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File No.: T 0153/91 - 3.2.1
Application No.: 85 200 149.4
Publication No.: 0 155 021
Classification: B65D 53/02, B65D 53/06, B65D 41/04, B65D 41/34
Title of invention: A closure cap provided with a gasket and a sealing ring from an olefin polymer

D E C I S I O N
of 9 September 1993

Applicant:

Proprietor of the patent: Kornelis' Kunsthars Producten Industrie B.V

Opponent: W.R. Grace & Co.

Headword:

EPC: Art. 56, 113(1) and 123(3)

Keyword: "Amendments change of category of claim (allowed)" - "Inventive step (yes)" - "Substantial procedural violation (no)"

Headnote
Catchwords



Europäisches
Patentamt

European
Patent Office

Office européen
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0153/91 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 9 September 1993

Appellant:
(Opponent)

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Representative:

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Respondent:
(Proprietor of the patent)

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Representative:

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Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office dated 7 December
1990 concerning maintenance of European patent
No. 0 155 021 in amended form.

Composition of the Board:

Chairman: F. Gumbel
Members: S. Crane
W.M Schar

Summary of facts and Submissions

- I. European patent No. 155 021 was granted on 11 May 1988 on the basis of European patent application No. 85 200 149.4.
- II. The patent was opposed by the Appellants on the grounds that its subject-matter lacked novelty and/or inventive step with regard to the state of the art (Article 100(a) EPC).

Of the considerable number of prior art documents cited in the opposition proceedings only the following have played any significant part in the appeal proceedings:

- (b) GB-B-2 051 660
- (c) GB-A-0 818 418
- (i) US-A-4 244 481
- (l) WO-A-84/00346
- (u) GB-A-1 592 222
- (v) GB-A-1 327 583

- III. By its decision dated 7 December 1990 the Opposition Division found that the patent was to be maintained in amended form.
- IV. An appeal against this decision was filed on 9 February 1991, the appeal fee being paid on the same day. The Statement of Grounds of Appeal was received on 2 April 1991.

With this statement the Appellants filed a statutory declaration of Mr Kenneth Sinnott, one of their employees, relating to the alleged commercial use of the process disclosed in document (b) before the priority date of the contested patent. This was supplemented by a

further statutory declaration of Mr Sinnott filed during the course of the appeal proceedings.

The Appellants requested that the decision under appeal be set aside and the patent revoked in its entirety.

V. Oral proceedings before the Board where held on 8 June 1993.

At the oral proceedings the Respondents (Proprietors of the patent) submitted a new set of claims 1 to 3 on the basis of which they requested maintenance of the patent in amended form.

Claim 1 reads as follows:

"A method for making a container (1) closure cap (2) made of polypropylene and comprising an end wall and a circumferential side wall, the cap comprising a pilfer-proof device (12, 13), the cap being provided with a gasket made from a plastisol material arranged to seal on the edge of the container neck (14), the cap (2) being obtained starting from a combination of the closure cap (2) with the pilfer-proof device (12, 13) and adding an amount of the plastisol material, the gasket (5) being formed by heating the closure cap (2) after addition of the plastisol to a chosen temperature and by subsequently exposing the resulting plastisol shaped into the gasket (5) configuration to electro-magnetic energy until the plastisol has completely fluxed, the pilfer-proof device (12, 13) being designed as a sealing ring (13) with which the container (1) can be sealably closed in conjunction with a locking collar (17) disposed around the neck (14) of the container (1), said sealing ring (13) being

integrally connected with the side wall of the closure cap (2) via frangible bridges (12) capable of being broken on first opening of the container (1), said frangible bridges (12) extending in the axial direction of the closure cap (2),

the end wall being internally provided with an annular space bounded by an outer undercut (4), the plastisol material being added to that annular space,

characterised in that

said space is also bounded by an inner undercut (3),

the end wall has a wall thickness decreased by 20-50% at the gasket,

the heating of the cap is to a temperature of 50-110°C, and

the electro-magnetic energy has a frequency of 10-200 MHz."

