

Nov. 5, 1974

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3,846,220

MULTI-LAYER WEB OF PACKAGING MATERIAL

Filed June 23, 1972

Fig. 1

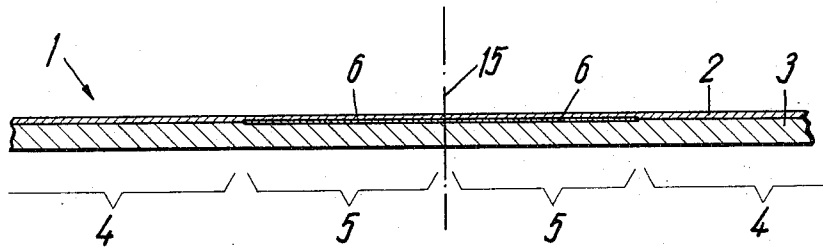


Fig. 2

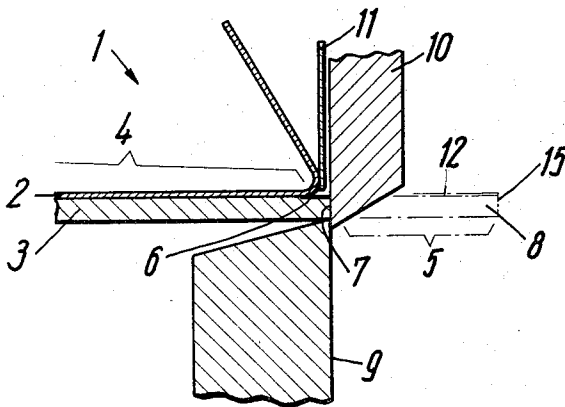


Fig. 3

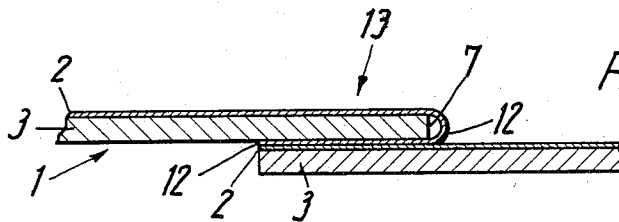
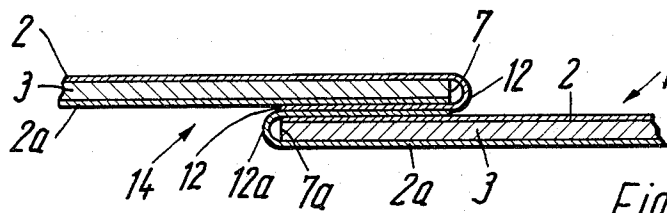


Fig. 4



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**MULTI-LAYER WEB OF PACKAGING MATERIAL**  
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Filed June 23, 1972, Ser. No. 265,784

Claims priority, application Germany, June 24, 1971,  
P 21 31 322.4

Int. Cl. B32b 3/00, 7/14, 31/12; B65d 7/12

U.S. Cl. 161-145

6 Claims

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## ABSTRACT OF THE DISCLOSURE

A packaging material for forming packaging containers characterized by having a seam zone which is suitable for gas or liquid tight containers. The packaging material has a covering layer and a substrate in juxtaposition with each other, with a sealable seam zone in the material. This seam zone includes a sealable covering layer portion associated with the balance of the covering layer and a substrate layer portion associated with the balance of the substrate layer. In the seam zone, the covering layer lies in juxtaposition with the substrate layer in a releasable non-laminated manner, as opposed to the other areas of the packaging materials, so that a portion of the substrate layer in the seam zone may be removed to leave a free edge portion for forming the seam of the container.

This invention relates to multi-layer packaging material adapted for forming gas or liquid-tight containers and provided with an improved seam construction.

As is well known in the packaging art, many different types of packaging materials exist which are used for various and diverse purposes. Such packaging materials, as an article of commerce, are provided to packaging manufacturers in the form of rolls, webs or strips of the material. One such type of packaging material supplied in strip or roll form consists of a base or substrate layer and a thermoplastic covering layer with the latter projecting laterally beyond the edges of the base layer. This projecting lateral material is adapted to form a seam for gas and liquid-tight containers or packages by the manufacturer of the containers. When the packaging or wrapping material is manufactured by the primary manufacturer, with the strip material being rolled into roll form, it is normally shipped in this roll form and as will be appreciated by those skilled in this art, the projecting lateral material is subject to damage during transportation and storage prior to processing, unless special precautions are employed to prevent damage to the free projecting margins. However, protecting these free edges in turn involves considerable expense in terms of additional packaging to protect the edges, additional costs for labor, equipment, etc.

