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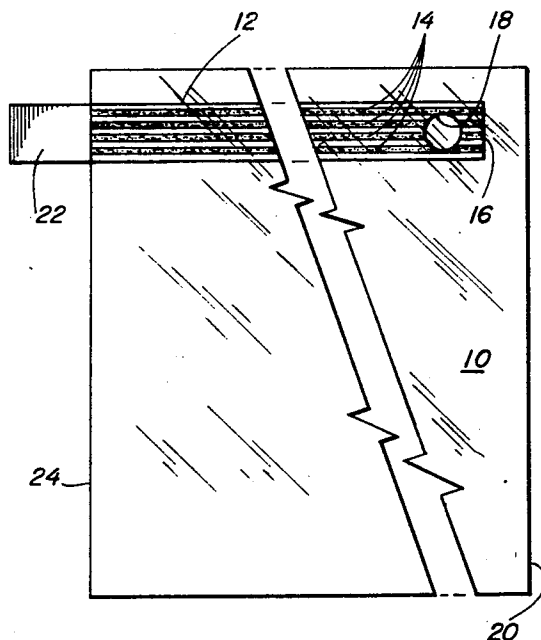
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[54] RECLOSEABLE BAG MEMBER
9 Claims, 4 Drawing Figs.

[52]	U.S. Cl.....	229/62, 229/65, 229/66
[51]	Int. Cl.....	B65d 33/30
[50]	Field of Search.....	229/62, 65, 66

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ABSTRACT: A bag member has a tubular body with a sealable inner surface having a peripheral strip of nonresiliently deformable material secured thereover. The strip is spaced downwardly from the upper end of the body to partially block the sealable material and to expose a peripheral band thereof above the strip at which sealing can be effected. Because the deformable material is nonadherent to itself, subjecting the upper end portion of the body to sealing conditions effects a seal at a location which is substantially limited to the exposed band of sealable material; because the deformable material is nonresilient and capable of maintaining a folded configuration, opposing portions of it may be interengaged by folding the bag along the strip to provide a closure for the bag.



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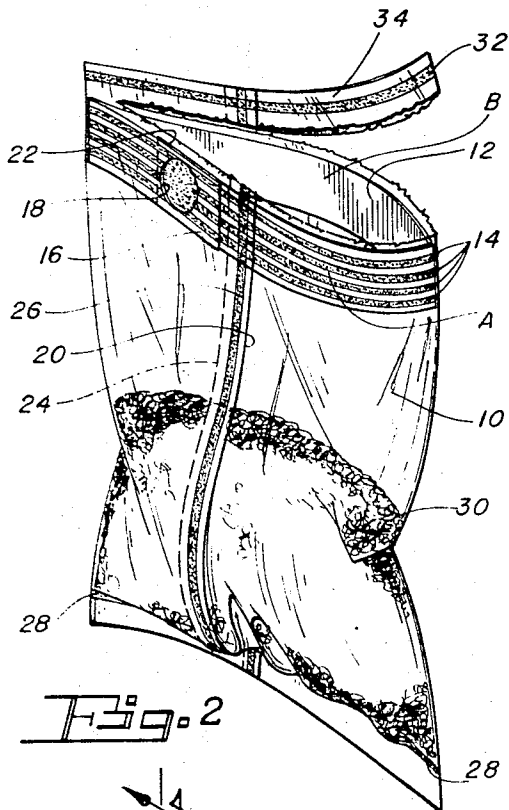


