BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File No.: T 0207/91 - 3.3.1

Application No.: 84 106 971.9

Publication No.: 0 129 240

Classification: C10M 111/04

Title of invention: Hydraulic fluids

D E C I S I O N
of 2 February 1993

Applicant:

Proprietor of the patent: Montedison S.p.A.

Opponent: 01) Hüls Aktiengesellschaft
02) BASF Aktiengesellschaft, Ludwigshafen

Headword: Hydraulic fluid/MONTEDISON

EPC: Art. 56 and 114(2)

Keyword: "Late submitted evidence (not accepted)" - "Inventive step (yes)"

Headnote
Catchwords

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0207/91 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 2 February 1993

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Representative:

Decision under appeal: **Decision of the Opposition Division of the European Patent Office delivered orally on 26 October 1990, with written reasons posted on 26 November 1990, rejecting the opposition filed against European patent No. 0 129 240 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: K.J.A. Jahn
Members: J.M. Jonk
J.-C. Saisset

Summary of Facts and Submissions

I. The grant of European patent No. 0 129 240 in respect of European patent application No. 84 106 971.9 was announced on 30 March 1988 (cf. Bulletin 88/13). The patent was based on five claims, independent Claim 1 reading as follows:

"1. A hydraulic fluid containing a glycol, a light ether of a glycol and a heavy ether of a glycol, characterized in that:
- said glycol is selected from diethylene glycol and triethylene glycol, the amount thereof ranging from 2 to 25% by weight;
- said light ether is the monoalkylether of diethylene glycol or triethylene glycol, the amount thereof ranging from 40 to 60% by weight and the alkyl group of the ether containing from 1 to 4 C-atoms;
- said heavy ether is the monoalkylether of a polyoxyalkylene glycol of the general formula

$$R-(-OCHR'-CH_2-)_n-OH$$

wherein

R is a C_1-C_4 alkyl group;

R' is H or CH_3 and

n is an integer, said heavy ether having an average molecular weight of from 208 to 600, and the amount thereof ranging from 15 to 35% by weight; and
- said hydraulic fluid has a boron content of up to 1% by weight, all amounts based on the total weight of the fluid."

Independent Claim 5 related to fluids free of boron.

II. Notices of opposition were filed on 13 December 1988 by Hüls AG (Opponent O1) and 17 December 1988 by BASF AG (Opponent O2), requesting the revocation of the patent on the ground of lack of inventive step. The oppositions were supported by six documents, of which only

(3) DE-A-2 457 097, and
(4) BE-A-829 962

are relevant to this decision.

III. By a decision delivered orally on 26 October 1990, with written reasons posted on 26 November 1990, the Opposition Division rejected both oppositions under Article 102(2) EPC.

The Opposition Division held that the subject-matter of the claims was novel. Furthermore, the subject-matter of the Claims 1 to 4 involved an inventive step because the compositions according to Claim 1, at the same boron content, exhibited WET PERT (boiling point after humidification) values higher than those of the compositions of the closest prior art, i.e. document (3), due to the unexpected finding that the heavy ethers of glycols - as defined in the claim - acted as WET PERT boosters when they were contained in compositions comprising light ethers of glycol, and diethylene glycol or triethylene glycol.

The subject-matter of Claim 5 was also considered to be inventive because no suggestions could be found in the cited documents as to how the WET PERT value could be raised above 155 °C and the viscosity at -40 °C below 1500 cSt in compositions free from boron.

IV. An appeal was lodged against this decision on 24 January 1991 by the former Opponent (O2) and the appeal fee was paid on the same date.

A Statement of Grounds of Appeal was submitted on 27 March 1991.

V. At the commencement of oral proceedings held on 2 February 1993, the Board raised a novelty objection having regard to the disclosure of document (4) (particularly Example 1 in combination with the subject-matter of Claims 22 and 23), and the established jurisprudence of the Boards of Appeal according to which it is necessary to consider the whole content of a citation when deciding novelty.

In response, the Respondent filed a new set of Claims 1 to 4.

The new Claim 1 corresponded to the Claim 1 as granted, except that "A hydraulic fluid" (line 1) was replaced by "A boron containing hydraulic fluid", and the feature: "said hydraulic fluid has a boron content of up to 1% by weight" (last line but one) was replaced by: "the boron containing compound is obtained by reacting H_3BO_3 with diethylene glycol and wherein the amount of said compound is ranging from 3 to 24% by weight".

