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D E C I S I O N
of 8 May 2001

Case Number: T 0895/97 - 3.3.1

Application Number: 90911930.7

Publication Number: 0533673

IPC: C09K 5/04

Language of the proceedings: EN

Title of invention:

Azeotrope-like compositions of pentafluoroethane and difluoromethane

Patentee:

AlliedSignal Inc.

Opponent:

Solvay (Société Anonyme)
Imperial Chemical Industries PLC

Headword:

Azeotrope-like composition/ALLIEDSIGNAL

Relevant legal provisions:

EPC Art. 54(1)(2), 56, 123(2)(3)

Keyword:

"Main request: support in the application as filed (yes) - novelty (yes) - inventive step (yes) - problem solved - non obvious solution"

Decisions cited:

G 0001/93, T 0201/83, T 0194/84, T 0133/85, T 0187/91,
T 0288/92, T 0881/92

Catchword:

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Case Number: T 0895/97 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 8 May 2001

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted 4 July 1997
revoking European patent No. 0 533 673 pursuant
to Article 102(1) EPC.**

Composition of the Board:

Chairman: A. J. Nuss
Members: P. P. Bracke
 R. T. Menapace

Summary of Facts and Submissions

I. The appeal lies from the Opposition Division's decision revoking European patent No. 0 533 673 essentially due to lack of inventive step over the content of document

(2) consisting of a letter dated 11 October 1988 to the attendees of the NIST workshop on property data needs for the ozone safe refrigerants held on 22 September 1988 and hand-numbered pages 1 to 114 comprising a summary of discussion sessions held during that workshop, a list of attendees and an Article by Mr McLinden, "Thermophysical property needs for the environmentally-acceptable halocarbon refrigerants" (21 pages) as well as further documentation (hand-numbered pages 45 to 114).

II. With telefax of 9 April 2001 the Appellant (Patent proprietor) filed seven sets of claims as main or first to sixth auxiliary request, respectively. The main request consisted of three claims reading:

"1. The use in air conditioning or heat pump applications of an azeotrope-like composition consisting of pentafluoroethane and difluoromethane which has a vapor pressure of 119 ± 5 psia (820 ± 35 kPa) at 32°F (0°C) and which contains at least 35.7% by weight pentafluoroethane."

"2. A method for producing refrigeration in air conditioning which comprises condensing a composition as defined in claim 1 and thereafter evaporating said composition in the vicinity of a body to be cooled."

- "3. A method for producing heating which comprises condensing a composition as defined in claim 1 in the vicinity of a body to be heated and thereafter evaporating said composition."
- III. At the oral proceedings, which took place on 8 May 2001, the Appellant filed an amended description adapted to the claimed subject-matter according to the main request.
- IV. As far as the claimed subject-matter according to the main request is concerned, the Respondents (Opponents I and II) contested that Claim 1 met the requirements of Article 123(2) EPC and of clarity and that the claimed subject-matter was novel over the teachings of document (2) and of document
- (6) NTIS Report no. CONF-890105-4 on the ASHRAE winter symposium, Chicago IL, USA, 28.01.89, by Vineyard et al.
- Moreover, the Respondents submitted that the claimed subject-matter was not inventive over the teachings of documents (2), (6) and
- (1) Research Disclosure 146, Nr 14623 of 1976.
- V. The Appellant argued in favour of the requirements of Article 123(2) EPC, clarity, novelty and inventive step being met. With telefax dated 9 April 2001 the Appellant filed sketches A to D showing the temperature glides in °C at boiling point, at 5 bar, at 21 bar and at 1 bar respectively for difluoromethane/pentafluoroethane compositions containing 0 to 100% difluoromethane in comparison with

commonly used fluorocarbon based refrigerant mixtures.

- VI. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or any of the six auxiliary requests filed by telefax on 9 April 2001 and a description as filed at the oral proceedings.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 Article 123 (2) and (3) EPC
 - 2.1.1 Claim 1 is supported by the azeotrope-like compositions defined in Claim 7 of the application as filed, the blends of pentafluoroethane and difluoromethane containing 35.7 or more weight percent described on page 13, lines 20 to 23 of the application as filed and the use of fluorocarbon based fluids in air conditioning and heat pump applications mentioned in the application as filed on, for example, page 1, lines 16 to 18, and page 2, lines 14 to 18, and the fact that on page 4, lines 14 to 17, it is said that the substitute materials must also possess those properties.

