United States Patent

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[72] Inventors **John Parkman Butler**
Appleton, Wis.;
Harry Meekma, Peekskill, N.Y.

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[73] Assignee **American Can Company**
New York, N.Y.
a corporation of New Jersey.

[54] **PACKAGING MATERIAL**
6 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **206/46,** 229/66
[51] **Int. Cl.** **B65d 77/38,** B65d 85/00
[50] **Field of Search** ..... 206/46(M), 46(Food), 56(A2); 229/66, 55, 48(T)

[56] **References Cited**

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Primary Examiner—William T. Dixson, Jr.
Attorneys—Robert P. Auber, Louis F. Heeb, Kenneth H. Murray, Patrick J. Walsh, George P. Ziehmer and Frank S. Charlton

ABSTRACT: A multiply pouch is described wherein the plies are bonded substantially only in the marginal areas and having a line of weakness in the inner ply lying within the ply-bonded area at the pouch mouth but outside the area which is heat sealed to close the mouth of the pouch.

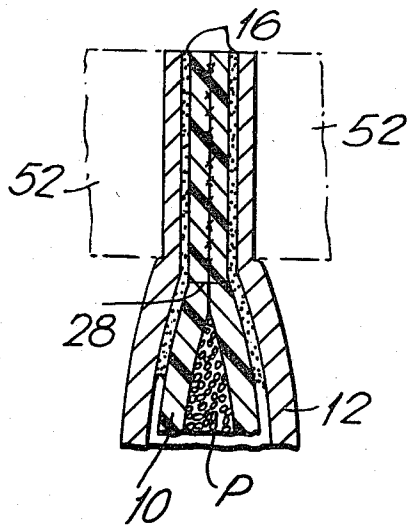


FIG. 1

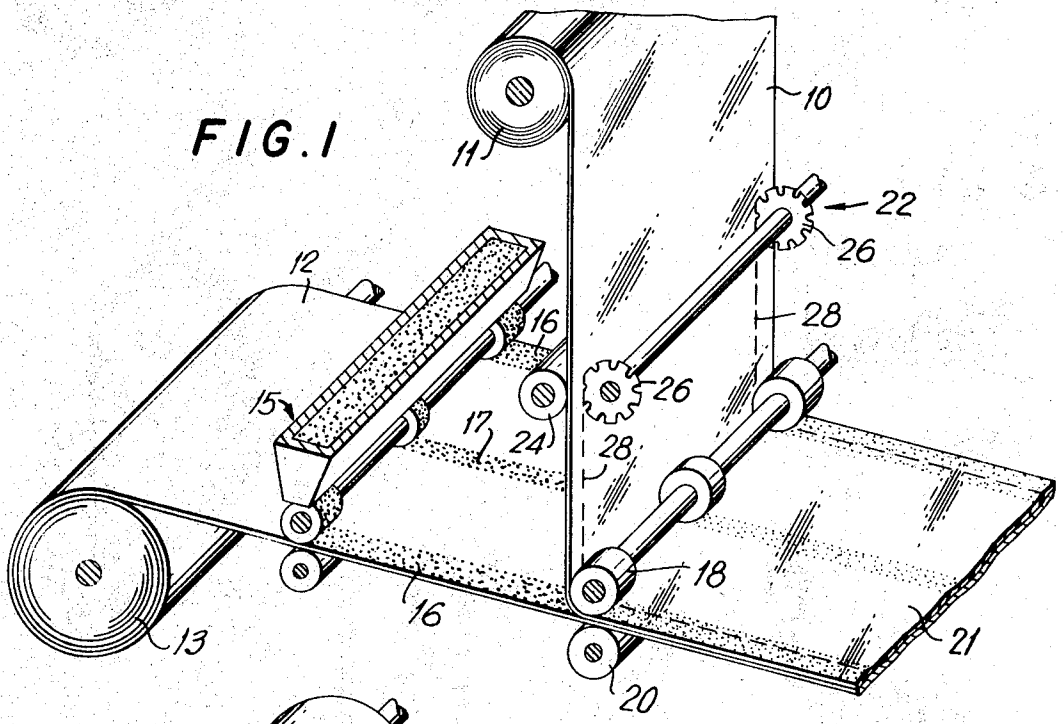


FIG. 8

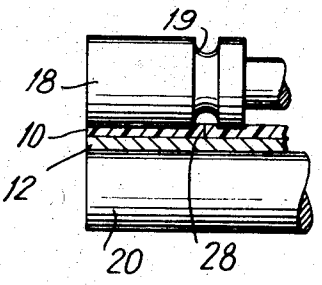


FIG. 2

FIG. 3

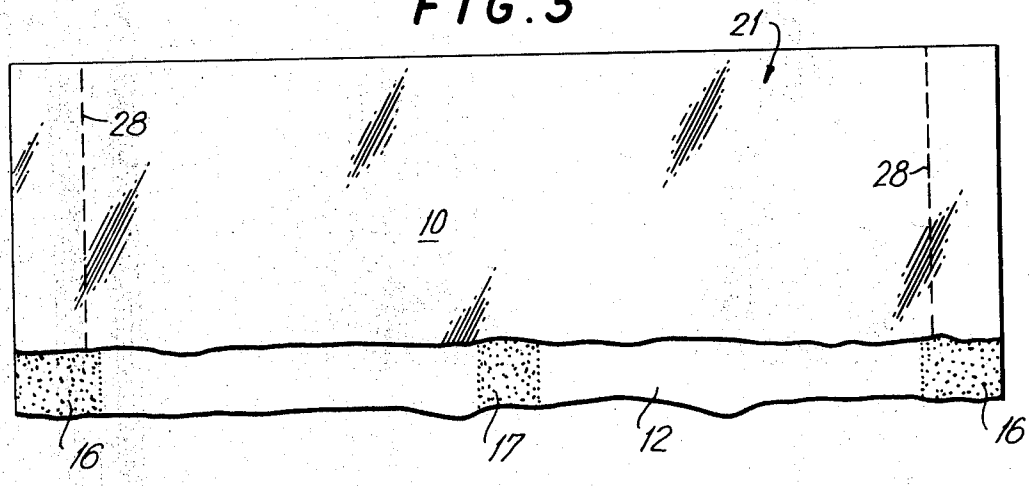


FIG. 4

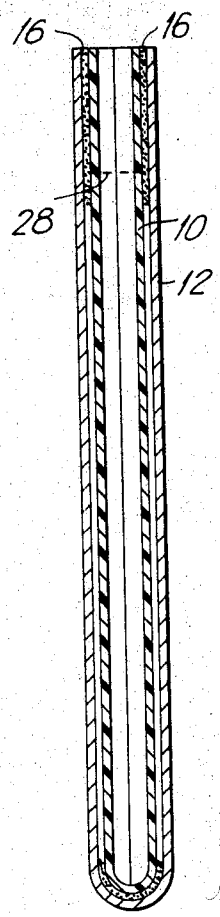
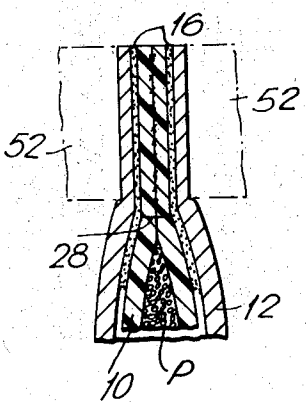


FIG. 5



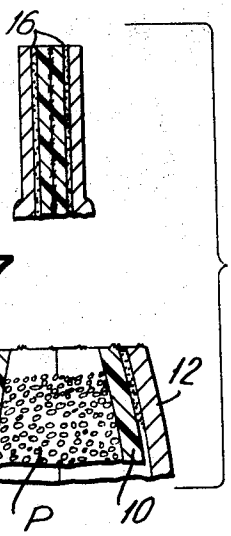


FIG. 7

FIG. 9

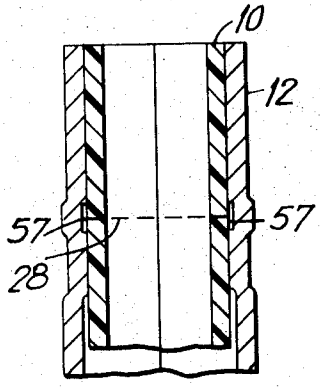
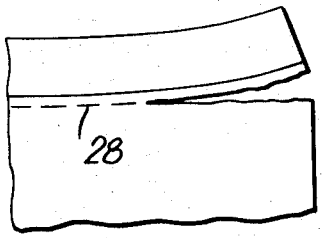


FIG. 6



PACKAGING MATERIAL

BACKGROUND OF THE INVENTION

This invention relates to manufacture of flexible sheet material pouches for products such as convenience foods and particularly to a multiply pouch having an inner ply which is substantially free of adherence to an outer ply except in the marginal areas of the pouch. More particularly, this invention relates to pouches of this type having a line of weakness incorporated therein for ease of opening, the formation and location of the weakness line being critical to the integrity of the pouch walls after opening.

