

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets

(11) Publication number:

**0 376 413**  
**A1**

(12)

# EUROPEAN PATENT APPLICATION

(21) Application number: 89203340.8

(51) Int. Cl.<sup>5</sup>: B65D 77/20

(22) Date of filing: 28.12.89

(30) Priority: 29.12.88 US 291716

(43) Date of publication of application:  
04.07.90 Bulletin 90/27(84) Designated Contracting States:  
BE CH DE ES FR GB IT LI LU NL SE(71) Applicant: SHELL INTERNATIONALE  
RESEARCH MAATSCHAPPIJ B.V.  
Carel van Bylandtlaan 30  
NL-2596 HR Den Haag(NL)(72) Inventor: Thomas, John Sheridan, Jr.  
114 Whistle Walk  
Williamsburg Virginia 23185(US)  
Inventor: Ofstein, David Edward  
106 Whistle Walk  
Williamsburg Virginia 23185(US)(74) Representative: Aalbers, Onno et al  
P.O. Box 302  
NL-2501 CH The Hague(NL)

(54) Easy opening plastic package.

(57) An easy opening plastic package (10) which comprises a flanged container formed from a laminate which has at least two layers (14) bonded together by a relatively weak adhesive (20) which allows the layers to be easily pulled apart and wherein the container flange (12) is formed with a crimp (22) which is thin enough to weaken the flange sufficiently so that it breaks away easily when the two layers are peeled apart. Finally, the package includes a lid (24) which is strongly attached to the container flange.

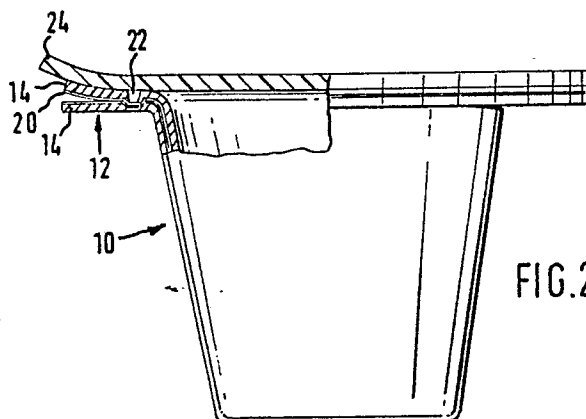


FIG.2

EP 0 376 413 A1

## EASY OPENING PLASTIC PACKAGE

This invention relates to plastic packages, especially those for food and other perishable items. More specifically, the invention relates to plastic packages sealed with a lid which may be easily removed from the container portion of the package.

Cup-like plastic containers for food and other products have been in use for many years. Very often, lids for such packages are formed from a metal foil which is attached to the container with an adhesive. It has been desirable to make such lids easily removable from the container and this has commonly been done by using an adhesive which allows the user to easily remove the lid from the container and thus open the package.

In recent years, there has been an increase in the use of plastic materials for lids for plastic containers. This has caused a number of problems including the difficulty in manufacturing such a package such that the lid may be easily removed from the container. U.S. Patent 4,693,390 issued September 15, 1987 illustrates one attempted solution to this problem. Therein the lid is scored (cut part of the way through) at two points on the surface which is bonded to an internal flange of the container. The purpose of the scoring is to allow a major portion of the lid to be relatively easily pulled away from the container leaving a small portion of the lid attached thereto.

It is an object of the present invention to provide an easily openable plastic package wherein neither the lid nor the package are scored so that there is a continuous layer of protective material both on the inside and outside of both the lid and the container to provide maximum protection for the contents of the package. This is especially significant when oxygen barrier materials are incorporated into the plastic lid or container since it is undesirable to have such materials or the adhesives by which they are bound to the protective layers come into contact with food or other sensitive materials. Furthermore, some of the oxygen barrier materials may absorb moisture either from the outside or from the inside of the package and this would decrease their effectiveness as a barrier to oxygen.

