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Bezeichnung der Erfindung: Improvements relating to the storage of fresh  
Title of invention: liquid milk products  
Titre de l'invention :

Klassifikation / Classification / Classement : A23C 3/03

**ENTSCHEIDUNG / DECISION**

vom / of / du 13 April 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

Milk Marketing Board

Einsprechender / Opponent / Opposant :

Krayer, Warner Dirk

Stichwort / Headword / Référence :

Products/Milk Marketing Board

EPÜ / EPC / CBE

Articles 54 and 56

Kennwort / Keyword / Mot clé :

"Novelty (confirmed)"

"Inventive step (confirmed) - prior art  
document leading away from the invention"

**Leitsatz / Headnote / Sommaire**

Europäisches  
Patentamt

European Patent  
Office

Office européen  
des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number : T 435/87 - 3.3.1



**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 13 April 1989

**Appellant :**  
(Opponent)

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**Respondent :**  
(Proprietor of the patent)

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**Representative :**

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**Decision under appeal :**

Decision of the Opposition Division of the European Patent Office of 1 July 1987, posted on 29 September 1987, rejecting the opposition filed against European patent No. 0 043 276 pursuant to Article 102(2) EPC.

**Composition of the Board :**

**Chairman :** K.J.A. Jahn

**Members :** R.W. Andrews

C.V. Payraudeau

## Summary of Facts and Submissions

- I. The mention of the grant of European patent No. 0 043 276 in respect of patent application No. 81 302 954.3, filed on 29 June 1981 and claiming priority of 30 June 1980 from a prior application filed in the United Kingdom, was announced on 21 March 1984 (cf. Bulletin 84/12) on the basis of twelve claims. The only independent claim reads as follows:

"A process for the production of a fresh liquid product having a prolonged shelf life which comprises heating a fresh liquid milk product to a temperature of 105-130°C for at least 0.5 seconds but not more than five minutes and then cooling the product to a temperature below 25°C and introducing the product under aseptic conditions into a sterile container which is then sealed, the temperature and duration of the heating step being sufficient to give a product which can be maintained in the aseptically packed sealed container at a temperature of 7°C for a period in excess of four weeks without detectable change in flavour or aroma characteristics of the product".

- II. A notice of opposition was filed on 6 December 1984 requesting the revocation of the patent on the grounds that its subject-matter lacked novelty and did not involve an inventive step. The opposition was supported, inter alia by the following documents:-

- (1) CSIRO Fd. Res. Q, Volume 35, pages 41 to 47, 1975
- (3) Journal of Food Protection, Volume 43, page 220, 1980
- (5) Journal of Applied Bacteriology, Volume 41, pages 1 to 11, 1976 and
- (10) Journal of Dairy Science, Volume 57(3), pages 280 to 284, 1974.

III. By a decision delivered orally on 1 July 1987, with written reasons posted on 29 September 1987, the Opposition Division rejected the opposition. The Opposition Division concluded that the claimed subject-matter was novel since Claim 1 of the disputed patent was to be construed as excluding the possibility of any interruption in the cooling stage and this distinguished it from the process disclosed in document (10). With respect to the closest prior art, as represented by document (10), the Opposition Division considered that there was an improvement in the length of time milk products obtained in accordance with the claimed process could be stored at 7°C without detectable change in flavour or aroma characteristics of the products. In the Opposition Division's opinion the important difference between the present process and that of this prior art lay in the manner in which the heated product was cooled. The Opposition Division considered that there was no indication in the prior art to suggest that cooling the product to a temperature below 25°C without any delay would provide the achieved improvement in shelf life. Therefore, the claimed subject-matter involved an inventive step.

IV. An appeal was lodged against the decision on 25 November 1987, with payment of the prescribed fee. A statement of grounds of appeal was filed on 14 January 1988.

In this statement and during the oral proceedings held on 13 April 1989 the Appellant contended that the subject-matter of Claim 1 lacked novelty in the light of the disclosure in document (10) since neither the description nor the wording of Claim 1 suggests that the cooling of the heated products to a temperature below 25°C must be carried

out without any interruption. Such a construction of the claim is supported by Claim 12, which provides for the homogenisation of the milk products after the heat treatment.