In the above referred to type of packaging or wrapping material, the free lateral edges of the packaging or wrapping material are used to produce packaging containers or the like which are characterized by overlapping seam portions—for example, the edges of the base or substrate layer are covered in a liquid and gas-type manner by the projecting areas of the covering layer being secured together. For this type of seam construction, the substrate material and the contents retained and contained in the package cannot come into contact with each other and thus adversely affect the material or the contents. Thus, this type of container has this advantage over other types of containers for different packaging operations. However, because of the above-described disadvantages, such packaging material would be more acceptable if these disadvantages were overcome while retaining its advantageous properties.

With this invention, applicant has developed wrapping material which overcomes the above-described disadvantages and at the same time, retains the features required for a good packaging material having desirable properties. More particularly, according to one aspect of this invention, there is provided wrapping material suitable for use for forming packages which are characterized by having a seam zone, the wrapping material comprising a length of sheet material having a substrate layer and a covering layer in juxtaposition therewith and laminated together adapted to form the walls of a packaging container, said wrapping material also including a sealable seam zone, said seam zone having a sealable covering layer portion integrally connected to and associated with said covering layer of the portion of the material adapted to form a wall of a packaging container, and a substrate layer portion integrally associated with said substrate layer of the substrate layer portion adapted to form the wall of a packaging container, said covering layer in said seam zone lying in juxtaposition with said substrate layer therein in a releasable non-laminated manner.

In the above-defined wrapping material, an additional embodiment includes the provision of a pair of adjacent sealable seam zones in such wrapping material. In this embodiment, the pair of seam zones will each be adapted to form a sealable seam zone for one container whereby two packaging containers may be made from the sheet material containing the seam zones adjacent each other. Thus, the covering layer portion of one of the pair of the seam zones will be contiguous with and integrally connected to the covering layer portion of the other sealable seam zone whereby the two covering layer portions of both of said zones form a continuous covering layer portion for the sheet material with the covering layer portions of the sheet material of the adjacent portions of the material which are adapted to form the walls of the packaging material. Conversely, the substrate layer of one of the pair of the sealable seam zones will be contiguous with and integrally connected to the substrate layer portion of the other of the sealable seam zones with the two substrate layer portions of both zones being continuous with the substrate layer portion of the sheet material of the adjacent areas which are adapted to form the walls of the packaging container. If desired, a separation line may be provided between the pair of sealable seam zones in this embodiment to define the pair of zones so that when it is desired to separate the packaging material into two separate entities, the material may be split, cut or otherwise separated to form two separate pieces of packaging material. In this embodiment and others where a line of separation is employed, it may be provided by incorporating into the covering and/or substrate layers a line of weakened resistance such as a skip-cut line, etc. which extends part or totally through the material in one or both layers.

In the above-described embodiment with a pair of sealable seam zones being adjacent each other and forming part of a unitary packaging sheet material structure, the covering layer and the substrate layer will be in juxtaposition with each other as described previously, and in a releasable manner whereby the covering layer may be readily separated from the substrate layer as described hereinabove and hereinafter.

In a further embodiment of the present invention, there is provided sheet wrapping material of the above type which has been treated so as to remove the base or substrate layer; and in a still further embodiment, there is provided a container having a sealed seam zone made of the abovedescribed packaging material. These embodiments will be illustrated and described in greater detail having regard to the subsequently described drawings.

The packaging material described above may be of any suitable width for packaging containers which will depend on the type of containers, the type of commodity and other factors well known to those skilled in this art. Thus, the width of the material may range from several inches to one or more feet, depending on the type of packaging container the material is intended to be formed into.

As outlined above and hereinafter, the packaging material once produced, may be rolled into roll form and shipped to the converter or a processing station for further work and formation into packaging containers. As such, the length of the material may vary considerably and can be formed into rolls of several hundred feet or more. In this respect, each roll may contain two or more sealable seam zones as described above, so that when producing the same, e.g. four or six seam zones may be included in a single width of material.