Claim 2 is supported by Claim 9 as filed and the use of the compositions according to Claim 1 in air

conditioning, as referred to herein-above.

The wording of Claim 3 corresponds to the wording of Claim 10 as filed.

- 2.1.2 The Respondents submitted that the use of azeotrope-like compositions according to Claim 1 in **air conditioning or heat pump applications** was not described in the application as filed, where only the use of such compositions in **cooling and heating applications** was mentioned, and that by restricting the use of the compositions to such specific applications the Appellant would be allowed to improve his position by adding subject-matter not disclosed in the application as filed, contrary to the general principle laid down in G 1/93 OJ EPO 1994, 541 (see, in particular, point 9 of the reasons for the decision).

However, according to the jurisprudence of the Boards of Appeal of the EPO, in assessing whether by an amendment subject-matter extending beyond the application as filed has been added, the relevant criterion is whether or not the proposed amended subject-matter is **directly and unambiguously derivable** from the content of the application as filed. This generally accepted principle is described in, for example, T 194/84 OJ EPO 1990, 59, point 2.4 of the reasons for the decision, confirming the principle described in T 201/83 OJ EPO 1984, 481, point 3 of the reasons for the decision. This principle is also in conformity with the one described in point 3.1 of T 288/92, namely that Article 123(2) EPC prohibits the introduction of any technical information which a skilled person would not have objectively derived from the application as filed. Moreover, this finding is not

at variance with what has been explained in T 187/91 OJ EPO 1994, 572, where in point 2 of the reasons for the decision reference is made to the warning given in decision T 133/85 that care is necessary when applying the principles relating to novelty to questions which arise in relation to Article 123(2) EPC.

It is true that, as the Respondents correctly pointed out, in the application as filed air conditioning and heat pump applications were only explicitly mentioned under the heading "Background of the invention" in relation to fluorocarbon based fluids (page 1, lines 16 to 18) and chlorofluorocarbons (page 2, lines 14 to 18) and not under the heading "Description of the invention". Nevertheless, under the heading "Background of the invention" it is also said that the art is continually seeking new fluorocarbon based azeotrope-like mixtures which offer alternatives for refrigeration and **heat pump applications** (page 3, lines 32 to 34) and that the efficiency in-use characteristic of substitute materials is important in refrigeration applications like **air conditioning** (page 4, lines 14 to 23).

Since it is established jurisprudence that citations in the application as filed may not be considered in isolation but in the context of the information provided by the application as a whole, and since it is said on page 4, lines 28 to 35, that it is **accordingly** an object of this invention to provide novel azeotrope-like compositions useful in cooling and heating applications and novel environmentally acceptable refrigerants **for use in the aforementioned application**, it is implicitly disclosed in the application as filed that in accordance with the logical premises or the

sequence of ideas and in conformity with what might be expected the novel azeotrope-like compositions according to the invention are not only useful in cooling and heating applications in general but also in the foregoing described applications, namely air conditioning and heat pump applications.

2.1.3 As support for their argument, that the use of azeotrope-like compositions in air conditioning or heat pump applications was not disclosed in the application as filed, the Respondents referred to the purport of decisions T 12/81 (OJ EPO 1982, 296), T 7/86 (OJ EPO 1988, 381), T 258/91 and T 615/95 (both not published in the OJ EPO).

However, T 7/86 is concerned with the principle that a general structural formula having at least two variable groups does not specifically disclose each of the individual compounds which would result from the combination of all possible variants within such groups, and in T 12/81 and T 258/91 it is explained that, if two classes of starting compounds are required to prepare the end products, a substance resulting from the reaction of a specific pair from two lists of starting substances is novel over a document describing those end products in general form and two lists of starting compounds for preparing them. However, these findings have nothing in common with the problem of whether different parts of the application as filed may be read together and, therefore these decisions are not relevant for the present case. Equally, the principle described in T 615/95, that the restriction of the generic group of chemical compounds is not objectionable under Article 123 (2) EPC, since these deletions do not lead to a particular combination of

specific meanings of the respective residues which was not disclosed originally, is not related to the problem of whether different parts of the application as filed may be read together, and thus, is not relevant here.

- 2.1.4 The Respondents also submitted that the combination of azeotrope-like compositions containing, in addition to difluoromethane, 35.7% by weight pentafluoroethane and their use in air conditioning or heat pump applications was not disclosed in the application as filed.

