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D E C I S I O N
of 24 September 2002

Case Number: T 0974/99 - 3.3.1

Application Number: 90125500.0

Publication Number: 0435253

IPC: C10M 105/36

Language of the proceedings: EN

Title of invention:

Refrigerator oils for use with hydrogen-containing
halogenocarbon refrigerants

Patentee:

NIPPON OIL COMPANY, LIMITED

Opponent:

Imperial Chemical Industries PLC
Cognis Deutschland GmbH & Co. KG

Headword:

Refrigerator oil/NIPPON OIL

Relevant legal provisions:

EPC Art. 56, 123(2)

Keyword:

"Main request: disclaimer not allowable under Article 123(2) -
anticipating disclosure relating to the same technical field"
"First to twelfth auxiliary request: inventive step (no)"

Decisions cited:

G 0002/88; G 0009/91; T 0170/87; T 0917/94; T 0863/96

Catchword:

-



Case Number: T 0974/99 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 24 September 2002

Appellant 1: Imperial Chemical Industries PLC
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Decision under appeal: Interlocutory decision of the Opposition Division
of the European Patent Office posted 25 August
1999 concerning maintenance of European patent
No. 0 435 253 in amended form.

Composition of the Board:

Chairman: A. J. Nuss
Members: P. F. Ranguis
S. C. Perryman

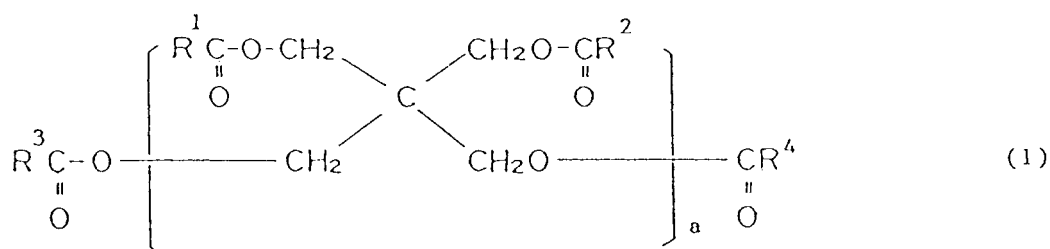
Summary of Facts and Submissions

I. The Appellants (Opponents 1 and 2) lodged an appeal against the interlocutory decision of the Opposition Division to maintain the European patent No. 0 435 253 (European patent application No. 90 125 500.0) in the form as amended (main request filed before the Opposition Division) pursuant to Article 102(3)a) EPC.

II. The then pending main request (submitted at the oral proceedings before the Opposition Division on 24 October 1997) comprised three claims reading as follows:

"1. A refrigerator oil for use in compressors using therein a chlorine-free type halogenocarbon as a refrigerant, consisting essentially of as a base oil at least one kind of an ester selected from the group consisting of:

a pentaerythritol ester represented by the general formula (1)



wherein R¹-R⁴ may be identical with or different from each other and are each a group selected from the group consisting of straight-chain alkyl groups having 3 to 11 carbon atoms, branched-chain alkyl groups having 3 to 15 carbon atoms and cycloalkyl groups having 6 to 12 carbon atoms, the straight-chain alkyl groups being present in a ratio of not more than 60% of

the total alkyl groups, and a is an integer of 1 to 3;
and further comprising at least one kind of an epoxy compound selected from the group consisting of phenylglycidyl ether type epoxy compounds, glycidyl ester type epoxy compounds, bisphenol A glycidyl ether being excluded, and epoxidized fatty acid monoesters, in an amount of 0.1 to 5.0% by weight based on the total amount of the refrigerator oil, with the proviso that a refrigerator oil consisting of 0.7 wt.-% 2-ethylhexanoic acid glycidyl ester and pentaerythritol ester of a mixture consisting of 65 wt.-% 2-ethylhexanoic acid and 35 wt.-% lauric acid is excluded."