Dependent Claims 2 and 3 relate to preferred embodiments of the method according to Claim 1.

VI. The arguments presented by the Appellants can, insofar as these are still relevant to the new claims submitted at the oral proceedings, be summarised as follows:

The problems associated with the *in situ* fluxing (i.e. curing to a final solid state) of a plastisol gasket in a plastics closure cap, the temperatures required for fluxing potentially leading to degradation of the material of the cap, were well known. Thus, it had already been proposed in document (v) selectively to heat the plastisol material by means of electromagnetic radiation in the microwave frequency range of 300 to 300,000 MHz, the material cap being substantially transparent to this radiation. A similar proposal had

been made in document (u), where instead of microwave radiation high frequency radiation in the range of 1 to 200 MHz was used. According to document (b), however, it had been found that the microwave heating proposed in document (v) cause the interior of the gasket to overheat and degrade. This problem could be overcome by a conventional pre-heating step before the closure cap was exposed to the microwave heating. It was this two stage process as described in document (b) that the Appellants had successfully developed and commercialised under the name "Darawave". It was obvious to the skilled man that such a conventional pre-heating step would also be of advantage when using high frequency radiation heating as proposed in document (u). The pre-heating temperature ranges suggested in document (b) were merely exemplary and in no way limitative. The skilled man would choose the temperature in dependence on a number of factors such as the nature of the plastisol and the polyolefin. It was self-evident that the lower the temperature used the less energy would be required for the pre-heating step. The constructional features of the cap specified in the new Claim 1 were all known *per se* in the prior art and constituted nothing of inventive significance to the claimed matter.

The new Claim 1 was also objectionable under Article 123(3) EPC since the frequency range of 10 to 200 MHz specified in it did not constitute microwave energy, i.e. with a frequency of 300 to 300,000 MHz, as stated in granted Claim 1.

Lastly, the contested decision resulted from a flawed procedure in which the Appellants had not been given proper opportunity to comment on the text which was proposed for maintenance of the patent in amended form. This procedural violation would also justify the setting aside of the decision.

VII. In reply the Respondents argued substantially as follows:

The object of the invention was to develop an energy-efficient and cost-effective method of providing pilfer-proof polypropylene caps with *in situ* fluxed plastisol gaskets. This was achieved by a combination of features relating both to the structure of the cap and way in which it was heated to flux the plastisol gasket. The substantial reduction in the thickness of the end wall of the cap in the region of the gasket ensured that even at the low pre-heating temperatures used the plastisol is quickly and uniformly pre-heated so that the time required for the final heating step by high frequency radiation could be reduced to the order of 15 to 30 seconds. Document (b) clearly taught the use of pre-heating temperatures considerably higher than those envisaged by the claimed invention. Furthermore, the use of radiation in the claimed frequency range of 10 to 200 MHz, as opposed to microwave radiation as proposed in document (b), enabled the use of simplified and cheaper equipment. The state of the art taken as a whole could not lead the skilled person to the combination of features claimed.

VIII. At the conclusion of the oral proceedings the Chairman of the Board announced that the procedure was to be continued in writing on the basis of the Respondents' request. They were invited to file a suitably amended description within a two month time limit.

IX. With a letter dated 1 July 1993 the Respondents filed fair copies of the claims submitted at the oral proceedings and amended pages 1 and 2 of the description to replace columns 1 to 4 and lines 1 to 32 of column 5 of the granted patent specification.

- X. By letter dated 21 July 1993 the Appellants stated that they had no outstanding objections to the terms of the amended description filed by the Respondents.
- XI. In a telephone conversation with the Rapporteur on 8 September 1993 the Respondent requested correction of the fair copy of Claim 1 to make this consistent with the terms of the claim submitted at the oral proceedings (temperature, range of "50-110°C" instead of "50-100°C", and a corresponding amendment to page 2 of the description. The requested amendments were confirmed by telefax on the same day. The Appellants were informed by telephone of the requested amendments and had no objections thereto.
- XII. The Respondents request therefore the maintenance of the patent on the basis of the following documents:

Claims: Claims 1 to 3 filed with letter dated 1 July 1993, received on 6 July 1993, with the amendment to Claim 1 requested on 8 September 1993;

Description: Pages 1 and 2 filed with letter dated 1 July 1993, received on 6 July 1993, with the amendment to page 2 requested on 8 September 1993; column 5, line 33 to column 6, line 44 of the granted patent;

Drawings: Figures 1 to 5 of the granted patent.