Fig. 2

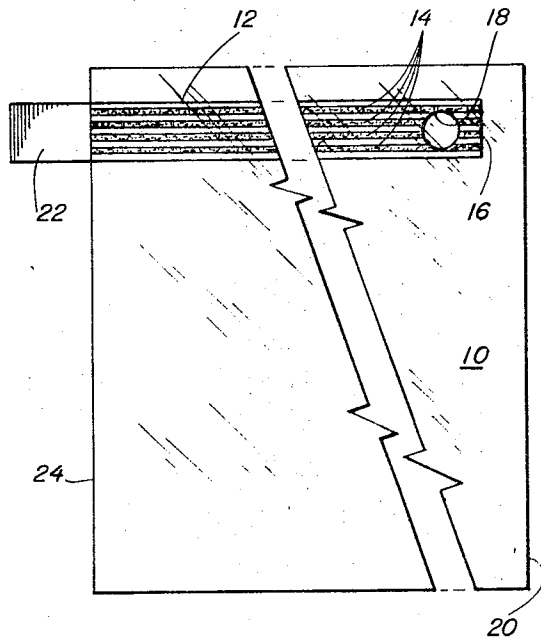


Fig. 1

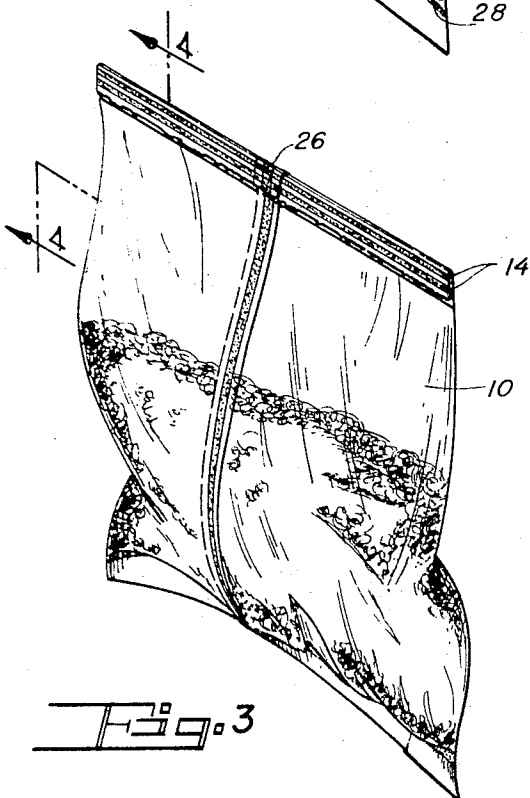


Fig. 3

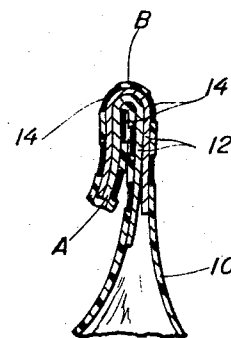


Fig. 4

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RECLOSEABLE BAG MEMBER

BACKGROUND OF THE INVENTION

Many types of closures and/or design modifications have heretofore been provided to enable a bag, container or over-wrap to be closed and opened, or to be reclosed after an original seal has been removed or broken. Such packages are particularly useful when only a portion of the contents thereof are normally removed, and especially when the contents are subject to deterioration or spoilage due to atmospheric conditions after the package has been opened, e.g. when the package contains baked goods such as bread, cookies, etc. or when it contains other foodstuffs such as candy and the like.

Among the various methods which have been used to provide recloseable packages is the provision of pressure-sensitive adhesives on one or more portions of the package designed to permit repeated bonding and release. However, the use of adhesives in this manner has not been very successful for a number of reasons. As a fundamental matter, it is difficult to achieve a balance of properties in an adhesive whereby a desirable level of adhesion is coupled with relatively facile release characteristics for opening the package. In addition, there is a tendency for loss of tackiness to occur rapidly in such adhesives so that after relatively short periods of use they become relatively ineffectual due either to frequent opening and closing or to contamination of the adhesive with dirt particles and the like.

Other attempts to produce closeable packages have relied upon metal clasps and closures for bags, envelopes etc. made of a variety of materials including paper and plastics. Such a closure is normally made of a nonresiliently deformable metal so that it can be bent upon itself or about a portion of the package to maintain a closed condition when desired. However, so far as is known the prior art constructions of this type do not permit convenient and complete sealing of the package initially, ready opening thereof without undue damage thereto, and repeated opening and closing of the package with substantially no loss of effectiveness after extensive use.

Accordingly, it is an object of the present invention to provide a bag member which is of a relatively simple construction, which may be conveniently and completely sealed initially, which may be readily opened without damage to the main portion thereof such as would render the bag unsatisfactory for subsequent use, and which may thereafter be repeatedly closed and opened without loss of effectiveness for the closure.

It is also an object of the invention to provide such a bag member which is initially heat-sealable, i.e., sealed by the application of heat thereto.

SUMMARY OF THE DISCLOSURE

It has now been found that the foregoing and related objects can be readily attained in a bag member comprising a generally tubular body having a reclosable end portion with a sealable inner surface, and a relatively thin, substantially continuous strip of nonresiliently deformable material extending about the inner periphery thereof and secured to said end portion at a point spaced from the edge thereof. The strip partially blocks the sealable surface and substantially prevents sealing thereat, and the edge portion between the edge and strip provides a peripheral band of sealable surface at which sealing of the inner surface may be effected. The deformable material is capable of maintaining a folded configuration and is nonadherent to itself under the conditions of sealing for the sealable surface. As a result, subjecting the end portion of the body to such sealing conditions effects a seal in a location which is substantially limited to the exposed peripheral band of sealable surface and the bag member is recloseable by folding the bag member along the strip to interengage opposed portions thereof.