"2. A refrigerator oil according to claim 1, further comprising at least one kind of a phosphorous compound selected from the group consisting of phosphoric esters, acid phosphoric esters, amine salts of acid phosphoric esters, chlorinated phosphoric esters and phosphorous esters, in an amount of 0.1 to 5.0% by weight based on the total amount of the refrigerator oil".

"3. A refrigerator oil according to claim 1, wherein said base oil has a pour point of not higher than -10°C and a kinematic viscosity of 2 to 150 cSt at 100°C."

III. The oppositions which had been filed sought revocation of the patent in suit on the grounds that the claimed subject-matter lacked novelty and did not involve an inventive step (Article 100(a) EPC). The oppositions were supported by several documents including:

(1) RO-A-96 079 (English translation)

- (2) JP-A-62 292 895 (English translation)
- (4) JP-A-55 155 093 (English translation)
- (7) EP-A-0 430 657 (prior art under Article 54(3) (4) EPC)
- (10) EP-A-0 406 479 (prior art under Article 54(3) (4) EPC)
- (18) EP-A-0 336 171

IV. The Opposition Division held that the two disclaimers present in Claim 1 of the main request (cf. point II above) did not contravene the requirements of Article 123(2) EPC. Claim 1 was novel over the documents (7) and (10) cited under Article 54(3)(4) EPC and over the other documents cited under Article 54(1)(2) EPC. Furthermore, the problem to be solved being to provide a lubricating oil compatible with chlorine-free type halogenocarbon refrigerants, it would not have been obvious to devise the claimed refrigerator oil in view of the cited prior art. In particular, document (2) was not relevant since it related to lubricating oils for use together with chlorine-containing type halogenocarbon refrigerants.

V. At the oral proceedings which took place on 24 September 2002, the Respondent (Proprietor of the patent) modified the rejected main request (cf. point II above) to replace in Claim 1 the expression "bisphenol A glycidyl ether" by the expression "bisphenol A **di**glycidyl ether" to put the disclaimer in conformity with the disclosure of document (7), which was prior art under Article 54(3)(4) EPC. The

Appellants did not object to this amendment.

The Respondent also submitted during the oral proceedings twelve auxiliary requests.

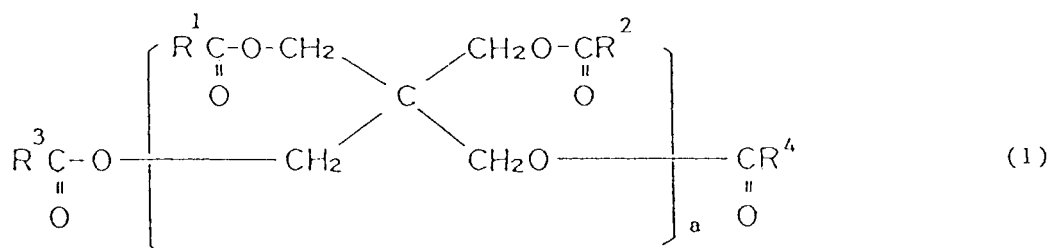
The first auxiliary request differed from the main request in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms", the second disclaimer being thus deleted.

The second auxiliary request differed from the main request in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms" and to limit the epoxy compound to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, phenylglycidyl esters, alkylglycidyl esters, alkenylglycidyl esters, and epoxidized fatty acid monoesters, in an amount of 0.1 to 5.0% by weight based on the total amount of the refrigerator oil", the first and second disclaimers being thus deleted.

The third auxiliary request comprised three claims reading as follows:

"1. Use of a refrigerator oil, consisting essentially of as a base oil at least one kind of an ester selected from the group consisting of:

 a pentaerythritol ester represented by the general formula (1)



wherein R¹-R⁴ may be identical with or different from each other and are each a group selected from the group consisting of straight-chain alkyl groups having 3 to 7 carbon atoms, branched-chain alkyl groups having 3 to 15 carbon atoms and cycloalkyl groups having 6 to 12 carbon atoms, the straight-chain alkyl groups being present in a ratio of not more than 60% of the total alkyl groups, and a is an integer of 1 to 3;

and further comprising at least one kind of an epoxy compound selected from the group consisting of phenylglycidyl ether type epoxy compounds, glycidyl ester type epoxy compounds, bisphenol A diglycidyl ether being excluded, and epoxidized fatty acid monoesters, in an amount of 0.1 to 5.0% by weight based on the total amount of the refrigerator oil together with a chlorine-free type halogenocarbon as a refrigerant in compressors of refrigerators."