Reasons for the Decision

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

2. *Formal admissibility of the amended documents*

Granted Claim 1 was directed to a closure cap defined both by structural features and features relating to the method by which the cap is produced. Present Claim 1 on the other hand is directed to a method of making a cap, that cap having all of the structural features specified in granted Claim 1. When, as in the present case, an invention resides in a combination of structural and method features, and those method features, here the use of a particular pre-heating temperature range and heating by means of electromagnetic radiation in a particular frequency range, are of interest only from the process point of view and leave no impact on the structure of the finished product, then a method claim is clearly more suitable for reflecting the totality of the invention. A change of category of claim is in these circumstances not in principle objectionable under Article 123(3) EPC (see for example Decision T 5/90, not published).

Although this general viewpoint was fully accepted by the Appellants at the oral proceedings they did, however, argue that the replacement of the reference in granted Claim 1 to exposing the plastisol to "microwave energy" by the reference in present Claim 1 to electromagnetic energy having a frequency of 10 to 200 MHz unallowably extended the scope of protection of the claim since, in their view, the term "microwave energy" would have been understood by the skilled person as

being electromagnetic energy having a frequency of 300 to 300,000 MHz. Having regard to column 4, lines 32 to 45 of the patent specification where it is stated that preferably "microwave energy" of a frequency of 10 to 200 MHz, specifically 27.10 to 27.15 MHz, is to be used it is however clear that the term "microwave energy" as found in granted Claim 1 was not intended to have the restricted, now generally accepted meaning of radiation with a frequency of 300 to 300,000 MHz. Indeed, it is apparent from the evidence submitted by the parties, for example Webster's Third New International Dictionary from 1971 and Entwurf DIN IEC 27 (Co) 48 from 1980, that at the relevant time of drafting the patent application in particular the lower end point of the range was not well defined. Accordingly, this amendment of Claim 1 represents a clear restriction and not an extension of its scope and is not objectionable.

Present Claim 1 has further been restricted with respect to granted Claim 1 by the definition of the closure cap as being made of polypropylene, cf. for example originally filed Claim 1.

Lastly, the reference in granted Claim 1 to heating the plastisol until it is "completely molten", which in the circumstances would make no technical sense, has been replaced by a reference to complete fluxing of the plastisol which is the generally accepted term in the relevant art, cf. for example document (b), page 1, lines 11 to 20.

The amendments made to the dependant Claims 2 and 3 and the description do not go beyond those necessary to bring these into line with the terms of Claim 1 and to indicate the most relevant state of the art.

There are, therefore, no objections to the amended documents under Articles 123(2) and (3) EPC.

3. *State of the Art*

- 3.1 Document (v) relates to the *in situ* fluxing of a conventional plastisol gasket material in a plastics closure cap. Since at the temperatures of 150°C to 170°C required for fluxing the plastics material of the closure cap would be subject to degradation, eg. softening or blistering, it is proposed selectively to heat the plastisol gasket material by microwave radiation in the frequency range of 300 to 300,000 MHz.
- 3.2 In document (u) it is proposed to flux plastisol gasket material in a polyolefin closure cap by exposing it to radiation in the frequency range of 1 to 200 MHz, the specific example given being 27.12 MHz. To this end the plastisol should comprise a plasticiser having specific dielectric properties. The exposure time lies between 30 and 60 seconds.
- 3.3 In document (b) reference is made to the method proposed in document (v) to the effect that the microwave heating of the plastisol gasket material led to overheating in the interior thereof and consequential degradation. It is accordingly proposed to pre-heat the closure cap and plastisol gasket material by conventional means such that at the time of microwave heating the closure is at a temperature preferably between 5°C and 35°C below its melting point. In the specific example given with a polypropylene cap having a melting temperature of 165°C the cap is heated to about 135°C to 140°C before being exposed to microwave heating at 850 watts for 1 to 1½ minutes.