Another object of the present invention relates to the fact that there is no criticality in the location of the seal between the lid and the container flange. In a package which utilizes scoring, the adhesive seal must be spaced from the scoring or else the container will tend to break at the score. In the package of the present invention, the burst strength of the package does not depend on locating the adhesive in a particular place with respect to the crimp, i.e. the adhesive is used all the way

throughout the container flange including the area of the crimp.

The present invention relates to an easily opened plastic package which comprises a flanged container formed from a laminate comprising at least two plastic layers bonded together by a relatively weak adhesive layer which allows the plastic layers to be easily pulled apart, wherein the container flange is formed with a crimp which is thin enough to weaken the flange sufficiently so that it breaks away easily when the plastic layers are pulled apart, and a lid which is strongly attached to the container flange. In the preferred case of oxygen barrier packages, the container will be formed of a laminate which comprises an inner oxygen barrier layer and two outer protective layers bonded to the barrier layer by two adhesive layers. One of the adhesive layers is strong and the other is relatively weak to allow the outer layer with which it is in contact to be easily peeled from the barrier layer.

The base or protective layers are preferably polypropylene but may also be selected from any thermoplastic which is capable of serving as a protective outer layer. The oxygen barrier layer is preferably an ethylene vinyl alcohol copolymer but may also be polyvinylidene chloride or other barrier polymers.

Figure 1 is a cut away cross section of an oxygen barrier package showing the flange of the container and the various layers of the laminate from which it is formed including the crimp and the lid attached thereto.

Figure 2 illustrates another embodiment of the invention wherein the container is formed of two base layers bonded together by a weak adhesive and also illustrates how the peeling process is begun by pulling upwardly on the extended end of the lid.

Figure 3 illustrates the embodiment wherein the crimp is formed on the underside of the flange.

Figure 1 shows a portion of an oxygen barrier container 10 and illustrates the details of the container flange 12. The container 10 and flange 12 are formed of outer layers 14 of a base protective material, an inner layer 16 of an oxygen barrier material, a layer 18 of the strong adhesive and a layer 20 of a relatively weak adhesive. The adhesives provide the adhesion between the outer protective base layers and inner barrier layers.

The outer base protective layers are preferably formed of polypropylene because it is inert to most food products and does not affect the flavor or odor of the product. Other inert strong polymers may also be used. The barrier layer is preferably

formed of a copolymer of ethylene and vinyl alcohol because it has excellent oxygen barrier properties and is easily processable. Polyvinylidene chloride and other barrier polymers may also be used.

The strong adhesive may be, for example, maleic anhydride-modified polypropylene. The weak adhesive may be, for example, maleic anhydride-modified polyethylene or maleic anhydride-modified polypropylene blended with polypropylene or even just a maleic hydride-modified polypropylene with a low degree of functionalization.

As can be seen in Figures 1, 2 and 3, the container flange 12 has a crimp 22 therein. Figs. 1 and 2 show the crimp on the upper side of the flange and Fig. 3 shows it on the underside of the flange. The crimp 22 weakens that portion of the flange 12 but still provides continuous unbroken base and barrier layers 14 and 16. The crimp may be formed into the container flange 12 in a secondary operation. Preferably, the crimp is formed into the container flange 12 during the forming process wherein the container 10 is formed. This may be accomplished by a variety of means including thermoforming and injection molding.

The lid 24 is adhered to the upper portion of the container flange 12. The seal between the lid 24 and the flange 12 should be a so called "permanent" seal-this means that the two layers should be extremely difficult to pull apart. Such a seal between the lid 24 and the flange 12 can be accomplished by a variety of means including virtually any sealing method-adhesion, ultrasonic, radio frequency, vibration welding, thermal conduction and spin welding, for example. In the case of the oxygen barrier package, the lid must also include an oxygen barrier material and preferably also include inner and outer protective base layers. If oxygen barrier is not important, then the lid may be formed of any plastic material, laminate or otherwise.

Figure 2 illustrates the non-oxygen barrier embodiment of the present invention wherein the container flange is formed of a laminate of two outer base protective layers 14 adhered together by a layer 20 of a relatively weak adhesive. The lid 24 is permanently sealed to the upper portion of the flange 12 and, as in Figure 1, extends outwardly beyond the end of the flange 12.