"2. The use according to claim 1, further comprising at least one kind of a phosphorous compound selected from the group consisting of phosphoric esters, acid phosphoric esters, amine salts of acid phosphoric esters, chlorinated phosphoric esters and phosphorous esters, in an amount of 0.1 to 5.0% by weight based on the total amount of the refrigerator oil".

"3. The use according to claim 1, wherein said base oil

has a pour point of not higher than -10°C and a kinematic viscosity of 2 to 150 cSt at 100°C ."

The fourth auxiliary request differed from the third one in that Claim 1 was amended to limit the epoxy compound to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, phenylglycidyl esters, alkylglycidyl esters, alkenylglycidyl esters, and epoxidized fatty acid monoesters".

The fifth auxiliary request differed from the main request in that Claim 1 was amended to limit the epoxy compound to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, phenylglycidyl esters, glycidyl acrylate, glycidyl methacrylate, and epoxidized fatty acid monoesters", the two disclaimers being thus deleted.

The sixth auxiliary request differed from the fifth auxiliary request in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms".

The seventh auxiliary request differed from the fifth auxiliary request in that Claim 1 was amended to limit the epoxy compound to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, and epoxidized fatty acid monoesters".

The eighth auxiliary request differed from the seventh auxiliary request in that Claim 1 was amended to

replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms".

The ninth auxiliary request differed from the third one in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 7 carbon atoms" by "straight-chain alkyl groups having 3 to 11 carbon atoms" and to broaden the epoxy compound to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, phenylglycidyl esters, glycidyl acrylate, glycidyl methacrylate, and epoxidized fatty acid monoesters".

The tenth auxiliary request differed from the ninth one in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms".

The eleventh auxiliary request differed from the ninth one in that Claim 1 was amended to limit the epoxy compounds to the group "consisting of phenylglycidyl ether, alkylphenylglycidyl ethers having 1 to 3 alkyl groups having 1 to 13 carbon atoms, and epoxidized fatty acid monoesters".

The twelfth auxiliary request differed from the eleventh one in that Claim 1 was amended to replace the expression "straight-chain alkyl groups having 3 to 11 carbon atoms" by "straight-chain alkyl groups having 3 to 7 carbon atoms".

VI. The Appellant's submissions in the written proceedings

and at the oral proceedings may be summarized as follows:

Claim 1 of the main request was not limited to a combination of the refrigerator oil together with a chlorine-free type halogenocarbon refrigerant since the reference to the use with chlorine-free type halogenocarbon refrigerants is to be interpreted as simply meaning that the refrigerator oil is **suitable** for this use. Document (2) was, therefore novelty-destroying or alternatively rendered the claimed subject-matter obvious. The same applied to Claims 1 of the auxiliary requests 1, 2 and 5 to 8.

Claim 1 of the third auxiliary request was obvious in view of document (18) as the closest state of the art in combination with document (2) and/or (4). The same applied to the respective Claim 1 of each of the auxiliary requests 4 and 9 to 12.

VII. The Respondent's submissions in the written proceedings and at the oral proceedings may be summarized as follows:

The subject-matter of the main request, first and second auxiliary requests was novel over document (2) since Claim 1 of each request related to a refrigerator oil for use with chlorine-free type halogenocarbon refrigerants, whereas document (2) referred to refrigerator oils used in combination with chlorine-containing type halogenocarbon refrigerants. Nor were documents (7) and (10) novelty-destroying since, among the epoxy compounds, only bisphenol A diglycidyl ether was explicitly disclosed.

Regarding inventive step, the person skilled in the art would not have considered the teaching of document (2) since it related to a different technical problem, namely the provision of refrigerating oils for use with chlorine-containing type halogenocarbon refrigerants. The claimed subject-matter of the main request, first and second auxiliary requests was, therefore, non-obvious over the cited prior art.