3.4 Document (1) relates to a polypropylene closure cap with a plastisol gasket cured by exposure to microwave radiation in conjunction with mild heating. The closure cap shown in Figure 4 comprises a pilfer-proof device in the form of a ring attached to the side wall of the cap by frangible bridges, the ring engaging under a locking collar disposed around the neck of the container. The gasket is disposed in an annular space bounded by an outer undercut and an inner axially extending rib. In the closure cap shown in Figure 2 the annular space for receiving the gasket is bounded by inner and outer undercuts.

3.5 Document (c) relates in general terms to the use of radiation in the frequency range of 5 to 30 MHz in the curing of polyvinyl chloride resin foams.

3.7 The other documents cited in the course of the opposition proceedings are less relevant than those analysed above and do not need to be considered here in detail. Furthermore, in view of the concession made by the Respondents with respect to the implicit teaching of document (1) (see below) it is not necessary to go into the alleged public prior use of the process disclosed in document (b) with respect of closure caps having pilfer-proof devices.

4. *Novelty and inventive step*

4.1 The closest state of the art on which the preamble of Claim 1 is based is to be found in document (1). At the oral proceedings the Respondents conceded that the reference in this document to curing the plastisol gasket material by exposure to microwave radiation "in conjunction with mild heating" would be understood by the skilled person as a reference to recently commercialised "Darawave" process as described in

document (b), the "mild heating" therefore being a pre-heating step as proposed there. Of the prior art documents cited, document (1) is the only one which specifically discloses, in relation to the Figure 4 embodiment, the *in situ* fluxing of a plastisol gasket in a closure cap having a pilfer-proof device of the form defined in the preamble of Claim 1. As that fluxing is achieved by exposure to microwave radiation, i.e. in the frequency range of 300 to 300,000 MHz as disclosed in document (b), rather than radiation in the frequency range of 10 to 200 MHz as specified in the characterising clause of Claim 1, it is apparent that the subject-matter of that claim is novel.

The subject-matter of Claim 1 is distinguished from the teachings of document (1) by two features relating to the structure of the closure cap and two features concerned with the parameters of the gasket fluxing operation as such.

The first of the features relating to the cap is that the annular space for receiving the plastisol material is bounded by both an inner and an outer undercut, whereas in the Figure 4 embodiment of document (1) only an outer undercut is provided. It is however known from Figure 2 of document (1) as well as document (i) to secure the attachment of the gasket to the closure cap by providing inner and outer undercuts in the claimed manner so that this feature cannot in itself be considered as contributing anything of inventive significance to the claimed subject-matter.

The remaining three characterising features of Claim 1 are all measures which are concerned with the technical problem of providing an energy-efficient and cost-effective method of equipping pilfer-proof polypropylene closure caps with *in situ* fluxed plastisol gaskets.

From a reading of the whole of document (b) it is apparent that the skilled person is being encouraged to use pre-heating temperatures which bring the plastisol close to the melting temperature of the closure cap, preferably 10 to 5°C therebelow, of page 2, lines 50 to 54. The minimum pre-heating temperature specifically mentioned is to 35°C below the melting point of the cap, that is for a polypropylene cap with a melting point of 165°C a pre-heating temperature of 130°C. Thus it is stated at page 3, lines 23 to 26 that a "closure temperature of more than 35°C below the melting point of the closure, i.e. typically below 130°C for polypropylene, is unlikely to be useful for conventional plastisols. For a plastisol of a lower fusion point a lower closure temperature is possible". However, the disadvantageous properties of such low fusion point plastisols are clearly described on page 1, line 59 to page 2, line 15 of the document. Accordingly, even on the assumption that the skilled person with the knowledge of document (b) would recognise the potential benefits of pre-heating the closures by conventional means when using lower frequency radiation in the range of 1 to 200 MHz as suggested by document (u), thereby to reduce the length of time exposure to the radiation is required, there is nothing which could encourage him to use pre-heating temperatures in the range of 50 to 110°C as stated in the present Claim 1.

