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(54) **Container with closure**

(57) The invention relates to a container (2) having a body (4) and a closure (6) with the closure, in the first instance and prior to first use, sealed to the body to maintain goods such as a foodstuff, in a sealed condition with the container. The body and closure are sealed together along matching faces (10,12) and on at least one of the matching faces is provided a raised protrusion (14) so that in practice it is the raised protrusion which is sealed to the other component. This reduced sealing area allows improved seals to be obtained with surface irregularities taken into account and the closure can be peelably removed. It also allows the possibility to use ultrasonic welding techniques and the closure can be removed and reused without altering the structure of the body or closure.

**EP 0 870 687 A1**

## Description

The invention which is the subject of this application relates to a container of a type comprising a body and a closure therefor, said container principally for use in containing a foodstuff which can be liquid, fluid or solid in form, therein.

In particular, the container is of a form such that, when first provided, the closure is sealed directly to a flange of the body of the container thereby overcoming the need for additional sealing materials to be used such as foil, plastics or the like. The closure can then be peelably removed from the container without any alteration in the form of the closure or the container body being required and furthermore the closure can then be replaced in position to close the container for subsequent uses. A container of this type is the subject of the applicants co-pending British Patent application No 9411145.7.

The subject of the current application is to provide an improvement to this type of container and to provide a general improvement in the sealing of closures to container bodies in a form which allows the closure, in the first instance, to be reliably and completely sealed to the body yet still be peelably removable therefrom.

A known problem with the existing containers where closures have been sealed to the body is that during the sealing of the closure using heat sealing techniques, irregularities in the surface of the flange of the body and/or or the lip of the closure mean that either the seal formed between the closure and body is not complete around the periphery of the closure and body and therefore the container is rejected or, alternatively, the amount of heat which is required to be applied to form a complete seal is such that the closure is effectively welded to the body thereby preventing the peelable removal of the closure from the body as required and again the container is rejected. This problem is exacerbated if the flange of the body is wide or relatively thin as even irregularities which may not be apparent to the eye can cause the seal between the closure and the body to be defective. Until the current invention, this problem has been a factor in the incomplete commercialisation of the invention and it is submitted that the invention which is the subject of this application overcomes this problem and will allow the full commercialisation of the invention and also allows alternative sealing methods which are novel to this particular area of product to be used effectively and to advantage.

In a first aspect of the invention there is provided a container formed of plastics material, said container comprising a body and closure therefor and which closure, prior to first use, is sealed to the body to seal material held in the container therein and wherein the seal is formed between a flange around the opening of the body and a matching means on the closure and either or both of the body flange and closure matching means are provided with a raised protrusion which is

formed substantially along the length of the seal formed.

The raised protrusion on either or both of the closure and body is sealed to the other of the closure or body rather than the whole of the flange of the body or the whole of the flange or lip of the closure and this allows the area, i.e. the raised protrusion, which forms the seal to be controlled and minimised so as to reduce the opportunity for irregularities in the same which could damage the seal. Furthermore, in a preferred embodiment the protrusion can be used sacrificially to indent or flex along the length of the seal so that relatively minor irregularities can be evened out by the sacrificial indentation of the protrusion and thus a complete seal can still be formed without the application of additional pressure where previously this was not possible, without the application of additional pressure which can cause the closure to be welded and not be peelably removed.

Typically the protrusion is provided in the form of an elongated beaded section which is moulded as part of the body or closure but preferably is provided on the flange formed around the opening of the body.

In use, the raised protrusion is sufficiently flexible such that when apparatus is applied to seal the closure to the body the raised protrusion can move to a sufficient extent to take into account any irregularities in the surface of the closure so that when the sealing takes place a complete seal is formed between the body and closure. Furthermore, the seal which is required to be formed can still be provided so as to allow the closure to be peelably removable from the body rather than welded thereto.

In a preferred embodiment the plastics material used comprises a base layer and a sealing material layer and is used to form at least one of, but preferably both of the closure and body such that the sealing material layer is provided to allow the seal to be formed. One particularly suited material is polypropylene material with a sealing layer applied thereto. Furthermore, the provision of this form of plastics material in conjunction with the provision of the protrusion as described allows ultrasonic welding techniques to be used to join the components to form the container. The use of ultrasonic welding in relation to thin walled plastics material components to close container bodies by sealing closures thereto is previously unknown and is believed to be novel and provide significant advantages over heat sealing as is described in more detail further in this description.