The new Claims 2 to 4 corresponded to the respective Claims 2, 4 and 5 as granted.

VI. The Appellant argued that the use of the boric ester as claimed could not involve an inventive step because the skilled person would expect an increase of the WET PERT value due to the high boiling point of diethylene glycol formed by transesterification of the boric ester with the glycol monoalkylethers of the hydraulic fluid. In

connection with this transesterification the Appellant referred to document (3) and document:

(7) "Methoden der organischen Chemie", Houben-Weyl, Band VI/2 (1963), pages 210 to 212, 214 and 218.

Moreover, the Appellant contended that the use of the boric ester as claimed would be obvious to the skilled person in the light of the disclosure of document:

(8) FR-A-2 158 523,

because this document, which was mentioned in the description of the patent in suit, described the use of the reaction product of boric acid with a closely related glycol, namely tetraethylene glycol. However, the Appellant admitted that this document did not disclose the use of the boric ester of diethylene glycol as claimed.

In addition the Appellant disputed that the use of the claimed boric ester would improve the WET PERT value. In this connection he referred to the test report filed by him on 15 September 1990, which demonstrated that the boric ester of diethylene glycol and the boric ester of triethylene glycol monomethyl ether provided the same WET PERT values.

VII. The Respondent contended that it was not correct that the WET PERT value of a hydraulic fluid would inevitably be increased if the amount of a relatively high boiling component were raised. Moreover, he disputed that substantial amounts of free diethylene glycol would be formed by transesterification. In this connection he observed that it was even disclosed in document (7) that polyhydric alcohols generally formed stable boric esters.

The Respondent also contended that the hydraulic fluids as claimed showed improved WET PERT values. In this connection he referred to the test reports filed by him on 19 September 1990 and on 21 July 1992, and in particular to the WET PERT value of fluid H of Table D of the first report compared with that of fluid ß of the second one.

VIII. The Appellant (Opponent O2) requested that the decision under appeal be set aside, and that the disputed patent be revoked as far as the Claims 1 to 3 were concerned.

The Respondent (Patentee) requested that the patent be maintained on the basis of the description and the Claims 1 to 4 submitted during oral proceedings.

IX. At the conclusion of the oral proceedings the Board's decision to maintain the patent as requested by the Respondent was announced.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Amendments under Article 123 EPC*

The subject-matter of present Claim 1 is based on Claims 1 and 3 as granted, and supported by Claims 1, 4 and 5 and page 10, third paragraph, of the patent application as filed.

Present Claims 2 and 3 are identical with the respective Claims 2 and 4 as granted, and supported by page 10,

second paragraph; page 9, last paragraph; and the examples of the originally filed patent application.

The subject-matter of the present Claim 4 corresponds to that of Claim 5 as granted and Claim 3 of the patent application as filed.

Thus, all claims of the new set of claims filed during the oral proceedings comply with the requirements of Article 123 EPC.

3. *Novelty*

The Board is satisfied that the subject-matter of the present claims is novel because none of the cited documents discloses hydraulic fluids containing the reaction product of boric acid with diethylene glycol.

4. *Inventive step*

4.1 Late submitted evidence under Article 114(2) EPC

The Appellant submitted document (8) for the first time in the course of the oral proceedings before the Appeal Board and alleged lack of inventive step only on the ground that this document described hydraulic fluids containing the reaction product of boric acid with tetraethylene glycol which was considered by the Appellant to be equivalent to the boric ester of diethylene glycol as claimed.

However, this allegation is not supported by any evidence. In addition, Appellant's submission disregards the fact that the compositions of the patent in suit contain the boric ester of diethylene glycol in combination with the other mandatory components.

In these circumstances, in line with the established jurisprudence of the Boards of Appeal (cf. for instance, Supplement of the Official Journal, 6/1992, pages 70 to 72, under C.5), the Board disregards this late filed evidence under Article 114(2) EPC because it would not change the present decision.

4.2 Closest state of the art

4.2.1 Document (4) relates to hydraulic fluids comprising specific boric esters of at least one polyalkylene glycol monoalkylether and at least one polyalkylene glycol in a ratio of 1 : 2 to 2 : 1 in amounts of preferably 20 to 50% by weight (cf. page 1, line 1 to page 2, line 4 of the last paragraph). Example 1 of this document describes a composition containing 30% by weight of a boric ester of 1 mole of tetraethylene glycol and 2 moles of triethylene glycol monoethylether (providing a boron content of 0.58% by weight based on the total composition), 47.8% by weight of light ethers and 21.7% by weight of heavy ethers as claimed in the disputed patent, and 0.5% by weight of usual additives. In addition, this document discloses that the hydraulic fluids may contain polyalkylene glycols having molecular weights of preferably 150 to 400 in amounts of up to 20% by weight (cf. page 3, second paragraph).

