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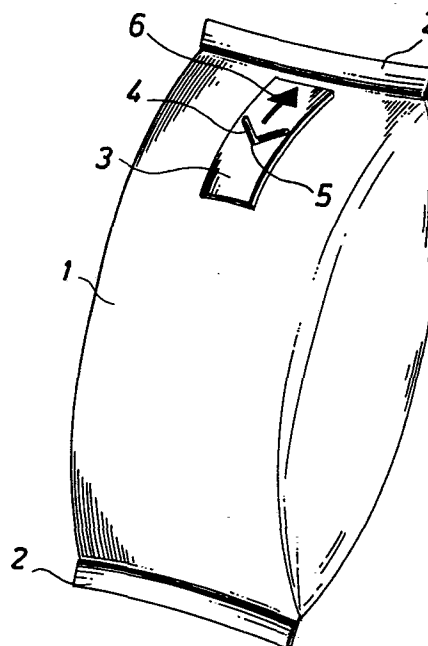
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⑴㉕ **Opening arrangement for packing container.**

⑴㉖ An opening arrangement for packing containers (1) which are made of a flexible, oriented plastic material. The opening arrangement comprises a material strip (3), which is joined to the packing container material by means of a V-shaped weld (4). The point of the V serves as a point of application of force (5) on opening of the package, and the opening arrangement is placed so in relation to the direction of orientation of the material that the material wall, after breaking up at the point of application of force, splits open along two substantially parallel lines in the direction of pulling, so that an emptying opening (7) is formed.



**EP 0 060 411 A1**

OPENING ARRANGEMENT FOR PACKING CONTAINERS

The present invention relates to an opening arrangement for packing containers, which at least in the area of the opening arrangement comprise a wall portion of oriented plastic film.

Aerated products, such as e.g. beer, refreshing beverages etc. are packed in drums and bottles, but also in "bag- or cushion-shaped" packing containers, which are manufactured from comparatively thin, flexible, hard plastic material. A packing container of this type is described in Swedish patent no. 75120220. One difficulty in the formation of these packages consists in providing an opening arrangement which, whilst being capable of withstanding the relatively high internal pressure in the package, can easily be opened by the consumer, when the contents of the package are to be emptied. As the packing container material is relatively thin and unstable, conventional caps or closing devices cannot be used. Opening arrangements for this type of packing container proposed up to now comprise one or more holes punched into the packing container wall which are covered by means of a common tape or tear strip, which is sealed to the outside of the packing container wall, so that it covers the emptying openings provided. This type of opening arrangement is easy to open, but may detach itself from the packing container wall under unfavourable conditions, e.g. when the internal pressure in the package increases, owing to the packing container having been exposed to a high temperature for a prolonged period of time. Furthermore, it is difficult, owing to these holes punched into the packing container wall, to supply a packing container provided with this type of opening arrangement, which also during a long period of storage retains the carbon dioxide content of the material contained therein.

It is an object of the present invention to provide an opening arrangement for the type of packing container which is made of flexible plastic material, which opening arrangement is not subject to the disadvantages of the earlier opening arrangements.

It is a further object of the present invention to provide an opening arrangement where the wall of the packing container is broken through only in connection with the opening.

It is a further object of the present invention to provide an opening arrangement which can easily be opened and yet withstands high

internal pressure and which is simple in its design and is inexpensive to produce.

These and other objects have been achieved in accordance with the invention in that an opening arrangement for packing containers which comprise, at least in the area of the opening arrangement, a wall portion of oriented plastic film, has been given the characteristic that a part located outside the package wall and serving as a pull-lug is sealed to the oriented plastic film by means of a weld which has a projection serving as a point of application of force which points against the direction of pulling.

By joining the pull-lug directly to the oriented plastic film in a weld fusing together the two material layers, which moreover is designed so that a marked point of application of force is formed, it is made easy to break through the packing material, when the packing container is to be opened. After the rupture at the point of application of force, the material is split open along the weld and, thereafter, substantially in the direction of orientation of the film. This eliminates the need for pre-formed holes or tear-notches in the packing container wall. In this manner not only an easily openable opening arrangement is produced, but also an opening arrangement which owing to the absence of pouring openings or slots in the packing container material provides a completely tight packing container which well retains the carbon dioxide content of the material contained therein.

Preferred embodiments of the opening arrangement in accordance with the invention have been given moreover the characteristics which are evident from the attached subsidiary claims.

The opening arrangement in accordance with the invention will now be described in greater detail with special reference to the attached drawing which schematically illustrates the arrangement in accordance with the invention. Only the details required for an understanding of the invention have been included.

Fig.1 shows in perspective a substantially "cushion-shaped" packing container made of flexible plastic material with an opening arrangement in accordance with the invention.

Fig.2 shows a part of the packing container according to fig.1 after the opening.