The seam zones may also have a varying width depending on the type and width of seam desired. Thus, for example, the width of the seam zone in the transverse direction of the packaging material when in a lay-flat form, may be from one-quarter inch to several inches or more. In a like manner, the covering layer, once separated from the substrate layer with a portion of the latter being removed from the seam zone in the material, may vary from one-quarter inch to several inches or more.

Preferably, the seam zones are formed in the sheet material in a substantially continuous manner but this may vary depending on the type of container it is desired to form and the nature of the material.

As outlined above, the sealable seam zones of the packaging material are characterized in that the covering layer is at least releasably associated with the substrate layer. To this end, the covering layer may merely lie in juxtaposition with the substrate layer in the sheet packaging material; alternately, the same may be lightly bonded to the latter in a releasable manner whereby the covering layer may be readily separated from the substrate layer. To this end, the sealable seam zone of the wrapping material may include a separating agent therebetween; such separating agents being suitable chemical agents as, e.g., chromium stearate or aluminum stearate, etc.

The areas of the sheet material adapted to form covering layer is fixedly secured to the substrate layer, may be produced in one of several ways. For example, in the zones wherein the covering layer is to be secured to the substrate layer, various types of adhesives may be employed to laminate the same together in a substantially non-releasable manner; alternately, various other types of processes may be employed for effecting lamination or providing a good bond between the covering layer and the substrate layer—e.g. the use of various types of flame treatments, electrostatic treatments, etc. to render the covering layer susceptible to bonding to the substrate layer. The actual process employed, and when using an adhesive the actual choice of the adhesive will vary depending on the type of materials forming the covering layer and the substrate layers.

With respect to the covering layer, any suitable thermoplastic material may consist of one or more layers of such thermoplastic materials chosen from those materials well known to those skilled in this art. The particular choice of the thermoplastic covering layer will vary depending on the type of packaging container it is desired to form, its intended use, etc. Likewise, the thickness of the covering layer may vary considerably from e.g. one-half mil to several mils or more and as noted, can be formed of one or more layers of suitable material. Typical of the materials which are used in the packaging art for packaging containers include, as the thermoplastics, polyethylene, polypropylene, copolymers of polyethylene, copolymers of polypropylene, as well as other polyolefin polymers and copolymers, cellulose acetate, cellulose acetate butyrate, ethyl cellulose, methylmethacrylate polymers

and copolymers thereof, nylon, polystyrene, vinyl chloride polymers and copolymers, copolymers of vinyl chloride and vinylidene chloride, and the like. The particular choice of thermoplastic material, as well as its thickness, etc. may be according to conventional requirements for packaging containers.

The substrate layer may likewise be formed of any suitable material commensurate with providing the necessary properties to a packaging container—for example, the latter may be made of material such as cardboard and/or aluminum. Other materials may likewise be chosen having regard to their properties.

At least the thermoplastic covering layer should be of a flexible nature to permit the thermoplastic layer to be folded over or otherwise subsequently processed and converted to form a sealed seam zone. To this end, the flexibility of the covering layer may vary, again depending on the type of container, etc. If desired, the substrate layer may also be flexible or semi-rigid—again depending on the type of container. The thickness of the substrate layer may vary considerably within the above parameters, typical thicknesses being, for example, one-half mil to several mils or more.

The sheet wrapping material of the present invention can be used to form various types of containers with different types of sealable seam zones. Thus, for example, packaging containers for various types of commodities may be provided as well as for packaging bulk articles.

The formation of the seams from the sealable seam zones of the products of the present invention can be carried out using various types of techniques. Thus, for example, various types of seams may be made by providing a single overlap of the free portion of the covering layer resulting from the removal of the portion of the substrate layer in the sealable seam zone whereby the covering layer may be secured to itself on the opposed side of a width of such material; alternately, opposed covering layers of the sealable seam zones may be integrally joined together to form a seam.

The seam zone can be formed using appropriate equipment which will be obvious to those skilled in this art.

The present invention provides sheet wrapping material having many advantageous features over prior art proposals; more specifically, the present invention permits the shipping, transporting and handling of the wrapping material without damage to the sealable seam zones as occurs in the prior art. Moreover, the products of the present invention can be readily formed in an economical manner.