Therefore, in line with the established jurisprudence of the Boards of Appeal that, when deciding what information has been made available to the public by a document, consideration should not be confined to the examples contained therein, but must extend to the document as a whole, the disclosure of document (4) makes available to the skilled person hydraulic fluids which only differ from the claimed fluids of the disputed patent in that they contain different boric esters.

Moreover, this document describes in Example 1 a hydraulic fluid having a WET PERT value of 165°C and a viscosity of 1104 cSt, thus a fluid belonging simultaneously to the classes DOT-3 (as regards the viscosity) and DOT-4 (as regards the WET PERT value) (see the test results indicated under (ß) on pages 4 and 5, particularly in the table on page 5 of document (4); and the statements on page 2, lines 32 to 46 of the patent in suit).

4.2.2 Document (3) concerns hydraulic fluids, which also simultaneously meet the provisions of DOT-3 and DOT-4 (cf. Table 1 on pages 12 and 13, Examples 1, 2, 3, 5 and 6) and differ from those of the patent in suit in that they contain different boric esters, namely boric esters of polyalkylene glycol monoalkylethers (cf. component C indicated on page 4, first paragraph). However, the technical teaching of this document with respect to the use of a polyalkylene glycol monoalkylether (cf. component A defined on page 3, second paragraph, and page 4, second paragraph) does not differentiate between light ethers and heavy ethers, nor does it give any indication about the weight ratios of these ethers if they were to be used in the form of mixtures.

4.2.3 Therefore, contrary to the view of the Opposition Division, the Board finds that the disclosure of document (4), which has the most features in common with the claimed subject-matter, is the closest state of the art.

4.3 Problem and solution

4.3.1 In the light of this closest state of the art, the technical problem to be solved by the patent in suit is the provision of a hydraulic fluid having an improved WET PERT value and, at the same time, maintaining the

low viscosity values according to DOT 3, i.e. a viscosity at -40°C of not more than 1500 cSt (cf. also the patent specification on page 3, lines 20 to 24, and page 2, lines 35 to 46).

4.3.2 The patent in suit solves this technical problem by suggesting hydraulic fluids according to Claim 1 wherein the boron component is the boric ester of diethylene glycol.

4.3.3 The experimental results of the test-reports submitted by the Respondent on 19 September 1990 and 21 July 1992 show that the comparative compositions which essentially correspond to the composition of Example 1 of document (4), namely the compositions designated "Ex.(1)" in Table D of the first report and as "Fluid α " in the second report, as well as the comparative composition designated as "Fluid ß", which corresponds essentially to this "Fluid α ", except that it contains 10% by weight of diethylene glycol, have WET PERT values of 164°C, 162.5°C and 165°C respectively, whereas the composition referred to as "Fluid H" in said Table D, having the same boron content and containing 13.8% by weight of the now claimed boric ester of diethylene glycol and 9.84% by weight of diethylene glycol has a WET PERT value of 172°C. Moreover, the Board sees no reason to doubt that the viscosity of "Fluid H" meets the DOT-3 standard. Also the Appellant did not raise any objection in this respect. Thus, having regard to these test-results, the Board considers it plausible that the technical problem as defined above has been solved.

4.3.4 In this connection, the Appellant contended on the basis of his test-report filed on 15 September 1990, wherein compositions containing the boric ester of diethylene glycol as claimed were compared with compositions containing the boric ester of triethylene glycol

monomethylether, that the claimed boric ester would not provide any improvement of the WET PERT value.

However, this test-report does not concern a comparison with the closest state of the art. Moreover, although the tested compositions as indicated in the table of the report have the same boron content, in the Board's judgment, they are not comparable because of the large differences in the amounts of diethylene glycol (2.1% compared with 19.2%) and of the light ether (59.5 or 57.5% compared with 33.1 or 31.1% respectively).

As a consequence, the Board finds this evidence unconvincing and cannot accept the Appellant's submissions based on it.

4.4 Inventive step of the claimed solution of the technical problem

4.4.1 As mentioned above, document (4) representing the closest state of the art discloses all the technical features of the claimed compositions, with the exception of the use of the boric ester of diethylene glycol as the boron containing compound. Thus, the question is whether, in the light of the prior art, the use of this particular boric ester involves an inventive step.