Fig.3 shows in section a part of a packing container wall with a first embodiment of the opening arrangement in accordance with the invention.

Fig.4 shows similarly to fig.3 a part of a packing container wall

with a second embodiment of the opening arrangement in accordance with the invention.

In fig.1 is shown in perspective a substantially "cushion-shaped" packing container 1 which has been made of a flexible plastic material and which has been formed into a tube and closed at opposite ends by means of seals 2 extending transversely in relation to the tube. The plastic film forming the packing container 1 consists of a thin, hard plastics, in particular biaxially oriented acrylonitrile which has a thickness of approx. 0.2 mm. Thanks to the biaxial orientation, the plastic film obtains improved properties and, among other things, its capacity to withstand the internal pressure arising in the packing container is increased. However, this is well-known to those versed in the art, and does not have to be described in detail. The plastic film may also be mono-oriented, but in this case it is important that the direction of orientation is such, that the direction of pulling of the opening arrangement coincides with the direction of orientation. Naturally, the plastic film may also be non-oriented, if the packing container is intended for contents which do not generate any appreciable internal pressure, but in such a case the packing container wall must in the area of the opening arrangement comprise a wall portion of oriented plastic film, since the orientation of the plastic film is a precondition for a correct functioning of the opening arrangement in accordance with the invention.

The opening arrangement in accordance with the invention comprises a part of strip 3 serving as a pull-lug, which is sealed to the packing container wall by means of a weld 4 which has a projection 5, serving as a point of application of force, which points against the direction of pulling. The direction of pulling is indicated in fig.1 by means of an arrow 6 and, as mentioned earlier, this arrow also indicates the direction of orientation, if the packing container material is mono-oriented.

As can be seen from the preferred embodiment of the opening arrangement in accordance with the invention shown in fig.1, the weld 4 is substantially V-shaped. The weld is so oriented that the point of the V faces in the direction opposite to the direction of pulling, which means that the said point will form a point of application of force on opening of the packing container. The pulling force, which acts upon the weld when the packing container is to be opened, is concentrated, owing to the shape of the weld, on the point of application of force, which greatly facilitates the rupture of the packing container wall. After rupture has properly taken place, the packing container material splits open without difficulty thanks to its

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orientation, the splits running/ from the point of application of force in both directions along the legs of the V-shaped weld, to progress subsequently in the direction of orientation of the material, as shown in fig.2. The width of the emptying opening <sup>produced</sup> ~~7~~ is regulated in that the linear distance between the ends of the legs of the V-shaped weld are chosen to be equal to the desired width of the emptying opening.

Since it is desirable in many cases that the pull-lug 3 together with the torn-up area of the packing container wall should be retained in one piece with the packing container, it is appropriate to locate the opening arrangement at some distance in front of the sealing fin 2 which extends over the width of the packing container right-angled to the direction of pulling. The sealing fin will then also interrupt the tearing up of the packing container wall, so that an emptying opening of an appropriate size is obtained.

It has been found that the initiation of the opening is facilitated, if the apex angle of the V-shaped weld is  $< 160^\circ$  and preferably amounts to  $90^\circ$ . A  $90^\circ$  apex angle, moreover, produces an emptying opening of a suitable shape which makes it easy to pour the contents out of the packing container in the form of a well collected and concentrated stream.

A special, simple embodiment of the opening arrangement is obtained, if the pull-lug 3 is constituted of a material strip of the same material as the packing container wall. The pull-lug as well as the packing container wall, however, may consist of laminated material which comprises layers of different types of plastics, aluminium foil or similar materials. It is a precondition for the opening arrangement in accordance with the invention, however, that at least the laminate layer facing towards the material strip must consist of sealable, oriented plastic film. In a mono-oriented plastic film, moreover, the direction of orientation of the packing container wall (and of the strip) must be parallel with the direction of pulling. To ensure that the emptying opening occurs in the packing container wall and not in the material strip it is appropriate, moreover, for the pull-lug to consist of a plastic strip whose thickness is 20-70% greater than the material thickness of the packing material wall. The combination of an oriented packing container wall of 0.2 mm thickness and a strip of the same material (acrylonitrile) of 0.3 mm thickness has proved particularly advantageous, and an extra thickness for the strip part of about 50% is therefore preferred. In the case of strips of non-oriented material, the strip and the container wall may have the same thickness, since the orientation of the packing container material will nevertheless cause the rupture to take

place there and not in the strip.

The weld 4 is formed by placing the strip in the correct position against the outside of the packing container material and then pressing a welding tool of the desired shape against the outside of the strip and the inside of the packing container wall, whereupon, through high frequency sealing and simultaneous pressing together, the material is heated to a temperature of 180 - 200°C, which produces a completely homogeneous weld and a depression corresponding to the shape of the weld in the packing container wall as well as in the material strip. This depression diminishes the thickness of the packing container wall by 10 - 30%. Through this the packing container wall is weakened to such an extent that it is easily ruptured in the point of application of force 5, when the material strip 3 is subjected to tensile stresses.