Regarding the third auxiliary request, starting from document (18) as the closest state of the art, the skilled person would have had no incentive to replace a polyoxyalkylene glycol monoether by a pentaerythritol ester such as defined in Claim 1. In particular, the physical properties of the polyoxyalkylene glycol monoether (kinematic viscosity and pour point) could not be viewed as a required property of the oil independently of the nature of the polyether and, therefore, the person skilled in the art would not have looked for other oils having the same physical properties, such as the oils of documents (2) or (4), all the more because the teaching of those documents related to oils compatible with chlorine-containing type halogenocarbon refrigerants.

Furthermore, the examples disclosed in the patent in suit showed the superiority of the oils defined in Claim 1 over the polyoxyalkylene glycol monoethers of document (18).

VIII. The Appellants requested that the decision under appeal be set aside and that the European patent be revoked.

The Respondent requested that the decision under appeal be set aside and that the patent be maintained on the

basis of the main request or one of the first to twelfth auxiliary requests all submitted at the oral proceedings.

IX. At the end of the oral proceedings the decision of the Board was announced orally.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Amendments - Article 123(2) EPC*

2.1 As stated in the decision of the Enlarged Board of Appeal G 9/91 (cf. OJ EPO 1993, 408, point 19 of the reasons), the EPC requires the Board to examine whether the amendments to the granted claims comply with the requirements of the EPC (e.g. with regard to the provisions of Article 123(2) EPC).

2.2 The feature of Claim 1 relating to the exclusion of a refrigerator oil consisting of 0.7 wt.-% 2-ethylhexanoic acid glycidyl ester and pentaerythritol ester of a mixture consisting of 65 wt.-% 2-ethylhexanoic acid and 35 wt.-% lauric acid (cf. point II above) was added during the opposition proceedings. This feature has no basis in the application as filed but is derived from the disclosure of document (2) whose example No. c relates to such a refrigerator oil.

2.3 According to the established jurisprudence of the

Boards of Appeal, it may be permissible to exclude a specific prior art from the claimed subject-matter by means of a disclaimer, even if the original application provides no basis for such an exclusion (see decision T 170/87, OJ EPO 1989, 441, point 8.4.1 of the reasons). However, a disclaimer may only be introduced into a claim if, by this amendment, the anticipating disclosure disappears from the prior art field to be taken in consideration (T 863/96, point 3.2 of the reasons).

- 2.4 The Respondent argued that the feature of Claim 1 "for use in compressors using therein a chlorine-free type halogenocarbon as a refrigerant" distinguished the prior art technical field of the claimed invention from that of document (2) since the latter related to refrigerator oils for use together with chlorine-containing type halogenocarbons as refrigerants. However, with the exceptions of medical uses of known substances, the indication of intended use of a claimed product is not a feature which is to be taken in consideration when assessing novelty over the prior art (cf. compendium "Case Law of the Boards of Appeal" (4th edition 2001) at pages 100 to 101, point 5.3.3, bridging paragraph) and must, therefore, be disregarded. It follows that document (2) is novelty-destroying for the claimed subject-matter without the disclaimer since it discloses a refrigerator oil based on pentaerythritol ester as defined in Claim 1 (cf. example c) in combination with 0.05 to 10 wt% of a glycidyl ester (cf. page 2, paragraph 2). Furthermore, document (2) would not disappear from the prior art to be taken into consideration for assessing inventive step and even would be the closest state of the art since it aims at the same objective as the claimed

invention (cf. point 5.3 below).

2.5 For the above reasons, the amendment of Claim 1 by incorporation of the said disclaimer changes the nature of the alleged invention and, thus, is not in compliance with the requirements of Article 123(2) EPC (cf. T 917/94, point 4 of the reasons).