4.4.2 Document (4), as indicated in section 4.2 above, discloses hydraulic fluids which are characterised by particular boric esters, namely those of at least one polyalkylene glycol and at least one polyalkylene glycol monoalkyl ether in proportions of 1 : 2 or 2 : 1 (cf. page 1 and page 2, up to line 7; Claim 1; and page 3, fourth paragraph). Thus, this document does not hint at the incorporation of the boric ester as claimed, let alone at the solution of the present problem.

4.4.3 Document (3) relates to hydraulic fluids comprising (A) 40 to 65% by weight of a polyalkylene glycol monoalkyl ether, (B) 16 to 45% by weight of a polyalkylene glycol and (C) 10 to 19% by weight of a boric ester of polyalkylene glycol monoalkyl ethers, with the provision that the total amount of the components (A) and (B) is more than 80% by weight in order to prevent the hydrolysis of the boric ester and, as a consequence, the forming of insoluble boric acid (cf. the claim; page 2, last paragraph to page 4, first paragraph; page 5, last paragraph to page 6, first paragraph; and page 7, third paragraph). Having regard to the different type of boric esters recommended by document (3), this document also does not provide any pointer to the proposed solution of the technical problem as defined above.

4.4.4 The Appellant also submitted, by referring to documents (3) and (7), that the incorporation of the boric ester of diethylene glycol did not involve an inventive step on the ground that the skilled person would expect the transesterification of the boric ester with the polyalkylene glycol monoalkylethers of the present composition providing free diethylene glycol and, due to the high boiling point of this glycol, an improved WET PERT value.

However, document (3) - as indicated above - only teaches that the hydrolysis of the boric esters of the particular polyalkylene glycol monoalkylethers can be prevented by the incorporation of the high total amount of the components (A) and (B). Thus, there is no indication at all in this document that these particular boric esters are converted to boric esters containing radicals derived from polyalkylene glycol. Moreover, in the Board's judgment, such a transesterification would be even in contradiction to the teaching of this document that the incorporation of the polyalkylene

glycols in the fluid in amounts of at least 16% by weight is necessary to obtain the desired properties and that the polyalkylene glycols remain in the fluid even if it is heated according to the DOT-4 vaporising test (cf. page 6, lines 12 to 16; and page 7, last paragraph but one).

It is true, that document (7) discloses that boric esters can be transesterificated with alcohols or phenols (cf. page 210, under a_2), but it is also indicated in this document that with polyhydric alcohols stable boric esters are obtained (cf. page 211, lines 1 and 2). From this document the Board concludes that the boric ester of the fluids as claimed in the patent in suit belongs to the class of stable boric esters and, therefore, are unlikely to transesterify.

Therefore, Appellant's submission on this issue fails in the absence of any convincing evidence that a substantial transesterification of the present boric ester would occur.

4.4.5 In addition, it is observed by the Board that, even if Appellant's argumentation with respect to the transesterification of the boric ester were accepted, the incorporation of the claimed boric ester would not be obvious to the skilled person. This argumentation would indicate the use of boric esters providing by transesterification polyalkylene glycols having high boiling points, such as tetraethylene glycol (boiling point 328°C), i.e. pointing away from the claimed boric ester which would yield by transesterification diethylene glycol having the relatively low boiling point of 245°C. However, as has been shown in the Examples 6 and 7 of the disputed patent, comparative compositions containing the boric ester of tetraethylene glycol, even in combination with a relatively high

amount of free tetraethylene glycol (Example 6), actually provide lower WET PERT values than the claimed compositions.

4.5 In conclusion, the Board finds that the compositions according to Claim 1 involves an inventive step because it would not have been obvious to the skilled person to solve the above defined technical problem by the incorporation of the claimed boric ester.

5. Dependent Claims 2 and 3, which relate to the preferred embodiments of the compositions claimed in Claim 1, are also valid for the reasons stated above.

6. Since the Appellant only opposed to the Claims 1 to 3 and the Board, *prima facie*, does not see any reason to doubt the patentability of Claim 4, the Board sees no reason to examine the subject-matter of this claim (see footnote[1]).

[1]In line with the decision of the Enlarged Board of Appeal G 9/91 dated 31 March 1993 (headnote published in OJ EPO, 5/1993, page X).

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 description and the Claims 1 to 4 submitted during oral proceedings.

The Registrar: The Chairman:

E. Görgmaier K.J.A. Jahn