The Appellant also argued that the claimed process is prima facie obvious since its purpose is to prevent the deterioration in the taste of milk products which is experienced with a conventional ultra high temperature (UHT) process due to the temperatures used in this process and the means adopted to realise this purpose is to lower the temperature to which the product is heated. Moreover, the skilled person would realise that in order to prevent a reduction in shelf life of the products it would be necessary to use longer treatment times at these lower temperatures. Furthermore, document (10) discloses similar time/temperature relationships and the purpose of the work described in this document was to inactivate spore formers to achieve longer shelf lives. The Appellant considered that there was no evidence to support the view that the claimed method was better than the one disclosed in document (10) and that it was doubtful that there was any difference in the results obtained using the two processes.

The Appellant considered that the alleged inventive concept underlying the disputed patent lay in the time/temperature relationship and that the cooling stage, which was not emphasised in Claim 1, had no inventive merit. After heating it was quite normal in the dairy industry to rapidly cool milk products since the temperature range of 25 to 40°C is very favourable for the growth of bacteria. Similarly, homogenisation is a usual step in the industry and whether this step takes place before or after the heat treatment cannot be regarded as having any inventive merit.

- V. The Respondent considered document (10) to be the closest prior art since it discloses an investigation into the shelf life and flavour qualities of milk products subjected to different heat treatments. However, the corrected Table 3 and Table 4 clearly show that the objective of the present invention was not attained. The poor results reported in document (10) were either due to the process as a whole or the failure of the authors to carry out the process in the manner described. In either case, the teaching of this document leads away from the claimed process and it must be regarded as surprising that the claimed process achieves its objective. Moreover, there is no indication in the document or the other cited documents of how to solve the problem underlying the disputed patent.

The claimed process, which is designed to eliminate those organisms likely to cause spoilage at refrigeration temperatures, does not produce a sterile product. However, the product obtained has the advantage of fresh milk products with respect to its organoleptic properties combined with a longer shelf life. Even if the individual stages of the claimed process may have been described in the prior art, this does not render the process obvious since it is the combination of all its features that must be considered in deciding the question of obviousness.

- VI. The Appellant requested that the decision under appeal be set aside and that the patent be revoked. The Respondent requested that the appeal be dismissed and the patent be maintained on the basis of the document submitted during the oral proceedings.
- VII. At the conclusion of the oral proceedings it was announced that the Board had decided that the decision under appeal

be set aside and the patent maintained on the basis of the document (description and eleven claims) submitted during the oral proceedings.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, allowable.
2. There are no formal objections under Article 123 EPC to the present Claims 1 to 11 since they are adequately supported by the original disclosure and do not extend the protection conferred. This set of claims is identical with the statement of claim as granted apart from the deletion of granted Claim 12 and the insertion of the term "rapidly" between the words "then" and "cooled" in the third line of Claim 1 as granted. A basis for this qualification is to be found on page 6, lines 14 and page 9, line 7 of the printed patent application (cf. page 3, lines 14 and 47 of the published patent specification).
  - 2.1 The deletion of Claim 12 as granted is not only necessary as a consequence of the amendment to Claim 1 but also because the Board considered that this claim was not adequately supported by the original disclosure. In the Board's judgement the sentence on page 7, lines 16 to 19 of the printed patent application (cf. also page 3, lines 30 and 31) of the published patent specification) is to be construed as meaning that, regardless of the butter fat content in the fresh milk product used as starting material in the claimed process, it is desirable to subject this starting material to homogenisation. This interpretation is supported by Example 1 where a preheated homogenised cream was heat treated in accordance with the claimed process.

3. The patent in suit relates to a process for the production of a milk product having prolonged shelf life when stored in an aseptically sealed container at a temperature of 7°C. Document (10), which may be regarded as representing the closest prior art, discloses a process wherein whole fresh milk or low-fat fortified milk is preheated to a temperature of 71°C, subjected to heat treatment at a temperature of 107° and 121°C for 1.5 and 5 seconds, then after cooling to 63°C homogenised through an aseptic homogeniser and finally cooled to 4°C before being introduced into containers (cf. the right-hand column on page 280 under the heading "Experimental Procedure"). However, it was considered that the shelf lives of the products so obtained when stored at 7.2°C was not adequate (cf. amended Table 3 and Table 4).

3.1 In the light of this closest prior art the technical problem underlying the disputed patent may be seen in providing a process for the preparation of milk products, the organoleptic properties of which are practically indistinguishable from the corresponding fresh milk products, having an improved shelf life at 7°C as compared with those prior art products known from (10).

