overlap centerline 14*a* of the paper portion of the bottom (FIG. 2B). If the heat seal is too high, the film liner will not nest into the bottom and will be forced to support the content load.

For the pre-heat sealed plastic tubing method, the printed eyemark 12 on the film near the heat seal band 11 is used for register control and automatic compensation of the heat seal with the tube cutoff (paper and film together). Where the plastic tubing is heat sealed in-line, the heat sealing mechanism is timed to register the heat seal with the bag machine cutoff.

FIGS. 2B-1, 2B-2 and 2B-3, which are cross sections of the finished unopened satchel bottom bag, show some possible positions of the tubing with respect to the paper, the pasting at the top and the heat seal band at the bottom of the tubing.

Referring to FIG. 3A the automatic or gusseted style bag is made in essentially the same manner except for the pasting at the top and tube forming. The same flat (non-guesseted) film tubing 10 used for the flat style bag is used, i.e., pre-heat sealed along bands 11 on bag tube length centers with printed eyemark 12 near seal, or heat sealed in line on the bag machine. The flat film tubing width is equal to the finished bag width (face) plus gusset dimension or less (one-half the finished bag perimeter or less) and is positioned on the web or webs of paper 18 between the left center gusset fold and the right center gusset fold. When the combined web enters the former the film tubing runs under the former plate 19 on the face side of the paper portion, each side portion is folded with the paper web one-half the gusset around the former plate, and the edges of the paper are adhered together along line 18*a* into a tube. As in the case of the flat style bags, the tubing and paper are adhered together along lines of pasting 20 adjacent a cutoff line 21 which will be the top or open end of the bag. Such line 21 is between the line of pasting 20 and the heat seal band 11. Here again the former is provided with ribs 19*a* to prevent the paste from adhering to the former. In some cases additional pasting will be applied in selected areas, as will be explained hereinafter.

After formation of the combined paper-film tube, the film tubing will be so positioned that it is in one-half side of the bag as defined by the center gusset folds. The face side and adjacent half gusset portions of the inner paper surface are pasted to the film at the top of the bag by the line of pasting 20.

The bottom of the gusseted style tube is formed into a bag in conventional manner. The plastic tubing is moved out of the way for the bottoming operation, as described above for the flat style bag, so that the plastic liner can be free and unattached in the finished bag in the bottom area.

FIGS. 3B-1, 3B-2 and 3B-3, which are cross-sections of the finished unopened automatic (gusseted) style bag, shows some possible positions of the tubing with respect to the paper, the pasting at the top of the bag, and the heat seal band at the bottom of the tubing.

FIG. 3C, which is a cross-section of the finished unopened gusseted tube, shows the position of the tubing with respect to the paper and the paste areas at the top.

FIG. 3D, which is a cross-section of the top end of the finished unopened gusseted tube, shows the tube partially open, shows the nesting of the film tubing around the inside of the finished tube when it is being opened, and illustrates how the adhesive bond between the film and paper on the back side of the tube pulls the film tubing open and across to the back side.

In the constructions heretofore described the film liner is only affixed to the paper tube at the topmost part of the bag leaving the tubing unattached and free inside of the lower part of the bag. In this embodiment the user can fill the bag with product, sew the top closed below the paste line, trim off the top portion of the bag containing the pasting of the tubing to the paper, and then heat seal the plastic tubing closed through the paper plies and just below the sewing line. By simply unraveling the sewing thread at the top, the plastic inner liner is free to be dumped along with the contents it encloses, free of the paper bag portion of the container.

In a modified embodiment the plastic film tubing is also affixed to the paper web by spot pasting near the bottom end of the bag. Such row of spot pasting causes the tubing at the bottom end of the container to draw back out of the way due to the vacuum effect when the bottom of the paper tube is opened to begin formation of the bottom. This is true for the automatic bag shown in FIGS. 3B-1, 3B-2 and 3B-3 (see FIGS. 6A-B-C-D), the satchel bottom bag shown in FIGS. 2B-1, 2B-2 and 2B-3 (see FIGS. 5A-B-C-D-E), and the sewn bottoms

for both the gusseted and flat bags (see FIGS. **4A-B-C-D**).

FIGS. **4A-B-C-D** illustrate the modified lines of pasting **22** as applied to the sewn gusseted tube of FIG. **3A**. It would likewise apply to the sewn gusseted tube of FIG. **2A**. The additional line of pasting **22** is applied above the sewing line and also above the heat seal band **11** of the tubing. Such line of pasting adheres the plastic tubing to both sides of the paper tube in the center area so that the separation of the faces of the tube, as shown in FIG. **4B**, will cause the bottom heat sealed end of the plastic tubing **10** to pull back by the vacuum created inside the plastic tubing. Thus, the plastic tube is automatically pulled back just enough to keep it clear of the sewing line **23** of the paper portion of the bag bottom at the end of the tube (FIG. **4C**).

FIGS. **5A-B-C-D-E** illustrate the modified line of spot pasting **24** as applied to the satchel bottom (non-gusseted) bag of FIG. **2A**. The additional line of pasting is applied below the line **25** which will be the main crease when the tube is scored and folded for forming the bottom. Such line of pasting **24** adheres the plastic tubing to both sides of the paper tube so that the bottom heat sealed end of the plastic tubing is caused to pull back by the vacuum created inside the plastic tubing. Thus, the plastic tubing is automatically pulled back just enough to keep it clear of the formation and pasting of the paper portion of the bag bottom. In this manner the heat sealed end of the plastic tubing is not adhered between the bottom folds of the bag and is free to move within the bottom area when the bag is filled.