In a preferred embodiment of the invention, the sealable surface is heat-sealable, and, more specifically, the sealable surface may be provided by a synthetic thermoplastic

polymer. The body of the bag member may be formed of a length of heat-sealable synthetic thermoplastic polymeric sheet material having substantially parallel longitudinal edges, and the strip of deformable material may be provided by an elongated deformable element secured transversely of the length of sheet material and substantially perpendicular to the longitudinal edges thereof. In such a case, the body may have a longitudinally extending heat-sealed portion securing the longitudinal edges of the sheet of packaging material in overlapping relationship.

In a preferred embodiment of the invention, such a deformable element is secured with one end adjacent and short of the longitudinal edge of the overlying ply of such sheet material so that the longitudinally extending heat-sealed portion previously referred to extends transversely over a portion of the deformable element adjacent the other end thereof. In such a case, the first end of the deformable element secured adjacent the edge of the overlying ply of the sheet material may be provided with an aperture and the other end thereof may project beyond the longitudinal edge of the underlying ply of the sheet material to extend beneath the first end and the aperture thereadjacent. The sheet may then be bonded to the deformable element adjacent the other or projecting end portion through the aperture to prevent substantial relative movement of the ends of the element.

Preferably, the deformable element comprises a wrought metal foil, and most desirably the foil element is adhesively secured to the sealable surfaces by a heat seal along a line extending longitudinally of the element and spaced from the edge thereof adjacent the band. In that manner an unsecured portion of the element will extend beyond the heat seal to reduce any tendency for the edge thereof to sever the body at a weakened zone produced directly adjacent the heat seal. Most desirably, the edge of the element is relatively sharp and provides a cutting edge to facilitate tearing and removal of the end portion of the body extending therebeyond. The lower end of the tubular body may be sealed by a heat seal extending transversely and generally perpendicular to the longitudinal edges thereof. The bag member may include an article therewith and may be sealed within the peripheral band of sealable material to provide a recloseable sealed bag containing such an article.

In the method of the invention, a recloseable bag member is produced utilizing a length of packaging sheet material having at least one pair of substantially parallel edges and at least one sealable surface. A relatively thin, elongated, nonresiliently deformable element is secured over the sealable surface transversely of the length and substantially perpendicular to the parallel edges of the length to partially block the sealable surface and expose a band of sealable surface to one side of the element. Portions of the length along the parallel edges are contacted and secured together to produce a body of generally tubular configuration with the deformable element peripherally disposed therewithin to provide a strip extending about the periphery thereof. Opposing portions of the band of sealable surface are contacted under sealing conditions therefor to effect a seal thereat. The characteristics of the deformable element are as have been previously indicated so that the seal produced is substantially limited to the band of sealable surface and the bag member is reclosable by folding together and thereby interengaging opposing plies thereof.

The present invention also provides a substantially continuous method of producing a multiplicity of recloseable sealed bag members wherein the length of packaging sheet material comprises an extended length of heat sealable synthetic thermoplastic polymeric sheet material. In accordance with that embodiment, a multiplicity of deformable elements are secured to the length of polymeric sheet material at a multiplicity of points spaced along the length thereof to provide a multiplicity of units. Each such element partially blocks the sealable surface and exposes a band thereof on side of the element. The step of contacting and securing the parallel edge portions of the length of polymer is effected substantially con-

tinuously for at least a multiplicity of units, and the step of effecting a seal at opposing portions of the band of sealable material may serve to simultaneously seal the adjacent end portions of two adjacent bag members.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary plan view of a blank utilized to produce a bag member embodying the present invention;

FIG. 2 is a perspective view to a slightly enlarged scale of a bag produced from the blank of FIG. 1 which has been opened by partial removal of a portion of the body above the foil strip;

FIG. 3 is a perspective view of the bag of FIG. 2 wherein the portion above the foil strip has been entirely removed and the piles of the end portion folded together to illustrate the recloseable feature of the bags of the invention; and

FIG. 4 is a fragmentary sectional view to an enlarged scale of the reclosed bag along the line 4-4 of FIG. 3.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Turning now in detail to the appended drawing, a recloseable bag embodying the present invention and illustrated in FIGS. 2 and 3 is produced simply and economically from the blank shown in FIG. 1. The blank consists of a rectangular length 10 of transparent synthetic plastic sheet material and a nonresiliently deformable metal foil element 12 secured on the underside of the sheet 10 and adjacent its one edge by a number of heat seals 14 extending along the length of the foil element 12. The foil element 12 has a hole 18 through it adjacent its end 16 which is spaced inwardly from the edge 20 of the length 10 to provide spacing therebetween. The end portion 22 at the opposite end of the element 12 projects beyond the opposite edge 24 of the length 10 for a purpose which will be more fully described hereinafter.