As shown in Figure 2, to open this package, an upward force is exerted on the extending end of the lid 24. Because of the strong adhesion between the lid 24 and the container flange 12, the upper base layer 14 does not peel away from the lid 24 but rather the two base layers 14 peel away from each other at the adhesive layer 20 because of the relatively weak adhesion strength of that layer. When the peel reaches the crimp 22, the outward

portion of the container flange 12 breaks off because the crimp 22 has weakened the flange 12 sufficiently at that point for such breaking off to occur. This action provides the opening of the package. The same type of thing happens with the package of Fig. 1 except that the peel is between the base and barrier layers which are bonded together by the weak adhesive.

The characteristics of the weak adhesive are important to the performance of the package of the present invention. In general, for shallow draw containers, the adhesive strength should be at or above 0.5 pounds per linear inch (PLI) and for deep draw containers, the adhesive strength should be at or above 1.0 PLI.

### Claims

1. An easy opening plastic package comprising:

a) a flanged container formed from a laminate comprising an inner oxygen barrier layer, outer layers bonded to said barrier layer by two different adhesive layers, one which is strong and one which is relatively weak and allows the outer layer with which it is in contact to be easily peeled from the barrier layer, and wherein the container flange is formed with a crimp which is thin enough to weaken the flange sufficiently that it breaks away when said outer layer is peeled away from the barrier layer; and

b) an oxygen barrier lid which is strongly attached to the container flange.