In whichever embodiment it is preferred that the closure and/or body are provided with means which allow the closure to be subsequently placed and retained in position once it has been peelably removed, so as to close the container. It is envisaged that this arrangement is of particular advantage with respect to the storing of perishable goods in the container such as dairy and yellow fat products. Thus the closure is provided in the first instance to seal the goods in the container and, upon opening the container for the first time by peelably

removing the closure, the closure can be replaced to close the container and thereby store and protect any remaining goods within the container. In one embodiment the closure is provided with an internal flange which allows a friction fit engagement between the internal flange and the internal face of the wall of the container body.

In a further aspect of the invention there is provided a method of forming a container comprising a closure and a body, with said closure, prior to first use, sealed to the body to be peelably removable therefrom, comprising the steps of forming a flange at the opening of the body, forming a matching means on the closure to allow said matching means to be sealed to the flange, forming a raised protrusion on either or both of the flange on the body and/or the matching means on the closure and sealing the closure to the body by sealing the raised protrusion on one of the closure matching means or body flange to the other of the closure matching means or body flange.

In one embodiment a raised protrusion is formed on both of the closure matching means and body flange and it is the raised protrusions which are joined to form the seal. However in practice the raised protrusion is normally only required on one of the body or closure and preferably the raised protrusion is provided along the flange of the body.

In one aspect of the invention the closure is heat sealed to the body of the container.

In an alternative feature and in another aspect of the invention, a sealed container comprising a closure and body of plastics material is formed when the closure is sealed to the body via a protrusion formed on either of a flange on the body or a matching means formed on the closure, by ultrasonic welding.

The use of ultrasonic welding for thin walled food containers has, to date, not been possible in relation to conventional food containers of this type. The provision of the protrusion allows ultrasonic welding to be successful and the advantages relating to this process to be obtained.

Specific embodiments of the invention will now be described with reference to the accompanying drawings wherein;

Figure 1 illustrates an elevation of a container according to the invention;

Figure 2 illustrates a plan view of a body of the container;

Figure 3 illustrates a sectional elevation of the container along line A-A of Figure 2;

Figure 4 illustrates the detail of the flange area of the container; and

Figure 5 illustrates an elevation of the closure of the

container in section.

Referring firstly to Figure 1 there is illustrated a view of a container 2 formed according to the invention in a condition prior to first use. The container 2 comprises a body 4 in which a material such as a foodstuff is held and a closure 6 which serves to close the opening into the body. The closure 6 is sealed to the body at the area 7 before first use so as to seal the foodstuff within the body in a hygienic and required manner to keep the foodstuff fresh. The closure 6 is shown in detail and in section in Figure 5 and is provided with location or matching means 10 which, in this embodiment, is the peripheral lip of the closure. This area is provided to be sealed to the flange 12 of the body which defines the opening of the body. However, the matching means 10 of the closure is not sealed to the whole of the flange 12 but rather to a raised beaded protrusion 14 which passes along the flange and is shown in Figures 2, 3 and 4 which show the body 4 in more detail.

It will be seen from Figures 2-4 that the overall shape of the body is similar to conventional container bodies for foodstuffs which in this case could be, for example, margarine but equally the container can be circular in plan or any other shape as required. The flange 12 is shown to be relatively wide but it is only the raised portion 14 which comes into contact to be sealed to the closure. The closure lip 10 may be provided with a protrusion instead of or in addition to that on the flange but this is not always necessary. The closure shown in Figure 5 provides a lip with an area to be sealed to the raised protrusion 14 of the container body.

The provision of the protrusion allows any irregularities in the flange surface of the body and /or lip of the closure to be accommodated as, as the area of the protrusion is significantly less than the flange and the shape and linear nature of the same allows the protrusion to be sacrificially indented or flexed to an extent and without the application of additional pressure so as to allow the closure to be sealed at all points thereby providing a hygienic and complete seal as is required. Furthermore the provision of the protrusion ensures that this seal can be created without the need for an increase in the pressure applied and the resultant increase in the strength of seal formed as the flex or indentation of the protrusion allows for any irregularity in the surfaces to be sealed together. For example, the protrusion can be indented to an extent to take into account surface irregularities. This is in contrast to conventional sealing procedures where it is necessary to increase the pressure applied and the strength of the seal formed to overcome irregularities as the faces which are sealed being relatively wide and planar cannot indent or flex and ensure that the seal with required integrity is formed. This can mean that the subsequent peelable removal of the closure from the body is not possible. However, using the protrusion according to this invention the seal can be created and because the

protrusion is significantly narrower than the flange so that the seal is significantly narrower than it would be if the closure was applied straight to the flange, the peelable removal of the closure is possible.