However, in the passage on page 13, lines 18 to 23, of the application as filed it is stated that the critical flammability composition was found to be 35.7 weight percent and that blends of pentafluoroethane and difluoromethane containing 35.7 or more weight percent pentafluoroethane are nonflammable in all proportions in air at ambient conditions. Since such non-flammability property is independent from the application in which such blend is used, this statement represents a general information, which is valid for any use. Therefore, the use of blends of pentafluoroethane and difluoromethane containing at least 35.7% by weight pentafluoroethane in air conditioning or heat pump applications is implicitly disclosed in the application as filed.

- 2.1.5 The Board is satisfied that the patent in suit has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed or that the claims have been amended so as to extend the protection conferred and the Respondents have also not made any submission to the contrary.

2.2 Clarity

The Respondents contended that Claim 1 was not clear due to the terms "azeotrope-like" and "air conditioning".

2.2.1 According to the jurisprudence of the Boards of Appeal of the EPO, if the patent in suit is amended during the opposition procedure, the Board has the power to consider whether all requirements under the EPC are fulfilled, **as long as they arise from the amendment(s) made**. Since, in the present case, the term "azeotrope-like" was present in Claim 1 as granted, this objection does not arise from the amendments made during the opposition procedure, and, consequently, the Board does not have the power to consider this objection.

2.2.2 The Respondents objected that the term "air conditioning" was not clear since it could not be deduced from the patent in suit whether with such a term a residential or an automotive air conditioning system was meant.

Such objection, however, does not concern the clarity of the wording of the claim, but rather the extent of the protection conferred by the patent in suit, which according to Article 69(1) EPC is determined by the terms of the claims. Since "air conditioning" is not as such an ambiguous term and embraces any kind of air conditioning, Claim 1 is not rendered unclear by such term and therefore meets the requirement of clarity (Article 84 EPC).

2.3 Novelty

2.3.1 Novelty over document (1)

In document (1) it is stated that materials whose boiling points are reasonably close to one another are preferred as the components of binary refrigerants (page 14, left-hand column, third paragraph under "Refrigerants useful in vapor compression systems") and in Table I a pentafluoroethane/difluoromethane mixture is described as having a boiling point difference of 6°F.

As the composition of the binary refrigerant systems is not mentioned in document (1), it cannot be considered as disclosing mixtures containing at least 35.7% pentafluoroethane by weight and, consequently, to destroy the novelty of the claimed subject-matter.

2.3.2 Novelty over document (2)

In the "summary of discussion sessions", it is stated on page 1 that difluoromethane and pentafluoroethane were also proposed as promising refrigerant fluids and that difluoromethane and pentafluoroethane (or mixtures thereof) were considered likely candidates in specific needs and from page 2 it follows that near-azeotropic mixtures difluoromethane/pentafluoroethane were specifically suggested as refrigerants.

Although document (2) is silent on any requirement for the difluoromethane/pentafluoroethane mixture to contain at least 35.7% pentafluoroethane by weight, the Respondents were nevertheless of the opinion that the content of document (2) was novelty destroying for Claim 1, since the requirement of the lowest necessary amount of pentafluoroethane was a completely arbitrary

limitation from the prior art.

A limitation can only be considered arbitrary if the selected subject-matter has the same properties as the subject-matter which was not selected. Since in the present case it follows from page 6, lines 5 to 7 of the patent in suit that the critical flammability was found to be 35.7 percent pentafluoroethane by weight and, thus, that difluoromethane/pentafluoroethane blends containing at least 35.7 percent by weight pentafluoroethane are nonflammable in all proportions in air at ambient temperature whereas those containing less than 35.7 percent by weight pentafluoroethane are flammable, the subject-matter not being selected does not have the same properties as the selected one and, therefore, the limitation according to Claim 1 to compositions containing at least 35.7 percent pentafluoroethane by weight cannot be considered as arbitrary.

As a consequence not all features of the use and methods according to Claims 1 to 3 were directly and unambiguously derivable from document (2), and thus, the claimed subject-matter is novel over that of document (2).

2.3.3 Novelty over document (6)

Document (6) concerns the "selection of ozone-safe, nonazeotropic refrigerant mixtures for capacity modulation in residential heat pumps", with the purpose of performing a comprehensive screening of refrigerant pairs which, through a shift in composition, could improve the performance of heat pump systems and to select a mixture with a gliding temperature difference

that matches that of the heat transfer fluid in both heat exchangers and a higher capacity relative to chlorodifluoromethane at low outdoor temperature (see the title of the Article and the third and the fourth sentence of the abstract).

