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D E C I S I O N
of 20 May 1994

Case Number: T 0106/93 - 3.2.1

Application Number: 87200546.7

Publication Number: 0235870

IPC: B65D 41/34

Language of the proceedings: EN

Title of invention:
Tamper-evident closures

Patentee:
Kerr Glass Manufacturing Corporation

Opponent:
Alcoa Deutschland GmbH

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (yes, after amendment)"

Decisions cited:
-

Catchword:

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0106/93 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 20 May 1994

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 11 November 1992, and issued in writing on 2 December 1992, revoking European patent No. 0 235 870 pursuant to Article 102(1) EPC.**

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
J.-C. Saisset

Summary of Facts and Submissions

I. European patent No. 0 235 870 was granted on 11 July 1990 on the basis of European patent application No. 87 200 546.7, which being a divisional of European patent application No. 84 300 850.9 had been accorded a date of filing of 10 February 1984.

II. The patent was opposed by the Respondent on the grounds that its subject-matter lacked inventive step (Article 100(a) EPC).

The state of the art relied upon by the Respondents included the following pre-published documents:

(D3) GB-A-1 593 072
(D9) EP-A-0 049 876
(D10) DE-U-8 018 273

III. By its decision announced at the oral proceedings on 11 November 1992, and issued in written form on 2 December 1992, the Opposition Division revoked the patent. The reason given for the decision was that the subject-matter of granted Claim 1 lacked inventive step having regard to the teachings of document D3, which was to be considered as the closest state of the art, and document D10.

IV. An appeal against this decision was filed by the Proprietors of the patent on 25 January 1993, the appeal fee being paid on the same day.

The Statement of Grounds of Appeal was received on 13 April 1993.

V. In a response dated 11 November 1993 to the communication of the Statement of Grounds of Appeal the Respondents referred to two further state of the art documents, *viz*:

(D12) GB-A-2 076 381
(D13) DE-C-2 144 628

VI. Oral proceedings before the Board were held on 20 May 1994.

At the oral proceedings the Appellants submitted a new set of Claims 1 to 4 and a revised description on the basis of which, together with the drawings as granted, they requested maintenance of the patent in amended form.

Claim 1 reads as follows:

"A temper-evident closure for sealing an open top container having an external screw thread (29) formed thereon and an outwardly projecting annular shoulder (28) formed below the screw thread the closure being formed in plastics and comprising: an internally threaded cap (12) which may be removed from the container for dispensing the contents of the container, the cap comprising a top wall (16) for extending across the top of the container, an annular sidewall (18) integrally joined to the top wall about the periphery of the top wall and depending therefrom, an internal screw thread (22) formed on the inside of the sidewall for engagement with the external screw thread on the container, and tamper-indicating means (14) comprising a ring (36) depending from the annular sidewall and having breakable connector means (25), said ring having an inner diameter greater than the outer diameter of said shoulder (28) to slide past the shoulder in a capping

operation, and a plurality of tabs (34) extending upwardly and radially inwardly from spaced locations around the lower periphery of the ring for engaging the annular shoulder (28) of the container during removal of the cap to prevent the tamper-indicating means from travelling upward beyond the annular shoulder with the cap and to break the ring away from the cap, said ring (36) having upper and lower portions, each of which is located axially in vertical alignment with said annular sidewall (18) of the cap and radially within the confines of the side wall said connector means (25) being located between said upper and lower portions of said ring and located radially within the confines of each sidewall so that downward forces during a capping operation do not break said connector means and separate the lower portion of the ring from the cap; characterised in that the tabs (34) are connected to the lower periphery of the ring by heat set folded flexible joints (38) which support the tabs extending upwardly and inwardly of the lower periphery of the ring."

Dependent Claims 2 to 4 relate to preferred embodiments of the closure according to Claim 1.

VII. The arguments put forward by the Appellants in support of their request can be summarised as follows:

In the prior art closure according to document D3 the inwardly projecting tongues for engaging the container shoulder were stamped out of the wall of the tamper-indicating ring and because of this there was the danger that after having been deflected by the shoulder on passing it they would not return properly to engage the shoulder. The heat set folded tabs of the invention which extended upwardly from the lower periphery of the tamper-indicating ring were a distinct improvement on the prior art arrangement. The folding of the tabs led

to orientation of the molecular structure in the region of the joints, which strengthened them and gave them good resilience, whereas the heat setting ensured that the tabs stayed in the desired position and did not return, for example after exposure to raised ambient temperatures, to a downwardly extending position. There was nothing in the state of the art which could suggest such a combination of folding and heat setting. It could be readily determined from the finished closure that the folded joints had been subjected to a heat setting operation so that there could be no objection to the use of this feature for defining the closure.