Figure 5 illustrates that the closure can be provided with an internal flange 18 which allows the closure to be applied to close the body after the seal has been broken, and the internal flange contacts with the inner wall 20 of the body thus providing a friction fit which allows the container to be subsequently closed without the need for alteration to the body or the closure form.

Thus, the container according to the invention allows a container to be provided which has a body and a closure, with the closure in the first instance sealed to the body thereby overcoming the need for any additional foil or plastic film sealing and is not altered in shape or form once the seal has been broken so as to allow the integrity of the closure and body to be maintained and also to allow the closure to be subsequently used to close the body.

The provision of the protrusion defines the area on the flange which is to be joined to the closure more accurately than with the conventional sealing of the entire flange. Thus, an ultrasonic welding process can be used which, by causing friction by vibrating the two components, causes melting of the protrusion and the closure to join the same together. The use of ultrasonic welding in relation to plastic containers such as those for foodstuffs has never been considered as practical in the past due to the problems with thin walled containers having a tendency to flex during the ultrasonic welding process. This flexing can cause inconsistent contact but by providing the protrusion according to this invention, so the contact between the components is consistent and so ultrasonic welding is successful. In this process the body of the container is held in a clamp and the closure is applied in position to be sealed to the body whereupon a face of a sonitrode of the ultrasonic apparatus is brought into contact with the outer surface of the closure. The sonitrode vibrates to cause a weld to be created between the protrusion and the closure and hence form the sealed container. It is also found that the use of ultrasonic welding means that the join between the closure and the body can be formed in approximately half the time required to form the same join using heat sealing and therefore improvements in the efficiency and the quality of join are created.

A further advantage of this invention is that the problems of using a heat sealing method to seal the closure to the body, said problems including the closure being welded to the body rather than simply to be sealed to be peelably removable, can be overcome.

## Claims

1. A container (2) formed of plastics material, said container comprising a body (4) and closure (6) therefor and which closure, prior to first use, is

sealed to the body to seal material held in the container therein and characterised in that the seal is formed between a flange (12) around the opening of the body (4) and a matching means (10) on the closure (6) and either or both of the body flange and closure matching means are provided with a raised protrusion (14) which is formed substantially along the length of the seal formed.

2. A container according to claim 1 characterised in that the raised protrusion on either or both of the closure and body is sealed to the other of the closure or body rather than the whole of the flange of the body or the whole of the matching means of the closure.
3. A container according to claim 1 characterised in that the protrusion is relatively linear in shape and can flex or be indented along the length thereof.
4. A container according to claim 1 characterised in that the protrusion is provided in the form of an elongated beaded section which is moulded as part of the body or closure.
5. A container according to claim 4 characterised in that the raised protrusion is formed on the flange on the body.
6. A container according to claim 1 characterised in that the seal formed allows the closure to be peelably removed from the body without alteration in the shape or form of either of the closure or body.
7. A container according to claim 1 characterised in that one or both of the body and/or closure is formed from a plastics material which comprises a base layer and a sealing layer such that the sealing material layer is provided and positioned to allow the seal to be formed.
8. A container according to claim 7 characterised in that the plastics material comprises a polypropylene material with a sealing layer applied thereto.
9. A container according to any of the preceding claims characterised in that the seal is formed using ultrasonic welding apparatus.
10. A container according to any of the preceding claims characterised in that the closure and/or body are provided with means which allow the closure to be subsequently placed and retained in position on the body once it has been peelably removed, so as to close the container.
11. A container according to claim 10 characterised in that the closure is provided with an internal flange

which allows a friction fit engagement between the internal flange and the internal face of the wall of the container body.