2.6 Therefore, the main request must fail.

First auxiliary request

3. *Amendment of Claim 1 - Article 123(2) EPC*

The Board sees no objection to the added feature related to the exclusion of the bisphenol A diglycidyl ether from the epoxy compounds defined in Claim 1. This disclaimer finds support in the disclosure of document (7) which is prior art under Article 54(3)(4) EPC. By this disclaimer, document (7) disappears from the prior art to be taken into consideration and, therefore, this amendment does not contravene the requirements of Article 123(2) EPC (cf. point 2.3 above).

4. *Novelty - Article 54(3)(4) EPC*

Document (7) which is prior art under Article 54(3)(4) EPC discloses a refrigerator oil comprising a pentaerythritol ester falling within the definition of Claim 1 and additives including epoxy compounds such as epoxidized soybean oil and bisphenol A diglycidyl ether (cf. page 3, lines 29 to 32). Since the bisphenol A diglycidyl ether was excluded (cf. point 3 above) and since the epoxy compounds listed in Claim 1 do not emerge unambiguously from the description of document

(7), it must be concluded that the subject-matter of the first auxiliary request is novel over this document. The same applies to document (10) which cites the epoxy compounds without any further details.

5. *Inventive step - Article 56 EPC*

5.1 The patent in suit relates to a lubricating oil for compressors of refrigerators using therein a hydrogen-containing halogenocarbon as a refrigerant (cf. page 2, lines 3 to 5). The refrigerants which may be used include chlorine-free type halogenocarbons as well as chlorine-containing type halogenocarbons (cf. page 8, lines 31 to 38). The refrigerator oils have excellent compatibility with the hydrogen-containing halogenocarbons and have a high electrical insulating property, high lubricity and low hygroscopicity (cf. page 8, lines 39 to 42). The general object to be achieved is reflected by Claim 1 of this request which in no way is restricted to the use of a refrigerator oil together with a chlorine-free type halogenocarbon refrigerant (cf. point 2.4). In other words, the scope of the claimed invention includes a refrigerator oil whatever the hydrogen-containing halogenocarbon refrigerant is.

5.2 Document (2) discloses a refrigerating machine oil comprising a polyvalent alcohol ester or a mixture of a polyvalent alcohol ester and a mineral oil or a synthetic oil, to which mixture has been added 0.05 to 10 wt.% of a glycidyl ester of a straight chain unsaturated fatty acid with a carbon number of 14-18 or a straight or a side-chain saturated fatty acid with a carbon number of 8-18 (cf. page 2, paragraph 2). Those oils reveal excellent lubricating oil properties and

thermal stability and have an improved flon stability, in particular the epoxy groups scavenge hydrogen chloride formed by flon decomposition and, therefore, stabilise the systems (page 4, two last paragraphs before the examples). As oils may be used esters of polyvalent alcohols and monocarboxylic acids. Among the polyvalent alcohols, pentaerythritol and dipentaerythritol are mentioned (cf. page 3, last but one paragraph).

- 5.3 The Respondent argued that document (2) was only concerned with problems arising from chlorine-containing type halogenocarbon refrigerants, submitting thereby that this document could not represent relevant prior art and, in any case, not the closest state of the art. In accordance with the "problem-solution approach" consistently applied by the Board of Appeal to assess inventive step, the closest prior art is normally a prior art document disclosing subject-matter aiming at the same objective as the claimed invention and having the most relevant technical features in common. Contrary to the Respondent's view, the Board holds that there is at least one common objective between the claimed invention and the document (2) since the claimed composition is not limited to the use of a refrigerator oil together with chlorine-free type halogenocarbon refrigerants (cf. point 5.1 above) and since document (2) discloses a refrigerator oil containing a pentaerythritol ester oil and a flon, i.e. any flon, as a refrigerant (cf. point 5.2). Furthermore, this document has the most relevant technical features in common with the claimed subject-matter and, therefore, qualifies to be the closest state of the art.

5.4 The Respondent has provided nothing relevant in respect of any advantage of the claimed composition in comparison with the oils disclosed in document (2). In view of document (2), the technical problem to be solved cannot be seen, therefore, in providing an improved oil but rather in the provision of a further refrigerator oil to be used in combination with a refrigerant and presenting the same valuable properties as those of document (2).