As in Table 3 it is specifically described that a 50/50 weight percent composition of difluoromethane and pentafluoroethane has a temperature glide of 3, the Respondents were of the opinion that the use of a 50/50 weight percent mixture of difluoromethane and pentafluoroethane in heat pump applications was implicitly described in document (6).

Again, this teaching may, however, not be taken in isolation but in the context of the complete teaching of the document.

As set out in the "abstract" (fifth and sixth sentences) in the screening method used, the number of pure components was paired on the basis of boiling point, stability, ozone depletion potential and toxicity and pairs were then assembled from the pure components using the temperature glide and the coefficient of performance to determine those pairs with the highest potential. Under the heading "introduction" (second paragraph) it is further stated that the goal of the future test program is to utilize capacity control and matching of the temperature glides to improve the coefficient of performance and that, in order to achieve a large shift in capacity, it is necessary to select pure components with **boiling points as far apart as possible**. From the heading "results" it follows that it was possible to construct a matrix (Table 3) showing the temperature glide for 50/50

weight percent mixtures of 12 preferred refrigerants and that the shaded portion of the matrix consists of those mixtures having the most potential for matching the temperature glide in the heat exchangers and that it was estimated by coupling the results of Figure 3 (refrigerant capacity versus outdoor temperature of pure refrigerant components) with those of Table 3 which would be the five best binary component systems to be further tested. As the mixture difluoromethane/pentafluoroethane had a temperature glide of 3 and the selected mixtures, i.e. the only retained mixtures, had a temperature glide between 17 and 23, it is clear from document (6) that the mixture according to present Claim 1 was thus not a selected refrigerant mixture and, consequently, that such mixture should not be incorporated in the above mentioned experimental test program. Therefore, document (6) does not even suggest the use of a mixture of pentafluoroethane and difluoromethane in heat pump applications and clearly does not therefore disclose such use.

Since in the first sentence of "results" it is said that the refrigerant components listed in Table 3 were **preferred** ones, the Respondents argued that the use of all the refrigerant components and their binary mixtures were disclosed in document (6) to be suitable for use in heat pump applications.

As is clear from the first paragraph of "methodology", the said preferred refrigerant components were selected on the basis of several criteria, such as toxicity, instability, ozone depletion, flammability, boiling point and commercial availability. The selection of the single refrigerant components does not imply, however,

that specific combinations of such components are also preferred. As set out in the preceding paragraph, it is only after considering the properties, such as the temperature glide, of the **mixtures** themselves that specific mixtures are retained or not. Thus, the fact that the refrigerant components in Table 3 are said to be preferred only refers to the compounds as such and not to any specific mixture thereof.

Therefore, the Board comes to the conclusion, that neither the claimed use of a 50/50 weight percent mixture of difluoromethane and pentafluoroethane in heat pump applications nor the claimed methods were described in document (6) and, consequently, that there is no disclosure in document (6) destroying the novelty of Claims 1 to 3.

2.4 Inventive step

2.4.1 According to the case law of the Boards of Appeal of the EPO, the definition of the technical problem to be solved should normally start from the technical problem actually described in the patent in suit in relation to the closest state of the art indicated there. Only if it turns out that an incorrect state of the art was used or that the technical problem disclosed has in fact not been solved or has not been correctly defined for some reason(s), is it appropriate to consider another problem which objectively existed (see, for example, T 881/92 of 22 April 1996, point 4.1 of the reasons and the other decisions cited in EPO Board of Appeal Case Law in 1996, special edition of OJ EPO 1997, Part I.C.2.1).

In the present case, the Board has no reason to assume that a state of the art exists which is more relevant to the claimed use in air conditioning and heat pump applications and to the claimed methods, than the one described in the introductory part of the patent in suit. On page 2, lines 47 to 54 of the patent in suit, it is namely stated that the art is continually seeking new fluorocarbon based azeotrope-like mixtures which offer alternatives for refrigeration and heat pump applications, in particular as environmentally acceptable substitutes for the fully halogenated chlorofluorocarbons, which are implicated in causing environmental problems associated with the depletion of the earth's protective ozone layer. Moreover, on page 2, line 55 to page 3, line 3 of the patent in suit it is said that the substitute materials must also possess those properties unique to the chlorofluorocarbons including chemical stability, low

toxicity, non-flammability and efficiency in-use.