According to the patent in suit this technical problem is solved by holding a fresh milk product at a temperature of between 105° and 130°C for a time in the range of 0.5 seconds to 5 minutes, then rapidly cooling the product to a temperature below 25°C and introducing it under aseptic conditions into a sterile container. The temperature and duration of the heating step is defined functionally in the terms of the result to be achieved, i.e. the resulting product must be capable of being stored at 7°C for a period in excess of four weeks without detectable change in it, flavour or aroma characteristics. In the Board's view the criteria for such functional definitions such as those laid

down in the decision of this Board T 68/85 (cf. OJ EPO, 228, 1987, particularly points 8.3 to 8.4.4) are met, especially in the light of page 2, lines 45 to 55 of the published patent specification.

- 3.2 In contrast to the Appellant the Board is satisfied that the technical problem as defined above is plausibly solved. Tables 1, 2 and 4 to 7 of the disputed patent clearly indicate that, given a proper selection of the temperature and duration of the heat treatment, a milk product whose taste is practically indistinguishable from that of the corresponding fresh milk product and which can be stored at 7°C for 37 days or more is obtained using the claimed process. The results in Table 3 have been left out of consideration since, although this Table shows that a cream prepared in accordance with the claimed process did not suffer bacteriologically and was comparable organoleptically to the control cream, the cream was not maintained continuously at 7°C for the 42 days of the test but was stored at ambient temperature for a certain amount of time during the 42 days.

Since it was agreed by both parties during the oral proceedings held before the Opposition Division that any differences resulting in storage of milk products at 7°C and 7.2°C would be insignificant, the Board considers that the results obtained in document (10) can be compared with those reported in the patent in suit.

In the Board's judgement the results in the corrected Table 3 and Table 4 of document (10) indicate that the flavour scores of whole milk and fortified low fat milk treated in accordance with the process disclosed therein at temperatures of 107° and 121°C for holding times of 1.5 and 5 seconds were unsatisfactory after storage at 7.2°C for less than 30 days. Thus, the only flavour rating reported

in the above-mentioned Tables after storage for 30 days is the unsatisfactory figure of 1.3 for whole milk treated at 121°C for 5 seconds. This conclusion is supported by the footnotes to both these Tables where it is stated that since adequate shelf life was not obtained by treatment of 107° and 121°C for the holding times of 1.5 and 5 seconds, these temperatures were not used for a 10 second holding time. Furthermore, in the abstract, it is stated that after 30 days storage at 72.2°C (sic) [7.2°C], whole milk and fortified low-fat milk heated at 135° and 143°C for 10 seconds were acceptable. Storage at 1.7°C for 30 days resulted in flavour scores between acceptable and good for all processing temperatures and times.

- 3.3 Document (3) in its comments on the work described in document (10) states that milk processed at several temperatures between 107° to 143° and stored at 1.7° and 7.2°C were judged from acceptable to good after evaluation by a 25-member panel after storage for 2, 9, 16, 23 and 30 days. However, this document is not sufficiently clear by itself and needs to be interpreted by reference to the disclosure of document (10). According to which either storage at 1.7°C or treatment at 135° or 143°C for 10 seconds is necessary to obtain the flavour rating of satisfactory or good after storage for 30 days.
4. After examination of the cited documents the Board has reached the conclusion that the subject-matter of the disputed patent is novel. It is considered that the technical feature of rapidly cooling the milk product after the heat treatment serves to distinguish the present process from that disclosed in document (10). According to the disclosure of document (10) after the heat treatment the milk product is cooled to 63°C and then homogenised. After homogenisation the product is cooled to 4°C before being filled into containers. Thus, in this prior art

process the cooling step is interrupted by a homogenisation step. In the Board's judgement the present amended claim is to be construed as precluding any interruption in the cooling stage and the subject-matter of the amended claim is therefore novel in the light of this prior art.