The bag illustrated in FIGS. 2 and 3 is produced from the blank by lapping the edge portions so that the edge 20 is outermost, and the foil element 12 provides a trip extending about the inner periphery of the tubular member so produced, i.e., by curving the edges of the sheet 10 into the page of the drawing. The overlapped edge portions are heat sealed together within the area of the overlap in a longitudinal seam 26 to provide a two-ply structure. Since the end 16 of the foil element 12 terminates short of its associated edge 20, the plies of plastic sheet material are in contact along the entire length of sheet material 10, and the seam 26 extends across the width of the end portion 22 of the element 12 which projects past the edge 20. Thereafter, the tubular body is closed at the lower end with a heat seal 28, and the desired contents 30 are placed into the bags produced.

To seal the upper end of the bag the opposing faces A, B of the length 10 of sheet material are brought into contact and the upper portion of the bag is subjected to heat sealing conditions. In this manner, a heat seal 32 is produced in the portion 34 above the foil element 12, the portion 34 being partly torn away in FIG. 2 for the purpose of illustration of the manner in which the bag is opened subsequent to sealing. Subjecting the upper portion of the bag to heat to effect the seal at 32 also causes the plastic of the sheet material overlying the hole 18 to adhere to the end portion 22 of the element 12 is prevented from hinging away from the end portion adjacent the edge 16 thereof so as to avoid tearing of the plastic sheet material within the area of overlap of the edges 20, 24.

Turning now in greater detail to FIGS. 3 and 4 therein illustrated is the manner in which the bag is reclosed after the portion 34 has been torn away to open the bag. Thus, the opposite faces A, B of the bag are brought together to position opposite portions of the foil element 12 in face-to-face contact, and the element 12 is then folded longitudinally at a point which is preferably approximately midway between its edges. Due to the nonresilient deformability of the foil element 12 and its ability to maintain a folded configuration, the resulting interengagement of the opposing portions of the element 12

maintains the bag in the closed position shown in FIGS. 3 and 4.

Outstanding features of the novel bag members disclosed herein are the convenience and effectiveness of the initial sealing thereof and the ease with which they may be opened initially, and thereafter closed and opened repeatedly during subsequent use. These advantages result in part from the novel placement of the element or strip of nonresiliently deformable material in a position to partially block the sealable surface on the inside of the sheet material, thus ensuring that it can be opened without significant detriment to the portion of the body below the nonresiliently deformable strip, and yet to expose a portion of the sealable surface thereabove for initial sealing. Securing the deformable material on the outside surfaces of the article in a manner contrary to the concept of the present invention necessitates very careful control and placement of equipment during the sealing step to avoid the creating of a seal under or between the plies of deformable material which would render the package virtually impossible to open without considerable inconvenience and without rendering it unsatisfactory for further use. Although it may be possible to avoid sealing at undesired locations by confining the effects of the sealing conditions to an area adequately spaced from the strip of nonresiliently deformable material, achieving the necessary level of control would be quite difficult on an economically feasible basis.

The method of effecting the seal to close the bag initially (and of effecting other seals during the fabrication thereof) may vary widely and will depend primarily upon the characteristics of the sealable material involved. Although other techniques may be feasible, the most effective and convenient manner of producing the seals will usually be by use of an elevated temperature technique employing materials which are heat sealable, i.e., rendered adhesive or tacky by subjecting them to heat. Many different types of heat-sealing apparatus may be used, such as the conventional heated jaws or rollers, and the heat source may involve infrared, dielectric, ultrasonic, or impulse heating effects.