12. A method of forming a container (2) comprising a closure (6) and a body (4), with said closure (6), prior to first use, sealed to the body (4) to be peelably removable therefrom, comprising the steps of forming a flange (12) at the opening of the body (4), forming a matching means (10) on the closure (6) to allow said matching means (10) to be sealed to the flange (12), forming a raised protrusion (14) on either or both of the flange (12) on the body (4) and/or the matching means (10) on the closure (6) and sealing the closure (6) to the body (4) by sealing the raised protrusion (14) on one of the closure matching means (10) or body flange (12) to the other of the closure matching means (10) or body flange (12).
13. A method of forming a container according to claim 12 characterised in that the raised protrusion is formed on both of the closure matching means and body flange and it is the raised protrusions which are joined to form the seal.
14. A method according to claim 12 characterised in that the raised protrusion is formed along the flange of the body.
15. A method according to claim 12 characterised in that the seal is formed using heat sealing apparatus.
16. A method according to claim 12 characterised in that the seal is formed using ultrasonic welding apparatus.

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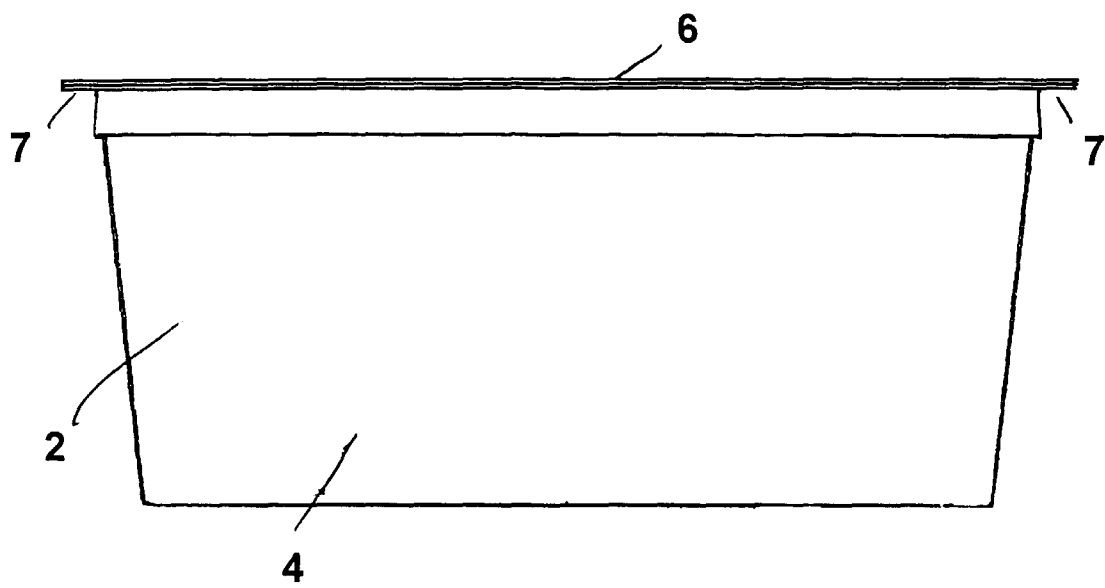
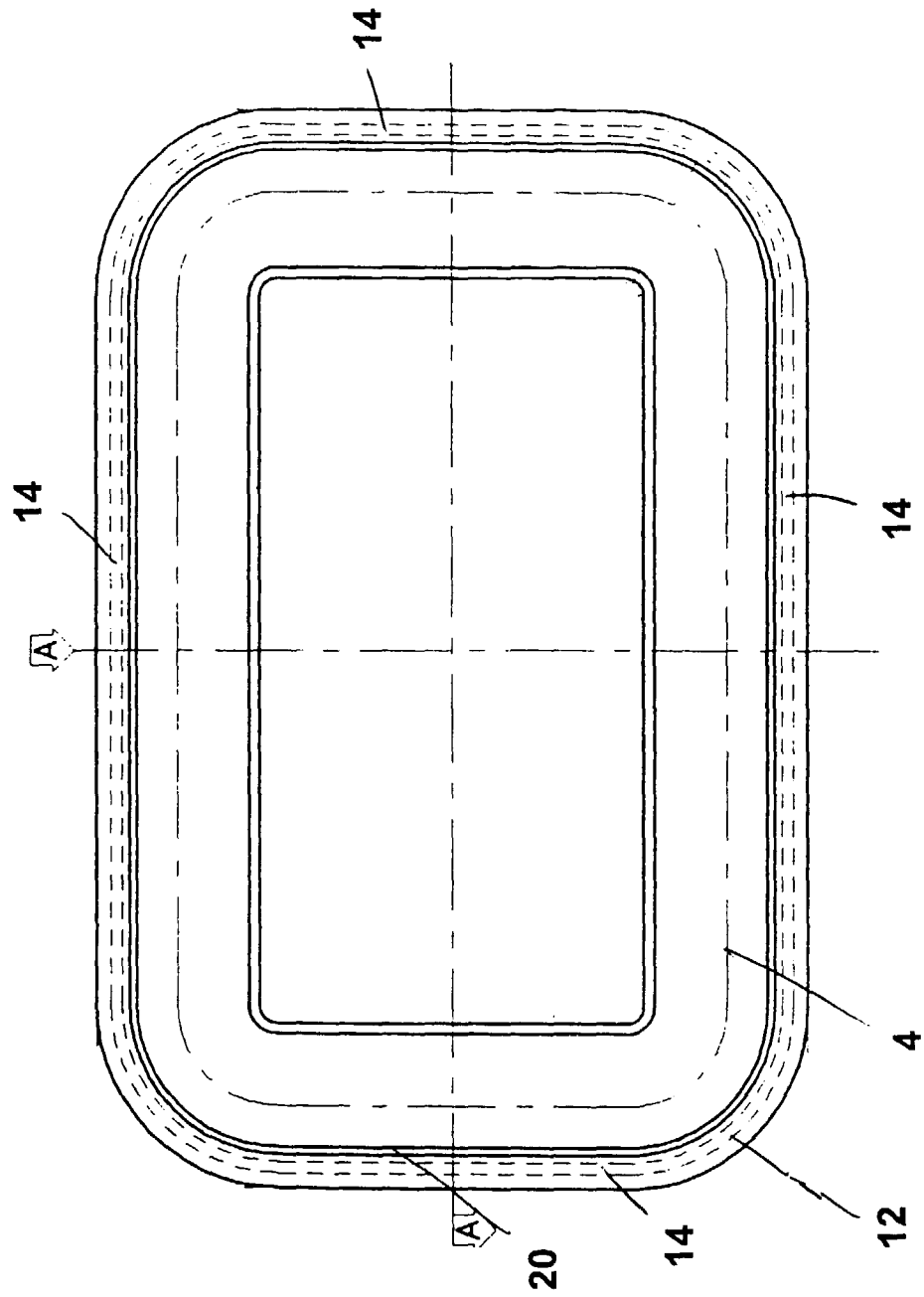