- 4.1 The Patentee is under no obligation either to explain why his process achieves the desired result whereas the similar process disclosed in document (10) fails or to demonstrate why rapid cooling without an intervening step might be responsible for the difference in the results of the two processes. Moreover, the Appellant has not contended that the technical features of the claimed process in combination with each other does not give the desired result with respect to the shelf life and organoleptic properties of the obtained milk product.
5. It still remains to be examined whether the requirements of inventive step is met by the claimed subject-matter.
- 5.1 As mentioned above, document (10) describes an investigation into the use of heat treatment of a milk product to improve its shelf life without losing consumer acceptability with respects to its flavour. Thus, the milk product was heated to 107°, 121°, 135° and 143°C and held at these temperatures for 1.5 and 5 seconds. Additional samples were held for 8 and 10 seconds at 135° and 143°C. The procedure followed in this work is described in detail in the passage bridging pages 280 and 281 headed "Experimental Procedure". These investigators found that the flavours of the treated milk products after 30 days storage at 1.7°C were judged as being between good and acceptable for all processing temperatures and times (cf. Tables 1 and 2). However, when the treated products were stored at 7.2°C it was discovered that a shelf life of longer than 23 days could not be obtained at the two lower

processing temperatures (cf. amended Table 3 and Table 4). From the disclosure of this document the skilled person would deduce that in order to obtain a whole fresh milk product capable of being stored at 7.2°C for 30 days it would be necessary to heat the milk to minimum temperature of 135°C. To obtain a low-fat fortified milk product of similar storage capability the skilled person would conclude that a holding time of 10 seconds would be required at either 135° or 143°C.

Therefore, the teaching of this document clearly leads away from the proposed solution to the above-defined technical problem and would actively discourage the skilled person from even investigating the heat treatment of milk products within the claimed temperature range for the specified holding times. In view of lack of success reported in document (10), it must be regarded as surprising that the claimed process successfully achieved the desired object.

- 5.2 Document (1) describes the indirect and direct UHT processing of dairy products with the purpose of rendering the product sterile by inactivating the microorganisms and destroying the enzymes present therein. According to this document, the process involves heating the dairy product to more than 135°C for generally 2 to 5 seconds to ensure sterility, cooling as quickly as practicable and generally introducing the product into containers under aseptic conditions (cf. last paragraph in the left-hand column and first paragraph in the right-hand column of page 41). Homogenisation can take place either before or after sterilisation (first paragraph of the left-hand column of page 43) and preheating of the dairy product to about 85°C for 4 to 6 minutes is recommended (cf. second complete paragraph of the left-hand column of page 44). It is

acknowledged that fresh UHT milk has a noticeable "cooked" flavour (cf. last two lines of the right-hand column on page 45). Thus, although this document discloses certain of the essential and optional features of the claimed process, it gives no indication of how to solve the problem of providing a process which yields milk products whose organoleptic properties are virtually indistinguishable from the corresponding fresh milk products after storage for a period of more than four weeks at 7°C.

- 5.3 Document (5) relates to a study of the occurrence and thermoresistance of psychrophilic and psychrotropic spore formers, i.e. cold-tolerant spore formers. The authors of this article concluded that the heat resistance of the spores of the investigated cold tolerant spore formers was relatively low and proved to be approximately equal to that of the more heat sensitive mesophilic spore formers (cf. page 10, lines 1 and 2 and 8 to 10).

Although in view of the fact that it is reported in Koeltechnik, Volume 64, 1971(7), pages 136 to 138 (document (4)), that spoilage of aseptically packed pasturised milk is due to psychrotropic spore formers, the skilled person might possibly have expected that the heat treatment at 107° or 121°C prescribed in document (10) would have killed such spore formers in view of the disclosure in document (5) and that the resulting milk product would have had a relatively long shelf life at 7.2°C, document (10) demonstrates that this was clearly not the case. Therefore, the skilled person would have considered that other factors might be involved in milk spoilage and would have refrained from investigating the heat treatment dairy products at the claimed temperatures for the specified holding times.

- 5.4 UHT processing, which has been the subject of intensive investigation since the 1950's, yields dairy products with prolonged shelf lives. However, a severe disadvantage of the UHT process is that the resulting products lose their fresh flavour and take on a characteristic flavour which is less attractive to the consumer. Therefore, for a long time there has been a need for a process for the manufacture of dairy products with improved shelf lives as compared with the fresh products which did not cause detectable change in the flavour of the products. In the Board's opinion the claimed process fulfills this need in an unobvious manner.
- 5.5 Therefore, in the Board's judgement the subject-matter of Claim 1 involves an inventive step. Claims 2 to 11, which relate to preferred embodiments of the process according to Claim 1 derive their patentability from this claim.

#### Order

For these 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 document (description and 11 claims) submitted during the oral proceedings.

The Registrar:

The Chairman:

F.Klein

K.Jahn