It is not contested that this technical problem is solved by the claimed refrigerator oil.

5.5 The remaining question is thus whether the prior art relied upon by the Appellants would have suggested to the person skilled in the art solving the technical problem indicated above in the proposed way. In particular, the question arises whether or not the person skilled in the art in view of the technical problem, as defined in point 5.4, would have been directed to use a pentaerythritol ester of formula (1) as defined in Claim 1 as base oil.

5.6 There is no detailed description of the monocarboxylic acids which can be condensed with the polyvalent alcohols such as pentaerythritol und dipentaerythritol in the disclosure of document (2). However, looking for base oils to be used within the teaching of document (2), the person skilled in the art would have noted that document (4) discloses refrigerating machine oils to be used together with flons with high chemical stability and exemplifies among others an ester of pentaerythritol and isononanoic acid, i.e. a branched saturated fatty acid with nine carbon atoms (cf. page 2, paragraph 3 and example 4). In the absence of

evidence to the contrary, the Board concludes that it would have been obvious for the person skilled in the art, faced with the technical problem defined in point 5.4 above, to use as oil an ester of pentaerythritol and isononanoic acid such as disclosed in document (4) within the teaching of document (2), thereby arriving without inventive ingenuity at one of the refrigerator oils of Claim 1. In that context, the Board observes that the scope of Claim 1 includes embodiments where the esters of formula (1) only comprise branched-chain alkyl groups having 3 to 15 carbon atoms as confirmed by the description of the patent in suit (cf. example 1).

- 5.7 Therefore, in the Board's judgement, the subject-matter of Claim 1 of the main request represents an obvious solution to the problem underlying the patent in suit and does not involve an inventive step.

Second auxiliary request

6. *Inventive step - Article 56 EPC*

For the assessment of inventive step of Claim 1 of this request, there is no relevant difference to Claim 1 of the first auxiliary request since, on the one hand, the pentaerythritol esters of formula (1) comprise branched-chain alkyl groups having 3 to 15 carbon atoms and, on the other hand, the epoxy compounds comprise alkylglycidyl esters without any further precision, namely the type of glycidyl esters disclosed in document (2) (cf. point 5.2 above). Therefore, for the same reasons which have led the Board to conclude that

Claim 1 of the first auxiliary request lacks inventive step, the subject-matter of the present Claim 1 is also obvious in view of the teaching of documents (2) and (4).

Third auxiliary request

7. *Rule 57a EPC*

The subject-matter of Claim 1 of the third auxiliary request was restricted to the "use of a refrigerator oil ... together with a chlorine-free type halogenocarbon as a refrigerant in compressors of refrigerators". This amendment is designed to overcome an objection of lack of novelty. Therefore, the amendment can be admitted under Rule 57a EPC.

8. *Amendments - Article 123(2) and (3) EPC*

8.1 This amendment finds support in the disclosure of the application as filed (cf. page 20, last three lines of the application as filed). The Board is, therefore, satisfied that the present request is not amended in such a way that it contains subject matter which extends beyond the application as filed.

8.2 This amendment amounts to a change of category from a "product" claim to a "use of a product for a particular purpose". Such an amendment is not open to objection under Article 123(3) EPC (cf. G 2/88, OJ EPO 1990, 93, Order ii).

9. *Inventive step - Article 56 EPC*

9.1 The claimed subject-matter in the form now claimed

relates to the use of a refrigerator oil consisting of a base oil of formula (1) to which was added 0.1 to 5.0% by weight based on the total amount of the refrigerator oil of an epoxy compound together with a chlorine-free type halogenocarbon as a refrigerant in compressors of refrigerators.