VIII. The arguments of the Respondents in support of their request that the appeal be dismissed were essentially as follows:

The evidence provided by the Appellants that the heat setting operation produced a visually detectable change in the closure was only relevant to the specific heat setting operation actually used by them and not to that generally described in the patent specification. This feature was not therefore an appropriate one for characterising a product claim. In any case the application of heat to material which had to be, or had been, bent or folded was so well known that this feature could not be of inventive significance. In particular, it was known from document D13 to engage a tamper-indicating ring with a container shoulder by the application of heat to it so that a portion of it shrank to a diameter less than that of the shoulder.

Document D10 discloses a tamper-evident closure provided with tabs for engaging the container shoulder arranged in substantially the same way as in the claimed invention. Since it would not be feasible to mould the closure with the tabs in the position shown it was

evident that these had been folded into this position after moulding. In the light of the teachings of document D13 it was an obvious measure to apply heat to the tabs after folding to set them in the required position.

Reasons for the Decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC and is, therefore, admissible.

2. *Allowability of the amendments*

Present Claim 1 combines the features of granted claim together with the feature that the tabs are connected to the lower periphery of the tamper-indicating ring by heat set folded flexible joints. This latter feature finds a clear basis in the original (parent) application at page 10, line 25 to page 11, line 18, which passage corresponds to column 7, lines 18 to 54 of the contested patent and describes how the tabs are first mechanically bent radially inwardly and upwardly about the joints where the tabs meet the ring, heat then being applied to the joints while the tabs are held in an upwardly bent position to set the tabs in the required orientation. Since the application of heat to the joints after they have been folded changes the physical properties of the plastics material in this region, in particular the tendency of tabs to return to their original position due to residual stresses (memory), it is apparent that the reference in present Claim 1 to "heat set folded joints" property defines characteristics of the claimed closure and is not objectionable as being a feature not capable of distinguishing the claimed closure from the

state of the art. The Board is satisfied that the skilled man could determine, by the application of suitable tests and visual or microscopic examination, whether in any particular case the folded joints had been heat set or not so that present Claim 1 meets the requirement of Article 84 EPC that it clearly define the matter for which protection is sought.

Dependent Claims 2 t o 4 have been derived from granted Claims 2, 6 and 7, revised to take account of the amendments to Claim 1.

The amendments to the description do not go beyond those necessary to adapt its terms to the present claims and to refer to the most relevant state of the art.

It is therefore apparent from the above that the amendments made conform to the requirements of Articles 123(2) and (3) EPC.

3. *State of the art*

3.1 Document D3 relates to a tamper-evident closure of the general form defined in the preamble of present Claim 1. The tabs provided on the tamper-indicating ring for engagement under the shoulder of the container are formed by stamping these inwardly from the wall of the ring. As the closure is applied to the container the tabs are first deflected outwardly by the container shoulder and then spring back inwardly so that their free ends engage underneath it.

3.2 In the tamper-evident closure according to document D9 the tamper-indicating ring has a larger diameter than that of the threaded cap and is joined to the cap by breakable connector bridges which extend substantially radially. In some embodiments the tamper-indicating ring

is provided with circumferentially spaced tabs for engaging the shoulder of the container. In particular, the tabs may be formed on moulding the closure such that they project inwardly and upwardly from the lower periphery of the tamper-indicating ring (figure 3 and figure 8, left side respectively), such that they extend radially inwardly and are first deflected upwardly by initial engagement with the container shoulder (figure 3, right side) or such that they extend downwardly or slightly outwardly from the ring and are first bent inwardly by suitable equipment on the capping machinery (figure 8, right side).

3.3 In the tamper-evident closure disclosed in document D10 the tamper-indicating ring is provided with tabs which are connected to the lower periphery of the ring by thin integral hinges. The tabs extend generally radially and are deflected upwardly by engagement with the container shoulder as the closure is applied to the container.