It is however apparent that by using these lower temperatures the energy requirements for pre-heating will be reduced and the rate of throughput through the heating oven can be increased since the closure caps will more quickly reach the desired temperature. This latter effect is further enhanced by the 20 to 50% reduction of thickness in the end wall of the closure cap in the region of the gasket, as required by present Claim 1, thus improving heat transfer to the plastisol.

It is true that in the embodiments of Figures 3 and 4 of document (1) the end wall is slightly thickened centrally and decreases in thickness towards its periphery. This is stated to allow better flow of plastics material in the mould and also to resist "doming" under pressure. In the embodiment of Figure 2 however it can be clearly seen that the end wall is considerably thicker in the region of the gasket than centrally thereof. Thus the skilled person receives no impetus from this document to decrease the end wall thickness at the gasket to the extent required by present Claim 1 and is not taught that any such reduction could be beneficial with respect to the gasket fluxing operation.

It is also known from a number of documents cited in the opposition proceedings to improve the mechanical anchorage of the gasket to the closure cap by providing dimples or other small recesses in the bottom of the channel in which the gasket is located. These recesses cannot however be considered as an end wall thickness reduction within the meaning of present Claim 1.

Having regard to the above the Board comes to the conclusion that the method defined in present Claim 1 cannot be derived in an obvious manner from the state of the art and accordingly constitutes a patentable invention (Article 56 EPC). This claim together with Claims 2 and 3 dependent thereon and the amended description therefore constitute a suitable basis for maintenance of the patent in amended form.

5. *Procedural questions*

At the end of the oral proceedings before the Opposition Division on 25 October 1990 the latter announced its intention to maintain the patent in amended form on the

basis of the amended Claim 1 submitted at those proceedings and set a two month time limit for the filing of an amended description. This was received on 29 October 1990 and communicated to the Appellants with an official letter dated 8 November 1990. With a fax dated 13 November 1990 (confirmed by letter received on 22 November 1990) the representative of Appellants indicated that there were aspects of the acknowledgement of prior art with which his clients would not be in agreement and that he was seeking their instructions. The interlocutory decision of the Opposition Division to maintain the patent in amended form was issued on 7 December 1990 before the receipt on 12 December 1990 of a fax from the Appellants (confirmed by letter received on 14 December 1990) setting out their objections to the introductory description of the amended patent specification.

The Appellants argue that the procedure adopted by the Opposition Division deprived them of their opportunity to comment on the amended description submitted by the Respondent on 29 October 1990. That assertion may on the face of it appear justified. It must, however, be pointed out that apart from a re-ordering and adaptation to the terms of the claim accepted at the oral proceedings the main substance of the amended description, in particular the evaluation of the teachings of document (b) which is the only aspect criticised in the Appellants' letter received on 14 December 1990, is to all extents and purposes identical to that of the granted patent specification. It cannot therefore be said that the Appellants did not have any opportunity to comment on this matter and indeed, as is clear from their submissions made in writing and during the oral proceedings before the Opposition Division, it is apparent that they had already clearly expressed their dissatisfaction with

what they believed to be a misleading interpretation of the true content of document (b).

Thus, although it might have been more apposite for the Opposition Division to await a further submission from the Appellants once the fax of 13 November 1990 had been received, the procedure followed by the Opposition Division does not constitute a substantial procedural violation since the right of the Appellants to be heard according to Article 113(1) EPC had been adequately safeguarded.

Order

For the above reasons, it is decided that:

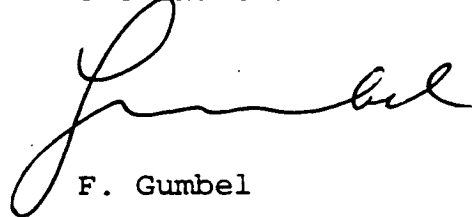
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the request of the Respondents as set out in point XII above.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel