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D E C I S I O N
of 12 January 2006

Case Number: T 0079/02 - 3.3.09

Application Number: 95307908.4

Publication Number: 0711511

IPC: A23L 3/36

Language of the proceedings: EN

Title of invention:

Apparatus and method for chilling soft solid materials and liquids

Patentee:

THE BOC GROUP, INC.

Opponent:

L'AIR LIQUIDE, Société Anonyme

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (no - obvious alternative)"

Decisions cited:

-

Catchword:

-



Case Number: T 0079/02 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 12 January 2006

Appellant: L'AIR LIQUIDE, Société Anonyme pour L'étude et
(Opponent) L'exploitation des procédés Georges Claude
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Representative: Mellul-Bendelac, Sylvie Lisette
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Respondent: THE BOC GROUP, INC.
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Representative: Wickham, Michael
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 27 December 2001
rejecting the opposition filed against European
patent No. 0711511 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: P. Kitzmantel
Members: J. Jardon Alvarez
W. Sekretaruk

Summary of Facts and Submissions

I. The grant of European patent No. 0 711 511 in respect of European patent application No. 95 307 908.4 in the name of THE BOC GROUP, INC., which had been filed on 6 November 1995, was announced on 23 December 1998 (Bulletin 1998/52) on the basis of 11 claims. Independent Claims 1 and 8 read as follows:

"1. A method of reducing the temperature of a soft solid or liquid material characterised by:

- a) providing a quantity of soft solid or liquid material in a blender having a bottom such that the material forms a surface;
- b) providing a source of cryogen comprising liquid and vapour and separating said vapour from said liquid;
- c) transporting the separated liquid cryogen to the blender and injecting it in liquid form into the bottom of the blender at a level below the surface of any material therein;
- d) removing vaporised cryogen from the liquid cryogen prior to injection into the blender; and
- e) mixing the soft solid or liquid material with the cryogen in liquid form."

"8. An apparatus for reducing the temperature of a soft solid or liquid material characterised by:

- a) a blender, having a bottom for receiving the material and in which the material forms a surface;
- b) a source of cryogen comprising liquid and vapour;
- c) separation means, for separating said liquid and vapour cryogen;
- d) means for transporting the separated liquid cryogen to means for injecting the cryogen in liquid form into the bottom of the blender at a level below the surface of any material therein;
- e) bypass means for removing cryogen vapour from the liquid cryogen prior to injection into the blender;
and
- f) mixing means, for mixing the soft solid or liquid material with the cryogen in liquid form."

Claims 2 to 7, 9, 10 and 11 were dependent claims.

II. Notice of Opposition requesting revocation of the patent in its entirety on the grounds of Article 100(a) EPC, was filed by L'AIR LIQUIDE on 15 September 1999.

The following documents were cited during the opposition proceedings:

D1: EP-A-0 166 655,

D2: Catalogue AIR LIQUIDE, "Les lignes de transfert pour fluides cryogéniques", 1976,

D3: J. Buchmüller, "Flüssiger Stickstoff - ein vielseitiges Kältemittel für die Süßwareindustrie", Zucker- und Süßwaren Wirtschaft (ZSW), 1980, vol. 33, pages 42 to 46,

D4: US-A-4 476 686,

D5: GB-1 430 385 and

D6: J. Roussel, "L'utilisation de l'azote liquide pour le contrôle thermique des réactions chimiques", Chimie et industrie- génie chimique, 1973, vol. 106(7), pages 483 to 493.

III. By its decision orally announced on 28 November 2001 and issued in writing on 27 December 2001, the Opposition Division rejected the opposition.

In the opinion of the Opposition Division the claimed subject-matter was novel over the available prior art, since none of the cited documents disclosed a method for reducing the temperature of a soft solid or liquid material comprising two cryogen phase separation steps in combination with the other features of Claim 1.

Concerning inventive step, the Opposition Division considered document D3 to be the closest prior art. The technical problem underlying the invention, namely to achieve an even cooling of soft solid or liquid materials, was essentially solved by mixing the material to be cooled with liquid cryogen pre-treated by two cryogen vapour separation steps. Since these features were not derivable from the prior art, the claimed process was considered inventive.

IV. On 21 January 2002 the Appellant (Opponent) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day.

In the Statement of Grounds of Appeal filed also on 21 January 2002, the Appellant requested that the decision of the Opposition Division be set aside and the patent be revoked because the subject-matter of the claims lacked novelty and/or inventive step.

V. The Respondent (Patent Proprietor) presented its counterstatement in a written submission dated 13 October 2004. The Respondent disputed all the arguments submitted by the Appellant and requested that the opposition be rejected and the appeal be dismissed.

VI. On 16 September 2005 the Board dispatched the summons to attend oral proceedings on 12 January 2006. In the annexed communication pursuant to Article 11(1) of the Rules of Procedure of the Boards of Appeal, the Board drew the attention of the parties to the points to be discussed during the oral proceedings.

VII. The arguments presented by the Appellant in its written submission and at the oral proceedings may be summarized as follows:

- The Appellant acknowledged that the claimed subject-matter was novel. It considered D3, which is directed to the cooling of food products using liquid cryogenes, to be the closest prior art.

- The essential feature of the claimed process, namely the use of a phase separation step to improve the cooling efficiency and to achieve an even cooling, was already disclosed in D3 where it was used for the same purpose (see page 46, lines 1 to 10). Furthermore documents D1 and D6 also disclosed the separation of cryogen vapour in order to ensure that only the liquid cryogen was effectively used in the cooling process (see D1, page 3, lines 1 to 3 and page 6, lines 9 to 13; D6, Figure 11).

- The second phase separation step did not cause any unexpected effect but only duplicated the measure known from D3 and was included for the same purpose. Moreover, the Appellant itself when filing the patent did not include this feature in the claims showing thereby that this second phase separation step was not considered a critical feature of the claimed invention.

- Furthermore, the bottom feeding of the cryogenic liquid was also well known in the field (see again D1 and D6, as well as D4 and D5) and could not justify the acknowledgement of an inventive step.

VIII. The Respondent essentially argued as follows:

- The invention as claimed related to a cooling method of enhanced efficiency by thoroughly and homogeneously mixing the material to be cooled in a blender with vapour-free liquid cryogen.

- The Respondent also considered D3 to be the closest prior art. In the process according to Figure 7 of

D3 liquid nitrogen, introduced via an injector lance into the top area of a container, was mixed with the material to be cooled present therein. By this arrangement liquid nitrogen was not used at its best because part of it evaporated without contacting the material thus leading to a less than optimal cooling efficiency.

- The cooling efficiency was considerably improved according to the method of Claim 1 by feeding only liquid nitrogen (free of gaseous nitrogen) through the bottom of the blender. There was no hint in the cited prior art as to the claimed bottom injection of liquid nitrogen. Although in document D4 bottom feeding was used, the cryogen used there was carbon dioxide, which -although injected under pressure in liquefied form - on feeding immediately changed into a mixture of gaseous and solid carbon dioxide.

- Similarly, the disclosure of Figure 8 of D3, which admittedly included a phase separation step, would not lead the skilled person to the claimed subject-matter because according to said figure the liquid cryogen was fed via a freezing tunnel, a system completely different from the claimed bottom-feeding of vapour-free liquid nitrogen into a blender. Also there was no hint of the use of a second phase separation step.

IX. The Appellant requested that the decision under appeal be set aside and that the European Patent No. 0 711 511 be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Novelty (Article 54 EPC)*
 - 2.1 In the course of the written proceedings, lack of novelty was alleged by the Appellant, having regard to documents D1 and D3, but it indicated at the oral proceedings before the Board that it did not further challenge the novelty of the subject-matter of the patent in suit.
 - 2.2 Novelty of the claimed subject-matter was also acknowledged by the Opposition Division, and the Board sees no reason to depart from that view.
3. *Inventive step (Article 56 EPC)*
 - 3.1 The patent in suit concerns a method of reducing the temperature of a soft solid or liquid material in a blender using liquefied cryogen as cooling agent. The method includes (i) two gas phase separation steps carried out in order to remove vaporised cryogen from the liquid phase (Claim 1, steps b) and d)) and (ii) the injection of the "de-vaporised" liquid cryogen into the bottom of the blender (Claim 1, step c)).

3.2 Closest prior art

3.2.1 The Board considers, in agreement with the parties and with the decision under appeal, that the closest prior art is document D3.

3.2.2 This document provides a summary of the use of liquid nitrogen as cooling agent in the confectionery industry. For the cooling of foodstuffs containing fat, like marzipan, the liquid nitrogen is directly introduced into the blend (see page 44, right column, lines 14 to 24; see also Figure 7 wherein liquid nitrogen is introduced into the top of a mixer).

According to pages 44 to 46 of D3 (see under "Problemlösung: Druck-Phasentrenner") liquid nitrogen is used for the rapid cooling of food products and the presence of vapour in the conduits can result in clogging of said conduits. To solve this problem D3 points out that it is usual to include a phase separator between the liquid nitrogen tank and the mixer (see first paragraph of page 46). Figure 8 exemplifies a system including a phase separator. Although in this figure a spray cooling unit fed from a liquid nitrogen tunnel container is shown, the teaching of the document is not limited to the use of a phase separation only with this kind of installation. This fact, which is particularly clear from the paragraph bridging pages 44 and 45, was also admitted by the Respondent during the oral proceedings.

3.2.3 Thus, the subject-matter of Claim 1 of the patent in suit differs from the disclosure of D3 by the introduction of the cooling liquid into the bottom of

the blender (see Claim 1, step c)) and by the use of a further (second) phase separation step (see Claim 1, step d)).

3.3 Problem to be solved

3.3.1 The patent in suit does not attribute any specific effect to these distinguishing features. The patent mentions in the paragraph bridging columns 1 and 2 that the prior art systems result in the uneven chilling of the foodstuff and that cooling capacity is lost by the venting of vapour to the atmosphere. However, these disadvantages of the prior art processes do not apply to the process disclosed in D3 which is said to result in an even cooling of the foodstuff (page 46, left column, lines 8 to 10).

In any case, the use of a phase separation step in D3 already improves the cooling efficiency by making use of the greater heat capacity of liquid nitrogen compared with gaseous nitrogen and no further effect has been attributed by the Respondent to the second phase separation step. Moreover, D3 also suggests the use of the separated gas to improve the cooling efficiency of the overall process (page 46, left column, lines 11 to 14).

3.3.2 Thus, in the absence of any improvement over the disclosure of D3, the objective technical problem to be solved by the patent in suit is to provide an alternative method for cooling a soft solid or liquid material.

3.4 Solution to the problem

3.4.1 The solution to this problem is the method exhibiting the features of Claim 1.

3.4.2 The Board accepts that the method as claimed solves the above mentioned problem. The example in the patent in suit shows that a batch of beef patties weighing 454 Kg can be chilled down by the method of the invention from a temperature of 7,2°C to a temperature of - 1,7°C in less than about two minutes. These results have not been challenged by the Appellant.

3.5 Inventive step

3.5.1 The question which remains to be decided is whether the claimed method of cooling involves an inventive step.

3.5.2 As explained above the distinguishing features of the claimed method are the feeding of the liquid cryogenic into the bottom of the blender and the use of two phase separation steps.

3.5.3 Concerning the feeding of the liquid cryogen into the bottom of the blender, the Board notes that the state of the art includes several documents in which the liquid cryogen is fed in this way (see figures in D4 and D5; see also D6, page 489). These documents show that both the feeding of the liquid cryogen into the bottom or onto the top of the mixer are equally valid cooling alternatives commonly used in the cryogenic field.

The Respondent argued that the feeding of the liquid nitrogen above the material to be cooled as in D3 did not achieve the best possible cooling. Moreover, although in D4 and D5 bottom feeding was used, the liquid carbon dioxide used in D4 forms carbon dioxide gas and snow which was a different process than the present use of liquid nitrogen. In addition, in D5 no blending took place.

The Board does not agree with the Respondent's reasoning. The question whether carbon dioxide or liquid nitrogen is used as cryogenic agent is not relevant because the scope of the claims is not limited to the use of liquid nitrogen. Moreover, the fact that the figure of D5 does not show a blender is also not relevant because the stirring of the tanks is also covered by its disclosure (see page 4, lines 77 to 81).

In the absence of an unexpected effect, the feed of the liquid cryogenic into the bottom of the blender is thus merely an obvious alternative for the cooling of a soft solid or liquid material. This feature is suggested to the skilled person by the prior art documents D4 to D6 and consequently does not contribute an inventive step.

- 3.5.4 Concerning the use of a further phase separation step, the Board notes that the use of a phase separation step for improving the efficiency of the cooling process is already disclosed in D3 and that the addition of a further phase separation step does not add anything unexpected to the process. Thus, no inventive effort is involved in the use of this known measure for the known purpose.

3.5.5 The Respondent also wanted to interpret the claims in a very restrictive sense. The Respondent pointed out that the term 'blender' had a specific meaning in the food industry, namely it related to the cooling of, for instance, meat hamburgers and that the cooling of large quantities of meat hamburgers in a short time posed particular problems relating to the flow of liquid cryogen. The claimed method, however, allowed the cooling of large quantities of food with liquid nitrogen within a short time using batch operations, which was not something suggested by D3, essentially because Figure 8 of D3 showed a continuous process without using a blender.

3.5.6 The Board cannot accept these arguments since Claim 1 of the patent in suit is neither limited to the use of a specific blender for large quantities tailored to the requirements of the fast food industry nor to the use of liquid nitrogen as liquid cryogen or to a batch process. Rather, the claimed process covers the cooling of any soft solid or liquid material in any quantity, the use of any liquid cryogen and allows the working in a batch or a continuous way. The arguments of the Respondent cannot therefore invalidate the above conclusion of obviousness of the subject-matter of Claim 1 of the patent in suit (see 3.5.3 and 3.5.4).

3.6 For the above reasons the Board decides that the opposition ground of lack of inventive step according to Article 100(a) EPC prejudices the maintenance of the opposed patent.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chairman:

G. Röhn

P. Kitzmantel