More specifically, an aspect of the present invention resides in the provision of a multi-layer web of packaging material for forming the walls of a packaging container which includes a substrate layer and a covering layer of thermoplastic material which is secured to and placed in juxtaposition with the substrate layer. The covering layer has transverse to the web a heat seal responsive seam zone secured to the substrate, the zone extends substantially continuously in the direction of the web in a releasable non-laminated manner. There is also provided an adjacent zone co-extending parallel to the seam zone with the adjacent zone being permanently secured to the substrate.

Having thus generally described the invention, reference will now be made to the accompanying drawings illustrating preferred embodiments, and in which:

FIG. 1 is a cross-sectional view of a strip of wrapping material constructed according to the present invention;

FIG. 2 is a cross-sectional view taken through a strip of wrapping material of the present invention, showing the initial steps in the formation of a packaging container;

FIG. 3 is a cross-sectional view taken through a seam of a typical packaging container produced from the material of the present invention; and

FIG. 4 is a cross-sectional view similar to FIG. 3 but showing a modified construction.

Referring now in greater detail to the drawings, reference numeral 1 indicates generally the wrapping material of the present invention which in the form shown, comprises a thermoplastic covering layer indicated by reference numeral 2 and a substrate or base layer indicated by reference numeral 3 and made of, e.g., cardboard and/or aluminum, etc.

The sheet material may be divided into two or more zones indicated generally by reference numerals 4 and 5—in the embodiment shown, a pair of each of such zones is illustrated with zones 5 being adjacent one another and forming continuous segments of the sheet material. Such zones 5 thus, in effect, are a single continuous zone, constituting the seal zone of the sheet material, but as described hereinafter, may include a parting line indicated generally by reference numeral 15 dividing the continuous zone into two separate zones as shown by the respective reference numerals 5 in FIG. 1.

Zone 4 is adapted to form the opposed faces of a packaging material for a packaging container and to this end, the thermoplastic covering layer 2 and the substrate layer 3 are joined together to form a laminate. As outlined before, such laminates may be prepared according to conventional procedures well known to those skilled in this art, having due regard to the type of materials involved.

In contrast, in the areas indicated by reference numeral 5, the seam zone is comprised of the covering layer 2 and the substrate layer 3 which are either only weakly joined so that the covering layer 2 may be separated from the substrate layer 3, or in the alternative, are not bonded together. Again, various types of methods may be employed in the production of the wrapping material 1 to ensure that the covering layer 2 is not firmly joined to the substrate layer 3—for example, a separating agent e.g. chromium stearate or aluminum stearate may be employed during the manufacture of the wrapping material 1 whereby the separating agent is applied to the wrapping material to permit ready separation. In such a case, the separating agent will be applied to the length of wrapping materials in an amount sufficient to ensure separation and covering the desired width of the seal zone. In such techniques, the separating agent may be applied to either or both of the covering layer 2 and the substrate layer 3. The layers 2 and 3 may then be treated to include the application of an adhesive (not shown) to the areas in which the covering layer 2 and the substrate layer 3 are adapted to form an integral laminate, whereafter the two layers are then pressed together by, e.g. calendaring. A still further alternative for producing integral laminates and forming the unitary areas 4 of the wrapping material involves the cooling of freshly extruded sheet material forming the covering layer in selected zones, whereafter a base or substrate layer is placed in juxtaposition and pressed against the covering layer so that only the selected zones remaining thermoplastic (i.e. other than the selected areas which are cooled) will be integrally and firmly joined to the base layer 3.

The wrapping material produced by the above method may then be wound into storage rolls according to conventional techniques, transported and stored pending processing or converting into packaging containers so that no damage to the zones 5 comprised of the covering layer 2 and the base layer 3 will occur since the covering layer 2 is protected by the base layer 3.