2. The package of claim 1 wherein the base layers are formed of polypropylene.

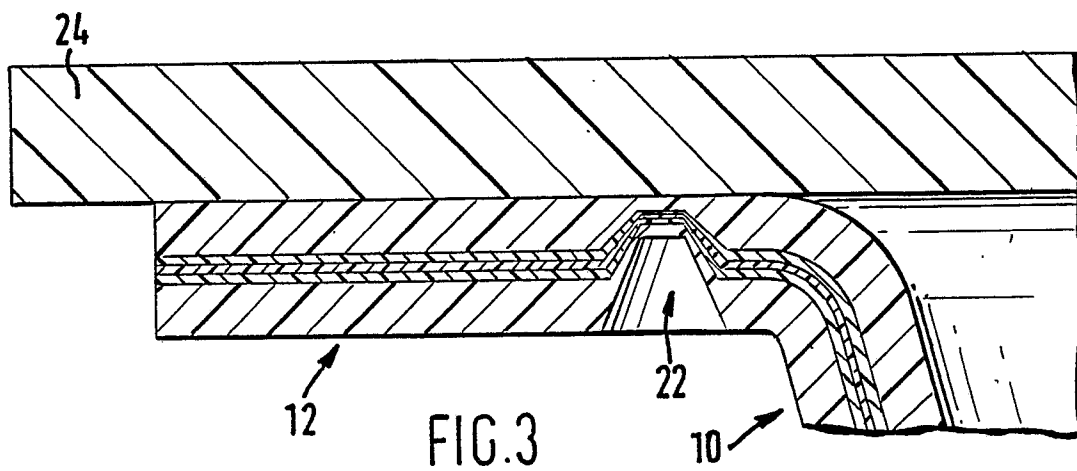
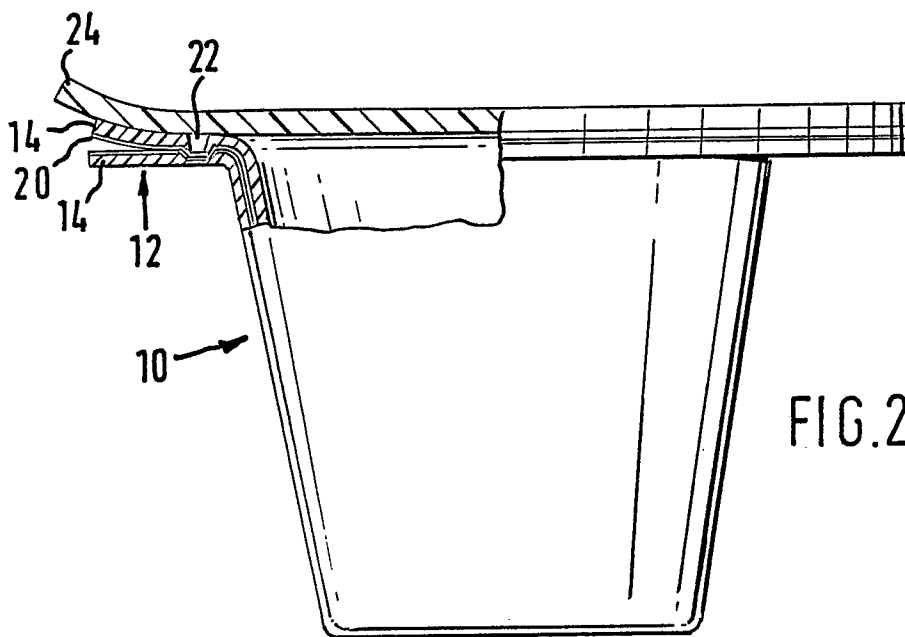
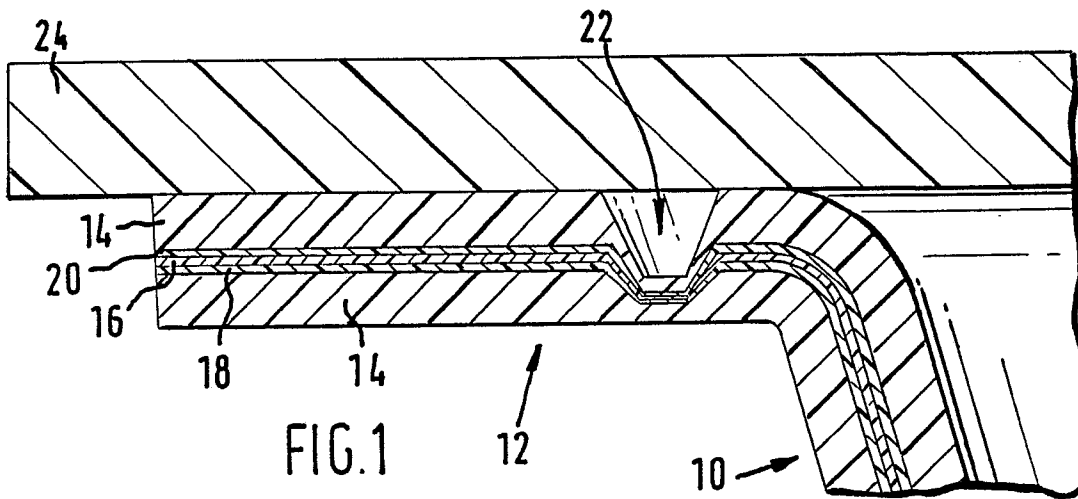
3. The package of claim 1 wherein the barrier layer is selected from the group consisting of copolymers of ethylene and vinyl alcohol and polyvinylidene chloride.

4. An easy opening plastic package comprising:

a) a flanged container formed from a laminate comprising two base layers bonded together by a relatively weak adhesive layer which allows the base layers to be easily peeled apart, wherein the container flange is formed with a crimp which is thin enough to weaken the flange sufficiently so that it breaks away easily when the base layers are peeled apart; and

b) a lid which is strongly attached to the container flange.

5. The package of claim 4 wherein the base layers are formed of polypropylene.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 282 773 (IDEMITSU PETROCHEMICAL CO.) * Page 2, line 54 - page 3, line 58; page 8, lines 13-39; figures 13a-14b,23 *	4	B 65 D 77/20
Y	---	1-3,5	
Y,D	US-A-4 693 390 (HEKAL) * Column 1, line 33 - column 3, line 2; figure 2 * -----	1-3,5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 21-03-1990	Examiner BRIDAULT A.A.Y.
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			