Figure 1

Figure 2



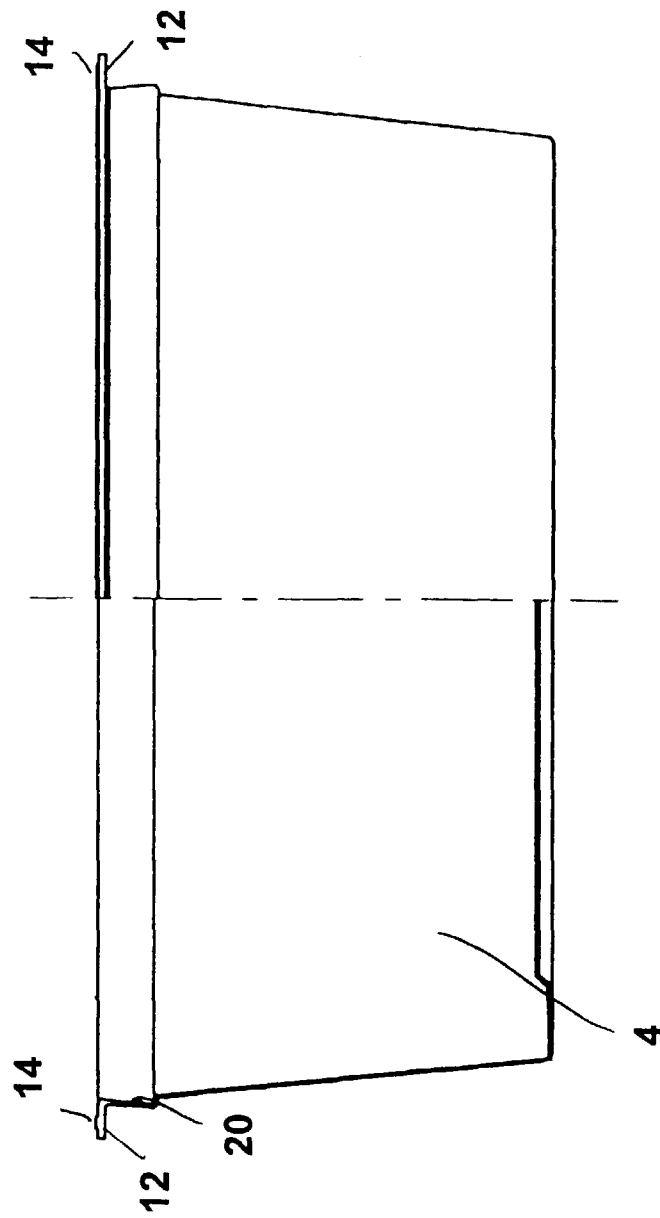


Figure 3



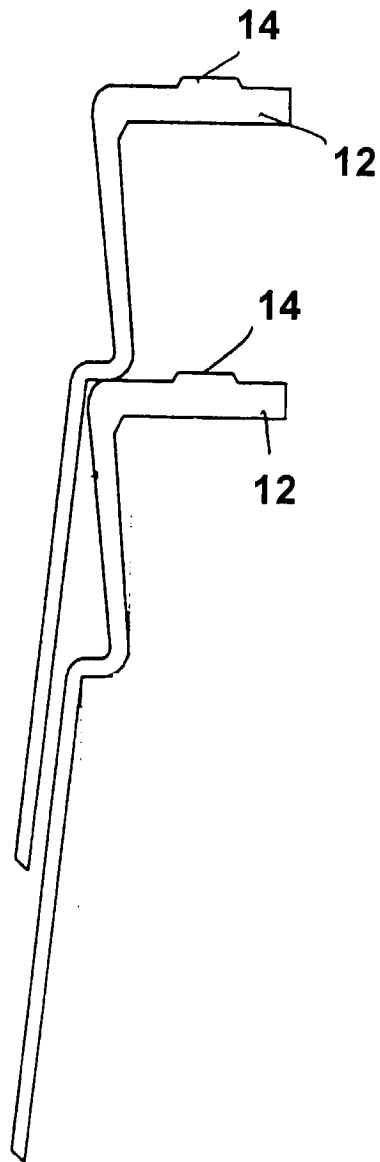


Figure 4

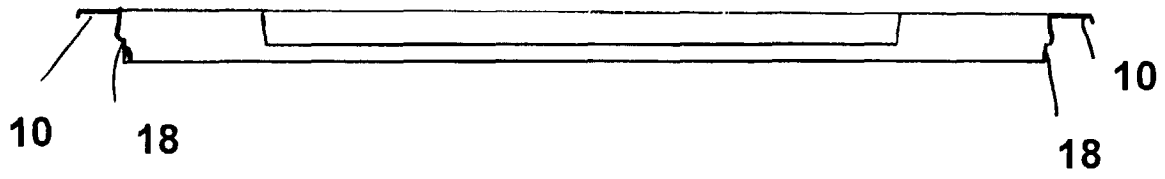


Figure 5



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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 10 6706

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.6)
X	W0 96 15049 A (GICS & VERMEE) 23 May 1996 * abstract; figures * * page 7, line 33 - page 8, line 5 * * page 9, line 10 - line 23 * ---	1-5,7	B65D1/00 B65D77/20
X	US 4 605 142 A (ITOH ET AL.) 12 August 1986 * abstract; figures * * column 1, line 31 - line 45 * * column 3, line 15 - line 35 * ---	1-6,12, 14,15	
A	CH 652 369 A (ALUMINIUMWERKE AG RORSCHACH) 15 November 1985 * abstract * * page 3, right-hand column, line 15 - line 30; figure 7 * ---	1,6, 10-12,15	
A	FR 2 736 617 A (PECHINEY EMBALLAGE ALIMENTAIRE) 17 January 1997 * page 2, line 27 - page 3, line 3 * * page 6, line 14 - line 16 * * page 6, line 33 - page 7, line 7; figures * -----	1-12, 14-16	TECHNICAL FIELDS SEARCHED (Int.Cl.6)  B65D
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>17 July 1998</b>	Examiner <b>Gino, C</b>
CATEGORY OF CITED DOCUMENTS 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			

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