In the same manner FIGS. **6A-B-C-D** illustrate the modified line of spot pasting **26** as applied to the automatic (gusseted) bag of FIG. **3A**. As in the case of the satchel bottom bag, the additional line of pasting is applied below the line **27** which will be the main crease when the tube is scored and folded for forming the bag. This pulls the heat sealed end of the plastic tubing out of the path of the folding and pasting of the bottom area of the automatic bag.

In the constructions heretofore described and illustrated the plastic film tubing is approximately one-half of the finished bag perimeter. However, such tubing can be of a width which is deliberately less than one-half of the finished bag perimeter to provide a cushioning effect as covered in U.S. Pat. No. 3,325,082.

A number of thermoplastic films could be used in this application. Polyethylene is preferred, but polyvinyl chloride, polyvinyl alcohol, copolymers of various olefins, and others would be satisfactory. Film thickness of from 0.1 mil to 10.0 mil could be used. The preferred form of film would be seamless flat tubing; however, sheeting could be utilized by having a separate tube forming, seaming, and heat sealing operation preceding and in tandem with the finished bag forming section of the bag machine. Furthermore, it will be understood that where heat sealing is mentioned herein such sealing can also be achieved by other sealing means or by adhesives.

Although several preferred embodiments of the invention have been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

What is claimed is:

1. The method of making a gusseted paper bag with a film liner comprising the steps of

providing a flat film tube having sealed bands at spaced intervals which bands will serve as the bottom seals of the liners of the said bags;

feeding said tube onto a paper web;

passing the combined web and film tube over a tube former which forms the paper web into a tube around the former, folds the said paper tube inwardly on each side along center lines to provide gussets in each side of the paper tube, and the positions the film tube within the paper tube with the film tube extending across one face of the paper tube to approximately the center gusset line on each side of the paper tube;

securing the outer edges of the paper tube together;

securing the film tube to the paper tube by spaced lines of adhesive each of which is ahead of, spaced from, and parallel to each sealed band of the film tube;

cutting the paper-film tubes transversely along a line parallel to and between the said line of adhesive and the adjacent sealed band into bag lengths, the ends of the tube ahead of the cut to form the top of the finished bag and the ends of the tubes in back of the cut to form the bottom of the bag;

opening the bottom end of the paper tube length preparatory to forming a bottom closure for the paper tube;

moving the film tube out of the way of the bottom end of the paper tube to permit formation of the bottom closure without inclusion of the film tube in such closure;

forming the bottom closure of the paper tube whereby the film tubing will be completely free and unattached in the bottom area of the finished bag.

2. The method of claim **1** wherein the bottom closure is formed by sewing the paper tube adjacent the bottom end to form a sewn bottom bag.

3. The film lined paper bag made by the method of claim **1**.

4. The method of making a gusseted paper bag with a film liner comprising the steps of

providing a flat film tube having sealed bands at spaced intervals which bands will serve as the bottom seals of the liners of the said bags;

feeding said tube onto a paper web;

passing the combined web and film tube over a tube former which forms the paper web into a tube around the former, folds the said paper tube inwardly on each side along center lines to provide gussets in each side of the paper tube, and positions the film tube within the paper tube with the film tube extending across one face of the paper tube to approximately the center gusset line on each side of the paper tube;

securing the outer edges of the paper tube together;

securing the film tube to the paper tube by spaced lines of adhesive each of which is ahead of, spaced from, and parallel to each sealed band of the film tube;

cutting the paper-film tubes transversely along a line parallel to and between the said line of adhesive and the adjacent sealed band into bag lengths, the ends of the tubes ahead of the cut to form the top of the finished bag and the ends of the tubes in back of the cut to form the bottom of the bag;

folding the paper-film tube length along a transverse line spaced above the bottom ends of the tubes;

opening the bottom end of the paper tube length preparatory to forming a bottom closure for the paper tube;

moving the film tube out of the way of the bottom end of the paper tube to permit formation of the bottom closure without inclusion of the film tube in said closure; and

folding the bottom end of the paper tube to form side and end flaps, folding the said flaps into overlapping relationship and adhesively securing the said flaps to form the bottom of an automatic bag whereby the film tubing will be completely free and unattached in the bottom of the bag.

5. The method of making a gusseted paper bag with a film liner comprising the steps of

providing a flat film tube having sealed bands at spaced intervals which bands will serve as the bottom seals of the liners of the said bags;

feeding said tube onto a paper web;

passing the combined web and film tube over a tube former which forms the paper web into a tube around the former, folds the said paper tube inwardly on each side along center lines to provide gussets in each side of the paper tube, and positions the film tube within the paper tube with the film tube extending across one face of the paper tube to approximately the center gusset line on each side of the paper tube;

securing the outer edges of the paper tube together;

securing the film tube to the paper tube by spaced lines of adhesive which are ahead of, spaced from, and parallel to each sealed band of the film tube, one of the lines adjacent a sealed band of the film tube securing the outer first face of the film tube to the said inner one face of the paper tube and the adjacent gusset portions and a second line adjacent the same sealed band of the film tube securing the center portion of the outer second face of the film tube to the center portion of the inner opposite face of the paper tube;

cutting the paper-film tubes transversely along a line parallel to and between the said line of adhesive and the adjacent sealed band into bag lengths, the ends of the tubes ahead of the cut to form the top of the finished bag and the ends of the tubes in back of the cut to form the bottom of the bag;

opening the bottom end of the paper tube length preparatory to forming a bottom closure for the paper tube;

moving the film tube out of the way of the bottom end of the paper tube to permit formation of the bottom closure without inclusion of the film tube in such closure;

forming the bottom closure of the paper tube whereby the film tubing will be completely free and unattached in the bottom area of the finished bag.

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