Multiply pouches, in which the inner ply is adhered to the outer ply only in selected areas so that, in major respect, the plies are free to move relative to one another, are well known. Pouches of this type display the advantages of greater suppleness and flexibility, while retaining in substantial measure the desirable handling characteristics on packing machinery which are commonly shown by pouches of single wall or fully laminated construction. Furthermore, pouches having a substantially free inner ply show much greater resistance to puncture or abrasive damage when used to package products having sharp protrusions or sharply angled surfaces which tend to nick, slice or puncture the packaging material with attendant loss of its protective functions. Examples of such products are dehydrated granules of foodstuffs such as potatoes and other vegetables.

Pouches having the desired protective properties for a variety of products have been prepared utilizing polyethylene, polypropylene, vinyl chloride or other similarly heat sealable film as the inner, substantially free or unadhered ply and having an outer ply of a flexible packaging material such as a synthetic polymeric film, printed paper or of paper combined by coating or overall laminating procedures with any of a variety of other materials such as metal foil, polyethylene, petroleum waxes, polyvinylidine chloride or other similar substances capable of forming protective films or coatings. The type of material and complexity of composition of the outer ply is dictated in each case by the stringency of the requirements for adequate protection of the flavor, moisture content and freshness of the product to be packaged, as well as the particular necessity for flexibility, printing characteristics and durability in a given packaging situation. As a further requirement of the outer sheet, the inner surface of the sheet must be capable of forming a strong bond with the heat sealable inner sheet during the formation of the seals which form the side seams of the finished pouches, as will be explained fully hereinafter.

Polyethylene is of particular value for use as an inner ply or sheet due to its excellent protective properties, flexibility, economy and its heat sealing properties. Other flexible protective films which have heat sealing properties or which bear a suitable heat sealable coating may also be utilized.

Prior art pouches, however, suffer from certain disadvantages associated with the opening of the pouches, since the polyethylene inner ply is relatively tough and difficult to tear along a chosen path and, after opening, the inner and outer plies are no longer adhered at the lip area. The mouth of the opened pouch then consists of a multiplicity of ragged lips formed by the torn edges of the separate inner and outer plies of each of the two main walls of the pouch. Prior attempts to incorporate a line of weakness in the lip area of pouches of this type have been ineffective due to a variety of circumstances which will become obvious in the following detailed description of the present invention.

SUMMARY OF THE INVENTION

The present invention provides for manufacturing of a flexible, multiply pouch having an inner ply which is adhered to the outer ply substantially only in the marginal areas and which both achieves the advantages of the so-called "free ply" construction and also incorporates a weakness line impressed in the inner ply in a manner which achieves ease in opening the sealed pouch and maintains the integrity of the lips thus formed at the mouth of the opened pouch.

More particularly, the present invention provides for the manufacture of a multiply pouch of the type already described in which the line of weakness formed in the inner ply is so positioned that it falls within the limited areas of interply adhesion at the top, or mouth, margin of the pouch, but does not fall within the area of the seal formed when the pouch is filled with a product and the pouch mouth is sealed.

DESCRIPTION OF THE DRAWINGS

The advantages and improvements of the invention will become apparent from the following description, read in relation to the drawings, in which:

FIG. **1** is a schematic isometric view illustrating a method for forming the strip laminated sheet material from which the pouches are formed,

FIG. **2** is a schematic isometric view illustrating the formation, filling and sealing of the pouches and the severance of the filled and sealed pouches from the parent web stock,

FIG. **3** is a fragmentary plan view of the multiply strip laminated pouch-forming stock prior to its formation into a pouch,

FIG. **4** is a cross-sectional view of a pouch formed according to this invention, before filling and sealing,

FIG. **5** is an enlarged cross-sectional view of the mouth area of a pouch during the sealing operation,

FIG. **6** is a plan view of a partially opened pouch,

FIG. **7** is an enlarged cross-sectional view of the pouch segments as they appear after opening the pouch,

FIG. **8** is an enlarged view, partly in cross section, of a laminating nip as used in an alternate embodiment of the invention, and

FIG. **9** is an enlarged cross-sectional view of the mouth area of a pouch before sealing, formed from a strip laminated web made by the alternate embodiment of FIG. **8**.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