As mentioned earlier it is appropriate, in order to prevent rupture in the material strip 3, to manufacture the same of a somewhat thicker material than the wall material of the packing container. A possibility of making the material strip 3 as well as the packing container wall 1 of identical material presents itself if the welding tool used is given a somewhat different design which results in a second embodiment of the opening arrangement in accordance with the invention. This embodiment is shown in fig.4. Like fig 3, fig 4 also shows a section through a part of the packing container wall 1 and the material strip 3 applied to the same. Contrary to <sup>what is the case in</sup> the preferred embodiment of the invention shown in fig.3, however, two co-operating welding tools of different shape are used in the formation of the opening arrangement according to fig.4. On the inside of the packing material a welding tool of a shape corresponding to the desired shape of the weld, e.g. the V-shape described, is used. On the opposite side of the material, that is to say the strip side, a co-operating welding tool with a heatable plane working surface is utilized, whose area is several times larger than the area of the working surface of the co-operating working surface. As a result of the heating of the working surfaces of the two co-operating welding tools and the simultaneous pressing together of the tools, a weld of the same shape as previously, that is to say preferably V-shaped, is produced, whilst the depression corresponding to the weld is obtained only on the side of the packing material. In the surface of the strip 3 instead an appreciably larger, but at the same time much shallower depression 8 is obtained, which means that the weakening of the packing material 1 will be appreciably greater than the weakening of the strip 3. This ensures that the packing material and not the strip will split in the point of application

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of force when the packing container is to be opened, in spite of the strip<sup>3</sup> and the packing container wall 1 being made of identical material.

By the arrangement in accordance with the invention an easily openable and robust opening arrangement for packing containers which have been manufactured from a flexible, oriented, hard plastic material is thus provided. The opening arrangement is inexpensive and particularly simple to manufacture, and therefore meets all the demands which may be made on an opening arrangement for a modern packing container of the non-returnable type.

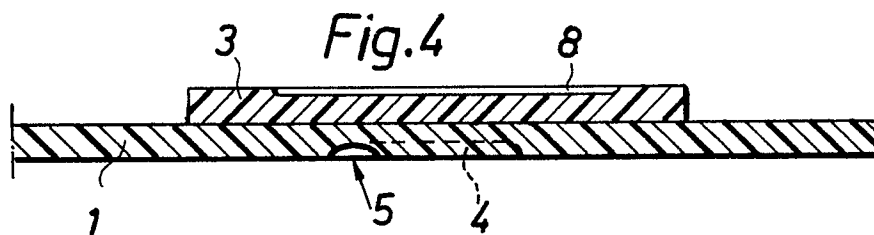
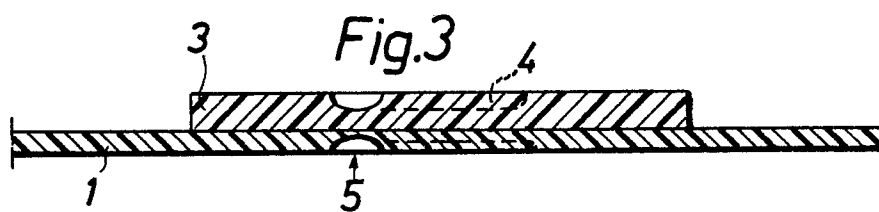
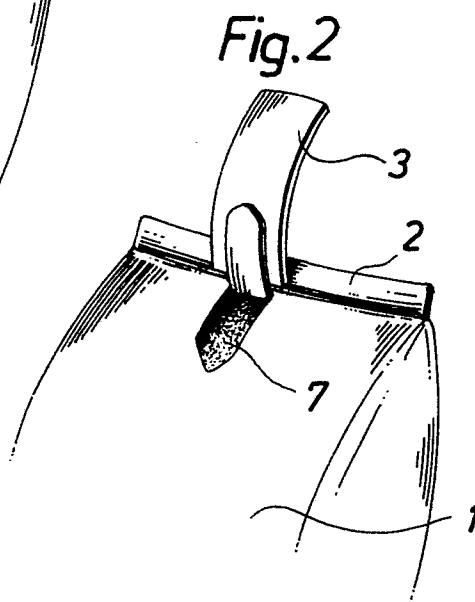
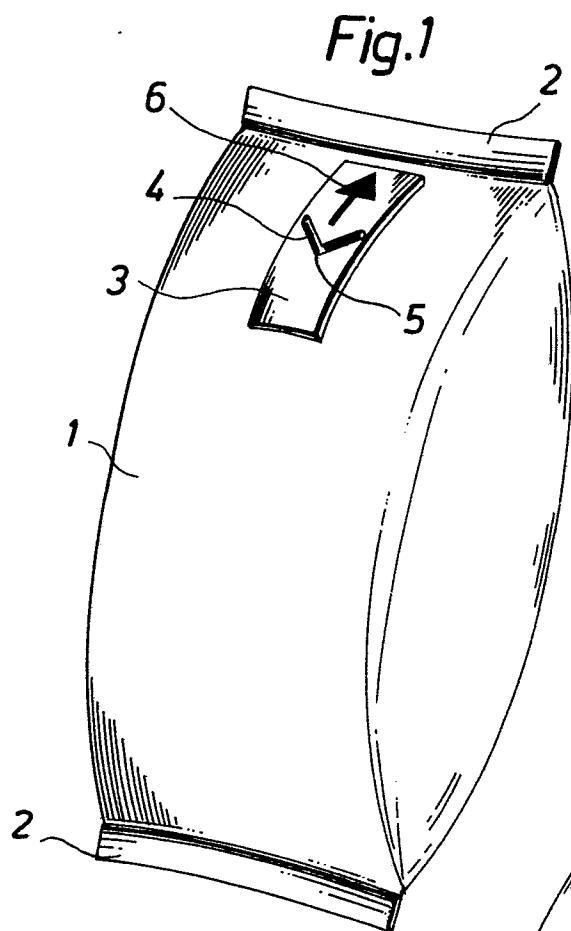
CLAIMS