9.2 In accordance with the "problem-solution approach" consistently applied by the Boards of Appeal to assess inventive step on an objective basis, it is necessary to establish the closest state of the art being the starting point, to determine in the light thereof the technical problem which the invention addresses and solves, and to examine the obviousness or non-obviousness of the claimed solution to this problem in view of the state of the art. The closest state of the art for the purpose of objectively assessing inventive is generally that which discloses subject-matter conceived for the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common, i.e. requiring the minimum of structural and functional modifications (cf. "Case Law of the Boards of Appeal of the European Patent Office", 4th edition 2001, I.D. 3.1, page 102). Among the prior art relied upon by the Appellants, only document (18) relates specifically to a lubricating oil composition for a refrigerator using therein the 1,1,1,2-tetrafluoroethane (HFC-134a), i.e. a chlorine-free type halogenocarbon refrigerant. This document is, therefore, the closest state of the art. This was not contested by the parties.

9.3 Document (18) discloses a lubricating oil for a refrigerator in which 1,1,1,2-tetrafluoroethane is used as the refrigerant comprising as the base oil a

polyoxyalkylene glycol monoether represented by the general formula



the polyoxyalkylene glycol monoether having a pour point up to -10°C and a kinematic viscosity of 2-110 cSt at 100°C (cf. page 3, lines 40 to 46). In order to further improve said oil in wear resistance and load resistance, it may be incorporated with a phosphate, such as tricresylphosphate, in an amount of 0.1 to 5.0 parts by weight per 100 parts by weight of the base oil and, in that case, an epoxy compound, selected from the group consisting of:

- (i) phenylglycidyl ether type epoxy compounds
- (ii) epoxidized fatty acid monoesters and
- (iii) epoxidized vegetable oils,

in an amount of 0.1 to 5.0 parts by weight per 100 parts by weight of the oil, is preferably incorporated to prevent the corrosion of metals caused by the phosphate (cf. page 5, line 16 to page 6, line 13). The Board observes that in present Claim 1 the presence of phosphate is optional, and as present dependent Claim 2 makes phosphate mandatory, the presence or absence of phosphate provides no distinction over the disclosure of document (18) (cf. Claim 2 of the present request, point V above).

- 9.4 In the next step of that approach, the technical problem which the claimed invention addresses in the light of document (18) is to be determined. The Respondent, relying upon the comparative examples Nos. 3 and 4 of the patent in suit which relate to polyoxypropylen glycol monobutylethers as oil, argued that the claimed invention represented a significant

improvement, in particular, in terms of resistivity, wear resistance, hygroscopicity and miscibility with 1,1,1,2-tetrafluoroethane (HFC-134a).

- 9.5 However, the comparison between the comparative examples No. 3 and 4 and the examples Nos. 1 to 23 according to the claimed invention is not suitable as evidence of an improvement. Indeed, to be of any significance in this respect, an improvement must be attributable to the technical contribution reflected by the technical features of the claim, namely an oil together with a chlorine-free type halogenocarbon refrigerant. Now, all the data related to the resistivity, the wear resistance, the hygroscopicity have been obtained with solely the oil **and not** with a mixture of oil together with a chlorine-free type halogenocarbon. This data is, therefore, not relevant. The sole data which may be taken into consideration is that related to the miscibility with HFC-134a. However, this data shows no improvement, the miscibility being of the same order for the polyoxypropylen glycol monobutylethers (comparative examples Nos. 3 and 4) and for the ester oils according to the invention (examples Nos. 1 to 23).

The technical problem to be solved cannot be seen, therefore, in providing an improved refrigerator oil but rather in the provision of a further refrigerator oil.

- 9.6 It remains to be decided whether or not the proposed solution to the problem underlying the subject matter of Claim 1 is obvious or not in view of the cited prior art. In that context, the sole relevant question to be examined is whether or not it would have been obvious

to replace the polyoxyalkylene glycol monoethers disclosed as base oils in document (18) by a pentaerythritol ester such as defined in Claim 1 of the present request.

9.7 The Respondent argued that document (18) did not give any hint in that respect. Nor could the person skilled in the art have found any relevant information in the other cited documents. In particular, he pointed out that there was a clear difference between the flons which contained chlorine and the chlorine-free type halogenocarbons and, therefore, the person skilled in the art would not have looked at documents such as document (4) since it related to the provision of refrigerators oils to be used in combination with chlorine-containing type halogenocarbon refrigerants. He also contested that the physical properties of the oil such as indicated in document (18), namely pour point and kinematic viscosity, would have been relevant as a pointer to the person skilled in the art, looking for further oils since these physical properties were characteristics of the disclosed polyoxyalkylene glycol monoethers and could not be considered in isolation as desirable characteristics for any other suitable oils.