Referring now to FIG. **1**, in a preferred embodiment of the invention, the inner heat sealable sheet **10** and outer sheet **12** are continuously unwound from suitably supported parent rolls **11** and **13**, respectively, in conventional manner preparatory to bonding the sheets together in limited areas to form a laminated web. The bonding is preferably by means of an adhesive, although heat and pressure may be alternatively employed through use of a somewhat modified apparatus, as will be later described. An adhesive applying device, generally indicated by the numeral **15**, applies continuous bands **16** of ply-uniting adhesive to the areas of outer sheet **12** adjacent the edges thereof and optionally, but preferably, also a continuous narrow band **17** of adhesive in the medial area of the sheet. The inner sheet **10** is subsequently superposed on outer sheet **12** and pressed into adhesive lamination therewith by passing the combined sheets through the nip formed between pressure roll **18** and backup roll **20** which suitably press the two sheets together in the adhesive-bearing areas to form a composite laminated web **21**.

Prior to its superposition on outer sheet **12**, the inner sheet **10** is passed through the nip of a perforating means **22** comprising a backup roll **24** and suitably mounted rotary perforating knives **26**. Lines of perforation **28** constituting lines of weakness are thus formed in inner sheet **10**, positioned so that when the inner and outer sheets are superimposed, the perforations will lie within the narrow bands of adhesion at each edge of the laminated structure, the two lines of weakness preferably being also equidistant from their adjacent side edges. The placement of these perforations **28** is critical to the present invention, as will be pointed out in greater detail hereinafter.

After lamination of the two sheet material webs in the limited areas hereinbefore described a has been effected, the composite web may be fed directly to a pouch-making apparatus or may be wound and stored in the form of stock rolls which serve as a supply source for a pouch-making machine.

As shown in FIG. 2 illustrating the pouch-making operation, the laminated web 21 is fed from a stock roll 32 over a guide roller 34 and thence over a wedge-shaped former or plow 36 which, in connection with conventional folding rods 38 and nip rolls 40, forms a medially located longitudinal fold in the composite web, thus bringing opposite side edges of the web into superposition and similarly superposing in register the perforated lines of weakness previously formed in the inner sheet 10. The folded web is then heat sealed transversely in spaced transverse bands 43 by a sealing unit 44 to form a series of interconnected pouches 46. During this step in the operation, the inner sheet is sealed not only to itself to form the side seams of the inner layer of the pouch, but is also firmly bonded in the side seal area to the inner surface of the outer sheet, thus assuring the complete integrity of the overall package in its side marginal seam areas. To this end, the inner surface of the outer sheet must be capable of forming a strong bond with the inner sheet under the heat sealing conditions established by the apparatus performing the side seaming operation. For example, paper, glassine and various anchor-coated foils and films, when utilized as an outer sheet, present an inner surface which has such capability. After formation of the side seams, the open pouches are filled through the unsealed mouth with a product P by means of conventional filling unit 50. Heat sealing rollers 52 then seal the mouth of each pouch and the sealed packages are severed into separate units by a cutting device 54. If desired, a separator finger 48 may be inserted between the upper edges of the folded web to facilitate opening the edges preparatory to the filling step.

FIGS. 3 through 5 illustrate the various stages through which the composite laminated web material passes in the pouch-forming process just previously described. In FIG. 3 is shown the laminated web 21, the inner sheet 10 being cut away in the lower portion of the FIG. to reveal the lower sheet 12 and the bands of adhesive 16 along the side edges of the sheet and preferred optional adhesive band 17 along the medial line of the sheet. It will be noted that the two sheets are bonded together only along these relatively narrow bands which form the top, or mouth, and bottom marginal areas of the finished pouch and are free of adhesion to each other throughout the remainder of the web area. It will also be noted that the lines of perforations 28 in the inner sheet 10 fall within the area of the sheet which in the composite web is bonded to outer sheet 12 by the adhesive bands 16. It has previously been mentioned that adhesion lamination is a preferred method for bonding the plies together, since it is important for ease in opening the pouch that the perforations retain their integrity, and ordinary methods of heat-bonding thermoplastic films tend to seal up the perforations by plastic flow and thus make the line of weakness ineffective. Furthermore, in the composite web, each line of perforations 28 overlies a region of the adhesive band 16 relatively remote from the free edge of the sheet, in order to leave the area adjacent to the web edges free for heat sealing the mouth of the finished pouch, as best illustrated in cross-sectional view FIG. 4 and in enlarged cross section in FIG. 5.