3.4 Document D13 relates to a metal screw cap which is provided with a separate plastics tamper-indicating ring. The ring is initially of L-shaped cross-section and has one leg which engages an outwardly extending bead on the bottom of the cap. On the application of heat the other leg of the ring shrinks inwardly to engage under a shoulder on the container. The ring has a circumferential line of weakness so that on unscrewing the cap one part of the ring is removed with the cap and the other stays attached to the container.

3.5 The remaining prior art documents cited in the course of the opposition and appeal procedures are less relevant than those referred to above and need not be considered in detail.

4. *Novelty*

The novelty of the subject-matter of Claim 1 is not in dispute. None of the cited prior art documents discloses a tamper-evident closure where the tamper-indicating ring is provided with tabs which are connected to the lower periphery of the ring by heat set foldēd flexible joints.

5. *Inventive step*

In the closest state of the art according to document D3 the tabs provided on the tamper-indicating ring are, on application of the closure to the container, deflected by the container shoulder back into the apertures in the wall of the ring from which they have been stamped. There therefore exists the danger that due to interference between the sides of the tabs and the sides of the apertures the tabs will not return properly to engage under the container shoulder once the tabs have cleared it. This in turn can lead to there being insufficient retaining force on the tamper-indicating ring to prevent this being removed together with the cap as it is unscrewed, thus invalidating the tamper-evident characteristic of the closure.

In the light of this state of the art the technical problem which the present invention sets out to solve is to provide a tamper-evident closure of the known type which can be applied to the container in a simple and highly reliable manner.

According to present Claim 1 this is achieved in that the tabs are connected to the lower periphery of the ring by heat set folded flexible joints which support the tabs extending upwardly and inwardly of the lower periphery of the ring. With this arrangement the tabs

are free to flex about their respective joints without any interference from the wall of the ring and can readily return after being deflected outwardly by the container shoulder to engage underneath it. This ability is further enhanced by the fact that the folding of the tabs into the required initial position leads to a structural change in the polymer in the region of the joints which increases their resilience. The heat setting of the folded joints ensures that the tabs stay in the required initial position and do not, in particular as a result of exposure to raised ambient temperatures, return towards a downward inclination which would prevent their proper functioning.

Although both documents D9 and D10 show tabs arranged around the lower periphery of the tamper-indicating ring in a manner generally similar to that claimed neither of these documents discloses a folding operation for placing the tabs in the required upwardly and inwardly extending orientation during manufacture of the cap. In particular, according to document D9 the tabs are either formed in this orientation during moulding of the closure or alternatively are formed in a radially inwardly extending or downwardly extending orientation and are only moved into an inwardly and upwardly extending orientation as the closure is applied to the container. A similar arrangement of radially inwardly extending tabs is shown in document D10. The argument of the Respondents that from a technical point of view it would not have been possible to mould the tabs in the orientation shown so that it was evident that they had been folded into this position from a downwardly extending one is clearly contradicted by page 10, paragraph 3 of document D9 which describes a the use of a three part moulding core for the equivalent purpose.

Thus it is clear that although on the basis of document D9 or 10 the replacement of the type of tabs shown in document D3 by tabs extending from the lower periphery of the tamper-indicating ring was arguably not inventive, which was the position taken by the Opposition Division with regard to Claim 1 as granted, these documents cannot suggest to the skilled man the use of heat set folded joints for joining the tabs to the ring in the manner defined in present Claim 1. Document D13, which was particularly relied upon in this respect by the Respondents, is also incapable of leading the skilled man towards the claimed invention since the sequential operations of folding a plastics component into a required configuration and then applying sufficient heat to set the folded area cannot be compared with the application of heat to a heat-shrinking plastics component to initiate the change of shape of this component into a desired configuration.

Accordingly, the Board comes to the conclusion that the subject-matter of present Claim 1 cannot be derived in an obvious manner from the state of the art and therefore involves an inventive step (Articles 52(1) and 56 EPC).

This claim, together with Claims 2 to 4 dependent thereon and the revised description can therefore form the basis for maintenance of the patent in amended form.

Order

For these reasons, it is decided as follows:

1. The contested decision is set aside.

2. The case is remitted to the first instance with the order to maintain the patent with the documents (Claims 1 to 4 and description) presented during the oral proceedings together with the drawings as granted.

The Registrar: The Chairman:

S. Fabiani F. Gumbel