The sealable surface or material may be provided by the inherent thermoplastic nature of the packaging sheet material of which the entire body of the bag member is constructed, or a heat activatable coating may be used on the inner surface, such as by laminating a film of greater heat-sealing characteristics to a film having less effective heat-sealing characteristics. More particularly, the packaging material may be sheet material of a synthetic thermoplastic polymeric resin having inherent sealing characteristics such as the olefin and vinyl homopolymers and copolymers, the vinyl chloride/vinylidene chloride copolymers, the ethylene/vinyl acetate copolymers, etc.; in many instances laminated combinations of or with such polymers are particularly preferred. Both (or all) components of such a laminate may have sealing characteristics, or one of the components may provide other properties which are desired, such as a nonsticking surface or advantageous gas and liquid permeation characteristics, certain of which may be obtainable with layers of paper, cellophane, polyesters, and the like. The packaging material may be a normally nonsealing material such as paper treated with a sealable composition, and such treatment may involve coating the paper with a heat-activatable adhesive or by dispersing a suitable polymer in the fiber slurry during its manufacture; the inner surface of a sheet material component may be entirely coated with the heat-sealable material or coated in only limited areas thereof.

The appropriate thickness of the packaging material will depend primarily upon the intended use of the bag member and is readily determinable by those skilled in the art. Polymeric sheet material will normally range from about 0.5 to 5.0, and will preferably be about 1.0 to 3.0 mils in thickness. In some instances the packaging material may be as much as 30 or more mils thick, but the design of an economically feasible process employing such heavy gauge materials will usually entail more complicated equipment and procedures, and the

gauge of deformable material necessary to maintain such a package closed may be prohibitive.

As has been mentioned, the material most appropriate for use as the deformable material is foil of a relatively ductile metal such as aluminum. It may be possible to substitute other nonresiliently deformable structures such as can be produced with a wire framework or skeleton (which may or may not be attached to or imbedded within a matrix such as paper), but from the standpoint of economics and convenience of manufacture the metal foils will generally be preferable. Virtually any configuration may be employed for the deformable element which will provide a substantially continuous strip or loop within the article when it is formed to provide the tubular body. Accordingly, the length of the material should be at least equal to the peripheral dimension of the tubular body, and preferably it will be somewhat longer. If the deformable element does not completely encircle the article gaps will be present to provide a course along which the tear for opening the package can proceed into the main part of the body, thus damaging it and rendering it less satisfactory for subsequent use. Notwithstanding this, discontinuities in the strip at the sides of the bag are somewhat advantageous because the sharp corners which otherwise result from the return bend of deformable material thereat are thereby eliminated so as to reduce the tendency for the packaging material to be cut by such sharp corners. As has been pointed out with reference to the drawings, the deformable element is preferably longer than the peripheral or circumferential dimension of the bag to provide a bridge which avoids a gap in the overlapping area along which tearing could result. However, in such a structure it is important that the end of the strip which extends beyond the edge of the sheet of material be secured against hinging, such as by bonding it through a hole or at cut out portions along the edges of the strip.

As regards the transverse or width dimension of the strip, it need only be wide enough to allow facile folding longitudinally thereof to provide adequate interengagement, and the same criterion is applicable to determine an appropriate thickness for the strip or deformable element. It should be appreciated that the use of metal foil is of particular advantage because the foil element also provides a cutting edge adjacent the upper end of the article for initial tearing away from the end portion above the foil element to effect opening, either by providing a sharp straight edge or one which is serrated to promote cutting of the packaging material. The positioning of the strip on the inside of the bag is also important in this respect since a strip located on the exterior surface would allow the material of the bag to be torn between the plies thereof and would therefore render it ineffective as a cutting edge.

The packaging material will normally be employed initially in the form of individual rectangular lengths of sheet material or as a substantially continuous length having parallel longitudinal edges. When the packaging material is provided as a substantially continuous length to enable to the production of a multiplicity of bags on a continuous or semicontinuous basis, the elements of deformable material are secured thereto at a multiplicity of points spaced along the length thereof and substantially perpendicular to the longitudinal or parallel edges thereof. Thereafter, the length of packaging material is formed into a generally cylindrical configuration, such as by rolling or folding it about a suitable mandrel, and the longitudinal edges thereof are heat sealed together continuously along the length of material as it passes over the mandrel. As the body thus formed passes from the mandrel, a second sealing mechanism may pinch or otherwise secure opposite sides together, simultaneously forming a lower end seal for one bag and an upper end seal for the preceeding one. The mandrel in such a method may suitably be hollow for use in filling the packages with the desired contents prior to sealing of the end portions.