The zones 5 in which the covering layer 2 is adapted to form a sealable seam, are preferably arranged in strip formation along the length of the sheet wrapping material. This has been found to be a most convenient form for subsequent processing and converting. In the latter type of operation, according to a further embodiment of this invention, the zone 5 adapted to form the sealable seam zone of a packaging container may be treated to separate the covering layer 2 from the base or substrate layer 3 and provide a covering layer portion projecting

beyond the margins of the substrate layer, in a manner as illustrated in FIG. 2. More particularly, a strip 8 may be removed from the base or substrate layer 3 within the zone 5 to leave a marginal edge portion of the covering layer 2 projecting therebeyond which may be of varying width depending on the width required for converting processing operations to form packaging containers. To this end, the strip 8 may be removed by, for example, separating the cover layer 2 from the base layer 3 by means of a separating tool 11, such as a separating blade, located within the zone 5 and then severing the base or substrate layer 3 with cooperating cutting means indicated by reference numerals 9 and 10. If desired, score lines or weakening lines, not shown, could be provided in a known manner between zones 4 and 5, and the strips 8 which are not required for the packaging containers could be removed or torn from the remaining portion of the packaging material, leaving a new border 7.

The projecting portion of the covering layer, indicated by reference numeral 12, projecting beyond the new border 7 in such a manner that it projects thereinto when a new seam 13 is made in a processing or converting operation, as illustrated in FIG. 3. By forming a seam in this manner, it will ensure that the contents of the package will not come into contact with the substrate layer 3 and thus, the contents of the packaging container and the substrate layer cannot adversely affect each other.

In an alternate embodiment, moisture egress to the outside of a seam 14 of a modified packaging container may be prevented in a similar manner if the packaging material 1 is provided with an additional covering layer indicated generally by reference numeral 2a, as illustrated in FIG. 4, which is also detachable and separable in the above-defining zones. Thus, an additional border zone indicated by reference numeral 7a, provided with projecting free margins 12a, opposed to the above described margins, can be produced in the strip of wrapping material in the manner described above. Then, as illustrated in FIG. 4, the projecting margins can be used to form a seam for the container to which moisture seepage to the outside of the seam 14 can be prevented.

In a further embodiment, since the strips or lengths of wrapping material 1 are generally produced in widths which are multiples of the width required for a packaging container, a further advantageous feature of the wrapping material of the present invention may be obtained by arranging the sealable seam zones 5 for a pair of containers in strip form, in such a manner that they run directly together and are adjacent to each other along a predetermined parting or separation line indicated generally by reference numeral 15. This parting line 15 may take various forms and may include, for example, a skip-cut line in the material, a line of weakened tear resistance in the length of wrapping material, etc. Accordingly, two or more of such zones 5 may be contained in a single width of wrapping material, and this wrapping material may be cut into a plurality of strips and wound into separate rolls if desired. This embodiment simplifies the application of a separating agent 6, and the application of adhesive to the covering layer 2 and the base layer 3, inasmuch as it reduces the total number of operations as well as simplifies processing steps. Still further, it also reduces the waste material arising from trimming the border strips during the laminating process, which are of no subsequent use during the processing or converting of the packaging material into packaging containers.

It will be understood that various modifications can be made to the above-described embodiments without departing from the spirit and scope of the invention.

What is claimed is:

1. A multi-layer web of packaging material for forming the walls of a packaging container, comprising:
  - a substrate layer;
  - a covering layer of thermoplastic material placed on and in juxtaposition with said substrate layer;

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- the covering layer having at least two zones extending substantially parallel to each other and substantially continuous in the direction of the length of the web; one of said zones being permanently secured to said substrate;
- the other of said two zones constituting a heat seal responsive seam zone releasably secured to said substrate;
- and a separating agent between said seam zone and said substrate.
2. A multi-layer web of packaging material according to Claim 1, wherein said web comprises a plurality of releasably and permanently secured zones with at least two seam zones being contiguous to each other.
3. A multi-layer web of packaging material according to Claim 1, wherein said substrate includes a weakened line extending parallel to said zones.
4. A multi-layer web of packaging material according to Claim 1, wherein said substrate includes a scored line extending parallel to said zones.
5. A multi-layer web of packaging material according to Claim 1, wherein said separating agent is a chemical coating.
6. A multi-layer web of packaging material according

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to Claim 1, wherein the first mentioned covering layer covers one side of said substrate; and a second covering layer covering the opposite side of said substrate and having a first zone releasably secured to said substrate and a second zone non-releasably secured to said substrate, and a separating agent between said first zone and said substrate.

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U.S. Cl. X.R.

156—289; 161—102, 146; 206—56; 229—48