FIG. 5 depicts in cross section the mouth area of the filled pouch during the heat sealing step. Again, it is particularly to be noted that heat sealing at the mouth occurs in the region between the lines of perforations 28 and the lip edges of the web, and that the lines of perforations lie within the area of the pouch wherein the layers are adhesively bonded by the bands of adhesive 16. Thus, none of the product P can penetrate the perforations 28 to sift down between the inner and outer layers of the composite sheet because these layers are bonded by the bands of adhesive 16 in the area of perforations into a unitary, composite laminated web.

Furthermore, since the lines of perforations in the thermoplastic inner sheet 10 lie outside the heat sealed area at the mouth of the pouch (i.e., to the inside of the heat sealed area with respect to the interior of the bag), they are not resealed and destroyed by the fusion of thermoplastic material which occurs during the heat sealing operation. Instead, they retain their integrity unimpaired to serve as a weakness line during the opening of the pouch, as shown in FIGS. 6 and 7. In tearing off the heat sealed mouth area of the pouch, the force applied is directed along the lines of perforations 28 and cleanly severed lips are thus formed on the opened pouch, in contrast to pouches which do not have a weakness line incorporated therein. Since the inner faces between the inner and outer layers of the pouch walls are still adhered by portions of the adhesive bands for a short distance below the perforate line, however, each lip of the opened pouch is maintained as a composite sheet, rather than as unattached multiple plies which have in the past proven to have numerous disadvantages in dispensing the product P, and in reclosure of the opening after a portion of the contents has been removed.

In an alternate form of the invention, the stripwise bonding of the inner layer to the outer layer in formation of the laminated sheet material may be achieved by heat and pressure rather than by application of a laminating adhesive, if desired. In this case, provision must be made to avoid applying the bonding heat and pressure directly on the line of perforations 28, since these small apertures in the inner film tend to fuse together under the influence of the bonding heat and the weakness line thereby loses its integrity and effectiveness. The desired result may be achieved by a slight modification in the apparatus shown in FIG. 1. In the formation of the heat bonded sheet, the adhesive applying section 15 of the apparatus is not required, of course, and the pressure roll 18 and/or backup roll 20 should be heated to raise the plies to a bonding temperature in the nip. The pressure roll 18 must also be relieved in the area which would contact the line of perforations 28 as it passes through the nip between rolls 18 and 20. This is accomplished, as shown in FIG. 8, by a small groove 19 in roll 18, which directly overlies the line of perforations 28 and prevents the heat and pressure of the bonding nip from sealing off these perforate apertures by means of plastic flow of the thermoplastic material of the inner layer. The resulting alternate pouch structure is illustrated in FIG. 9, which shows the mouth portion of a pouch in enlarged cross section, the inner layer 10 being heat and pressure laminated to the outer layer 12 in the bonding area 56. It is to be noted that the bonding area 56 is interrupted in the area of the line of perforations 28, as indicated by the numeral 57, so that the integrity of the weakness line is unimpaired.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the construction and arrangement of the parts without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form hereinbefore describing merely a preferred embodiment thereof.

We claim:

1. A package, comprising: a commodity contained within a multiply pouch of flexible sheet materials sealed at the mouth thereof, said pouch having a tear resistant, inner ply adhered to a tearable, outer ply substantially only in the marginal portions of the pouch and having lines of weakness, for ease of opening, formed only in the inner ply and located within the area of ply adhesion at the mouth of the pouch but not covered by the sealed area which closes the pouch mouth.

2. A package as claimed in claim 1 wherein the outer ply sheet material is a metal foil.

3. An open-mouthed multiply pouch of flexible sheet materials having a tear resistant, inner ply adhered to a tearable, outer ply substantially only in the marginal portions of the pouch and having a line of weakness formed only in the inner ply and lying within the area of ply adhesion adjacent the open mouth of the pouch.

4. A pouch as claimed in claim 3 wherein the outer ply sheet material is metal foil.

5. A multiply pouch of flexible sheet materials containing a product sealed therein, said pouch comprising a tear resistant, inner ply of heat sealable, moisture-resistant plastic film bonded to a tearable outer ply substantially only in the marginal portions of the pouch, the area of interply adhesion at the mouth of the pouch including a line of weakness only in said inner ply of each main pouch wall parallel to the mouth edge of the pouch, said weakness lines being spaced equally from said edge a distance slightly less than the width of the marginal area of interply adhesion, a product within the pouch and a sealed area closing the mouth of said pouch, said seal being restricted to the area between said weakness lines and the adjacent edge of said pouch.

6. A pouch as claimed in claim 5 wherein the outer ply sheet material is a metal foil.