9.8 First, the Board observes that the alleged barrier between the field of flons which contain chlorine and the field of chlorine-free type halogenocarbons is not so impenetrable as to deter the person skilled in the art from looking at documents in one field for information concerning oils likely to be of use in the other field. Indeed, document (18) encompasses both technical fields (cf. page 2, lines 31 to 44). In particular, this paragraph indicates that to avoid environmental problems, monochlorodifluoromethane

(HCFC-22) or dichlorodifluoromethane (CFC-12) should be replaced. Furthermore, this document also indicates that 1,1,1,2-tetrafluoroethane is similar in thermodynamic properties to dichlorofluoromethane and if, therefore, 1,1,1,2-tetrafluoroethane is to be used as the refrigerant, then refrigerator systems using this refrigerant therein, can be expected to be usable without a major change in design to obtain the same refrigeration performances as conventional systems (cf. page 2, lines 45 to 50). Therefore, the person skilled in the art would have had good reasons to look for the refrigerating systems using dichlorofluoromethane as refrigerant and, in particular the lubricating oils which are used therein. Furthermore, contrary to the Respondent's view, the physical properties such as kinematic viscosity and pour point are not merely product parameters but also define the characteristics required for obtaining appropriate lubricating properties, as confirmed by document (1) on page 2, second paragraph. In that respect, document (4) discloses a specific example of synthetic refrigerating machine oils to be used together with dichlorodifluoromethane, wherein the oil is the ester of pentaerythritol and isononanoic acid having a kinematic viscosity at 98.9°C of 7.35 cSt and a pour point of -22.5°C. Therefore, the person skilled in the art, knowing that the same refrigerator systems can be used for 1,1,1,2-tetrafluoroethane and dichlorodifluoromethane would have been directed to use, with a reasonable expectation of success, in lieu of the polyoxyalkylene glycol monoethers disclosed in document (18), another oil having the required properties in terms of kinematic viscosity and pour point such as the ester of pentaerythritol and isononanoic acid of document (4) which was disclosed as

a refrigerating oil for dichlorodifluoromethane and, thus, arrive without inventive ingenuity at the claimed invention. In that context verifying the chemical compatibility of the oil with 1,1,1,2-tetrafluoroethane is no more than a routine task for a person skilled in the art (cf. document (1), page 2, lines 4 to 7 and document (4), example No. 2).

- 9.9 For the above reasons, the subject-matter of Claim 1 does not comply with the requirements of Article 56 and the present request must fail.

Fourth to twelfth auxiliary requests

10. *Inventive step - Article 56 EPC*

10.1 The subject-matter of the respective Claim 1 of each of the fourth to twelfth requests comprises the use of a refrigerator oil consisting of a pentaerythritol ester of formula (1) wherein R^1-R^4 may be selected from the group consisting of branched-chain alkyl groups having 3 to 15 carbon atoms and 0.1 to 5.0% by weight based on the total amount of the refrigerator oil of an epoxy compound selected inter alia from the group consisting of phenylglycidyl ether or alkylphenylglycidyl ether or epoxidized fatty acid monoesters together with a chlorine-free type halogenocarbon as a refrigerant in compressors of refrigerators (cf. point V above).

10.2 The same documents, namely documents (1), (4) and (18), and the same reasons which have led the Board to conclude that the subject-matter of Claim 1 of the third auxiliary request was devoid of inventive step, apply mutatis mutandi to the subject-matter of Claim 1 of those requests.

10.3 Since the subject-matter of those Claim 1 of all these requests does not comply with the requirements of Article 56, they must fail. Since none of the requests put forward comply with the requirements of the EPC, the patent is revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

N. Maslin

A. Nuss