The manner in which the deformable elements are secured to the packaging material may vary considerably and will depend largely upon the specific materials involved; ad-

vantageously, the sealable surface itself furnishes the necessary bonding characteristics. For most satisfactory results, it is usually necessary to pretreat the foil element such as by coating it to render it more readily or more strongly adherent, and the coating composition will depend upon the particular sealable surface that is involved. For example, aluminum foil coated with a polyolefin composition readily adheres to a polyethylene sheet under heat-sealing condition, and this combination constitutes a particularly advantageous embodiment of the invention.

When the foil element is heat sealed to the packaging material, the locations of the seals can be quite significant. In most thermoplastics, heat sealing generally has the effect of weakening the plastic in a zone directly adjacent the heat-sealed area. This is advantageous from the standpoint of opening the bag, when desired, but it may be disadvantageous if it causes the bag to rupture or open prematurely. Accordingly, if the heat seal on the deformable element is directly adjacent the edge thereof, there will be a greater tendency for the strip to sever the packaging material prematurely since the edge and the weakened zone coincide. Spacing the heat seal inwardly from the upper edge of the foil element greatly reduces this tendency and yet permits facile opening of the bag since the weakened zone is still present but it is spaced from the edge of the strip. The cooperative effects of the tearing edge provided by the strip and of the weakened zone resulting from the heat seal results in a bag which is readily opened when desired and yet securely sealed until time. Although not illustrated, appropriately located nicks or cuts can be provided to initiate the tear for even more facile opening of the bag.

Thus, it can be seen that the present invention provides a bag member which is of a relatively simple construction, which may be conveniently and completely sealed initially, which may be readily opened without such damage as would render the bag unsatisfactory for subsequent use, and which may thereafter be closed and opened repeatedly without loss of closing effectiveness. The bag member may be produced economically and rapidly in a simple but highly effective manner adapted to continuous or semicontinuous operation on automatic filling apparatus.

I claim:

1. A bag member comprising a generally tubular body of synthetic plastic sheet material having a recloseable end portion with a heat sealable inner surface, and a relatively thin, substantially continuous strip of nonresiliently deformable material extending about substantially the entire inner periphery of said end portion and secured to said end portion at a point spaced from the edge thereof, said strip partially blocking said sealable surface to substantially prevent sealing thereat and the edge portion between said edge and strip providing a peripheral band of sealable surface at which sealing of the inner surface may be effected, said strip being dimensioned relative to the length of said body so as to be located adjacent said end portion with the major portion of said body being free from said strip, said deformable material being capable of maintaining a folded configuration and being nonadherent to itself under the conditions of sealing for said sealable surface so that subjecting said end portion to the sealing conditions effects a seal in a location substantially limited to said peripheral band, and said bag member is recloseable by folding said bag member along said strip to interengage opposed portions of said strip.

2. The bag member of claim 1 wherein said sealable surface is provided by a synthetic thermoplastic polymer.

3. The bag member of claim 1 wherein said body is formed of a length of heat-sealable synthetic thermoplastic polymeric sheet material having substantially parallel longitudinal edges, and wherein said strip is provided by an elongated deformable element secured transversely of said length of sheet material and substantially perpendicular to said longitudinal edges thereof, said body having a longitudinally extending heat-sealed portion securing said longitudinal edges in overlapping relationship

4. The bag member of claim 3 wherein one end of said deformable element is secured adjacent and short of the longitudinal edge of the overlying ply of said sheet material so that said longitudinally extending heat-sealed portion extends transversely over a portion of said element adjacent the other end thereof.

5. The bag member of claim 4 wherein said element has an aperture therein adjacent said one end and wherein said other end thereof projects beyond the longitudinal edge of the underlying ply of said sheet material and projects beneath said one end and said aperture, said sheet material being bonded to said element adjacent said other end thereof through said aperture to prevent substantially relative movement of the ends of said element.

6. The bag member of claim 1 wherein said metal foil element is adhesively secured to said sealable surface by a heat seal along a line extending longitudinally of said element and

spaced from the edge thereof adjacent the band, so that an unsecured edge portion of said strip extends beyond said heat seal to reduce any tendency for the edge thereof to sever said body at a weakened zone produced directly adjacent said heat seal.

7. The bag member of claim 6 wherein said edge of said element is relatively sharp and provides a cutting edge to facilitate tearing and removal of the end portion of said body extending therebeyond.

8. The bag member of claim 3 wherein the lower end of said tubular body is sealed by a heat seal extending transversely and generally perpendicular to the longitudinal edges thereof.

9. The bag member of claim 8 additionally including an article therewithin, said bag member being sealed within said peripheral band to provide a recloseable sealed container.

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