Thus, in accordance with the patent in suit, the Board considers that the closest state of the art is represented by the chlorofluorocarbons commonly used at the filing date of the application in suit as refrigerants in air conditioning and heat pump applications and that in respect of these conventional refrigerants the problem to be solved exists in providing acceptable substitute refrigerants.

The patent in suit claims to solve this problem by providing for such uses the azeotrope-like compositions according to Claim 1.

- 2.4.2 The first point to be considered in assessing inventive step is then whether it has been convincingly shown that by using an azeotrope-like composition according to Claim 1 the problems underlying the patent in suit have effectively been solved.

It has never been contested that the data provided in example 3 of the patent in suit show in a credible manner that difluoromethane/pentafluoroethane compositions containing 35.7 percent by weight pentafluoroethane or more are non-flammable.

Moreover, with the data presented in example 4 it has been shown that a difluoromethane/pentafluoroethane mixture comprising 20 percent by weight difluoromethane provides a coefficient of performance slightly above that attainable with difluoromethane refrigerant and that it provides essentially the same refrigeration capacity and also produces lower discharge temperatures from the compressor.

The Respondents argued that such data could not make it credible that the problem underlying the present invention is effectively solved by the azeotrope-like compositions according to Claim 1, since the use of difluoromethane/pentafluoroethane compositions comprising 20 percent by weight difluoromethane was not embraced by the wording of Claim 1. However, as indicated in the last paragraph of example 4, azeotrope-like difluoromethane/pentafluoroethane mixtures with a higher pentafluoroethane content than the 20 percent by weight used also provide a performance which is equivalent to that of difluoromethane and even lower compressor discharge temperatures. As this was not contested by the Respondents, the Board accepts that a credible case has been put forward that by using azeotrope-like compositions according to Claim 1 similar good coefficient of performance, refrigeration capacity and discharge temperature from the compressor are obtained.

Finally, the sketches A to D provided by telefax on 9 April 2001 clearly show that, contrary to the temperature glide pattern of commonly used fluorocarbon refrigerant mixtures, the temperature glide is very low, irrespective of the composition of the difluoromethane/pentafluoroethane mixture. The Board accepts therefore that a credible case has been put forward that difluoromethane/pentafluoroethane mixtures have a very low temperature glide and, consequently, are azeotrope-like independent of their composition.

The Respondents submitted that the sketches A to D were filed about one month before oral proceedings and, consequently, that by such late filing they were taken by surprise without having the possibility for proving

the contrary. However, as the temperature glide was extensively discussed during the opposition procedure and as this glide can be derived by routine calculation from the boiling point curves for different composition proportions of a blend, the patent in suit provided with the data in Tables I and II at least an indication of the fact that the temperature glide of difluoromethane/pentafluoroethane mixtures is very low independent of their composition. As there was thus an indication in the patent in suit that the difluoromethane/pentafluoroethane compositions according to Claim 1 have a very low temperature glide, the Respondents cannot reasonably maintain to have been taken by surprise by the filing of the sketches A to D, which merely confirms that the compositions in accordance with the claimed invention are indeed "azeotrope-like", i.e. constant boiling or essentially constant boiling (see page 3, lines 29 to 31 of the patent in suit).

Consequently, it has been shown, that by the compositions according to Claim 1 mixtures are provided, which are non-flammable, suitable for substituting commonly used refrigerants, azeotrope-like irrespective of the composition of the mixture and have an efficiency in-use comparable to the one of commonly used refrigerants.

2.4.3 It remains to be decided whether a skilled person would have expected that the mixtures according to Claim 1 have these properties.

2.4.4 The Respondents contended that, in view of the teachings of documents (1), (2) and (6), a skilled person would have expected so, for the following

reasons: Firstly, it was expressly disclosed on page 14, sixth paragraph in the left-hand column of document (1) that materials whose boiling points are reasonably close to one another are preferred as the components of binary refrigerants and it was also known from Table I that the boiling points of difluoromethane and pentafluoroethane differed only 6°F. Secondly, according to document (2) azeotrope-like mixtures of difluoromethane and pentafluoroethane were specifically suggested in the NIST workshop, as may be derived from hand-numbered page 2 of the summary of discussion sessions and it was known from hand-numbered pages 36 and 37 of the McLinden article that difluoromethane was flammable whereas pentafluoroethane was non-flammable and that by combining flammable and non-flammable pure components a non-flammable mixture can be obtained. Thirdly, it was known from document (6) that 50/50 weight percent mixtures of difluoromethane and pentafluoroethane have a low glide.