1. An opening arrangement for packing containers, which at least in the area of the opening arrangement comprise a wall portion of oriented plastic film, characterized in that a part (3), located outside the package wall (1) and serving as a pull-lug, is sealed to the oriented plastic film by means of a weld (4) which has a projection (5), serving as a point of application of force, which points against the direction of pulling.
2. An opening arrangement (1) in accordance with claim 1, characterized in that in the case of mono-oriented plastic film, the direction of pulling of the opening arrangement coincides with the direction of orientation.
3. An opening arrangement (1) in accordance with claim 1 or 2, characterized in that the weld (4) is substantially V-shaped, the linear distance between the ends of the legs of the V being equal to the desired width of the emptying opening (7).
4. An opening arrangement (1) in accordance with claim 3, characterized in that the apex angle of the V is  $< 160^\circ$ .
5. An opening arrangement (1) in accordance with claim 3, characterized in that the apex angle of the V is  $90^\circ$ .
6. An opening arrangement (1) in accordance with anyone of the preceding claims, characterized in that the pull-lug comprises a material strip (3) whose side, facing towards the packing container wall (1), consists of plastic film.
7. An opening arrangement in accordance with anyone of claims 1 to 5 inclusive, characterized in that the pull-lug comprises a material strip (3), which at least on the side facing towards the packing container wall, consists of mono-oriented plastic film, whose direction of orientation extends substantially in the direction of pulling.
8. An opening arrangement in accordance with anyone of the preceding claims, characterized in that the pull-lug consists of a plastic strip (3), whose thickness is 20 - 70% greater than the material thickness of the packing container wall.
9. An opening arrangement in accordance with anyone of the preceding claims, characterized in that the weld in the packing container wall forms a depression which diminishes the thickness of the packing container by 10 - 30%.



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10. An opening arrangement in accordance with anyone of the preceding claims, characterized in that the opening arrangement is located at some distance in front of a seal extending right-angled to the direction of pulling.





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# EUROPEAN SEARCH REPORT

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Application number

EP 82 10 1328

| 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. 3) |
| Y   | US - A - 3 302 856 (THOMPSON)<br><br>* column 1, lines 71-72; column 2, lines 1-72; column 3, lines 47-55; figures * | 1,6  | B 65 D 75/58                                   |
| A   | --   | 2,3,4, 5,8                                     |  |
| Y   | US - A - 3 711 011 (KUGLER)<br><br>* column 3, lines 39-68; column 4, lines 1-27; figures 1,3,4 *                    | 1,6  |  |
| A   | --   | 9,10   |  |
| A   | FR - A - 2 143 270 (IMPERIAL CHEMICAL IND. LTD.)<br><br>* page 4, lines 35-40; page 5, lines 1-17; figure *          | 1  | TECHNICAL FIELDS SEARCHED (Int. Cl. 3)         |
| A   | NL - A - 76 11 456 (A.B. ZIRISTOR)<br><br>* the entire document *  | 1  | B 65 D   |
| D   | & SE - A- 75 120 220<br><br>-----  |  |  |
| The present search report has been drawn up for all claims  |  |  |  |
| Place of search<br>The Hague  |  | Date of completion of the search<br>17-06-1982 | Examiner<br>BAERT                              |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>&amp; : member of the same patent family, corresponding document</p> |  |  |  |