- 2.4.5 Document (1) describes in the introduction in the left-hand column of page 13 that certain hydrogen-containing chlorofluorocarbons alone or in admixture, such as dichlorofluoromethane and pentafluoroethane, can be used as refrigerants in vapour compression systems. In the left-hand column on page 14 it teaches that the performance of mixed refrigerants differs from that of single components in that the temperature is not constant through the length of the heat exchangers (evaporators and condensers), because the composition and hence the boiling point changes as evaporation and condensation takes place because of the differences in the vapour pressure of the compounds; further that the magnitude of the temperature gradient along the heat exchangers increases with increasing difference in the

boiling points of the components and, for a particular binary system, is greatest for an equimolar mixture. Therefore materials whose boiling points are reasonably close to one another are preferred as the components of binary refrigerants. It is also desirable that the components be chemically similar so that conflicting compatibility requirements are not encountered. As one of the examples of a binary refrigerant system the combination of difluoromethane (boiling point: -61°F) and pentafluoroethane (boiling point: -55°F) is mentioned.

However, document (1) is completely silent about the fact that difluoromethane and pentafluoroethane would form an azeotrope-like composition for a certain amount of difluoromethane, let alone, that both components would form an azeotrope-like composition **irrespective of the amount of difluoromethane**. As document (1) is further silent about the flammability properties of difluoromethane and of pentafluoroethane and about the in-use efficiency of them, the properties made credible, as mentioned in point 2.4.3, could not be deduced from document (2) alone and even less their suitability therefrom for use in air conditioning or heat pump applications.

- 2.4.6 Document (2) consists of the summary of the discussions held during a workshop in order to identify needs for thermodynamic and transport property data concerning replacements of those refrigerants that damage the ozone layer in the upper atmosphere, and of an article by a certain McLinden.

Although in document (2) the use of difluoromethane/pentafluoroethane azeotrope-like

compositions is suggested, nowhere in this document can any information be found about the amount of difluoromethane necessary in order to obtain an azeotrope-like composition, let alone, that an azeotrope-like mixture is obtained irrespective of the amount of difluoromethane. Additionally, as clearly follows from the McLinden article which says on hand-numbered page 41, that virtually any information for mixtures of the hydrogen-containing halocarbons are missing, document (2) is silent about the coefficient of performance or about the refrigeration capacity of difluoromethane/pentafluoroethane azeotrope-like mixtures, and, therefore, it could not be deduced from that document that the efficiency in-use property of such mixtures would be satisfactory.

2.4.7 It was the primary purpose of the work described in document (6) to perform a comprehensive screening of refrigerant pairs which through a difference of the composition in the liquid phase and the vapour phase could improve the performance of heat pump systems. Since such purpose is contrary to the presently proposed solution, namely, using an azeotrope-like composition, this document even teaches away from the use of an azeotrope-like composition. The only information a skilled person could deduce from document (6) was that the temperature glide of a 50/50 weight percent mixture was 3°F.

Therefore, the claimed use and methods were not made obvious by the teaching of document (6) alone.

2.4.8 Since it was nowhere suggested in any of the documents (1), (2) and (6) that the compositions according to Claim 1 would combine the properties of

having a very low temperature glide independent of the composition of the mixture, thus enabling the formation of azeotrope-like compositions over a wide range of compositions and enabling the provision of compositions, which are non-flammable and have an efficiency in-use comparable to the one of commonly used refrigerants, a skilled person would not have found any suggestion in the combined teaching of documents (1), (2) and (6) that the composition according to Claim 1 would be suitable for being used in air conditioning or heat pump applications.

2.4.9 Thus, the subject-matter of Claim 1 meets the requirement of inventive step (Article 56 EPC). This is true, for the same reasons, also for the subject-matter of Claims 2 and 3.

3. *Auxiliary requests*

In the light of the above findings, there is no need to consider the auxiliary requests.

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 with Claims 1 to 3 filed as main request on 9 April 2001 and the description as filed at the oral proceedings.

The Registrar:

The Chairman:

N. Maslin

A. Nuss