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D E C I S I O N
of 8 August 2000

Case Number: T 0433/95 - 3.3.1

Application Number: 87310460.8

Publication Number: 0271262

IPC: C10M 159/22

Language of the proceedings: EN

Title of invention:

Alkaline earth metal hydrocarbyl phenates, their sulphurised derivatives, their production and use thereof

Applicant:

LUBRIZOL ADIBIS HOLDINGS (UK) LIMITED

Opponent:

Exxon Chemical Patents Inc.

Headword:

Hydrocarbyl phenates/LUBRIZOL

Relevant legal provisions:

EPC Art. 54, 56

Keyword:

"Novelty (yes, after amendment)"
"Inventive step (yes, after amendment) - non-obvious alternative"

Decisions cited:

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Catchword:

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Case Number: T 0433/95 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 8 August 2000

Appellant:
(Proprietor of the patent) LUBRIZOL ADIBIS HOLDINGS (UK) LIMITED
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Respondent:
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 29 March 1995
revoking the European patent No. 0 271 262
pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: A. J. Nuss
Members: J. M. Jonk
R. E. Teschemacher

Summary of Facts and Submissions

The Appellant (Patentee) lodged an appeal against the decision of the Opposition Division by which the European patent No. 0 271 262 (European patent application No. 87 310 460.8) was revoked.

II. The opposition was supported by several documents including:

(1) EP-A-0 094 814, and

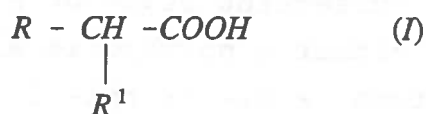
(2) EP-A-0 095 322.

III. The decision was based on the Claims 1 to 31 as granted, independent Claims 1 and 29 reading as follows:

"1. An additive concentrate suitable for incorporation into a finished lubricant oil composition, the additive concentrate comprising:

(a) a lubricating oil,

(b) a lubricating oil soluble sulphurised or non-sulphurised calcium, magnesium or barium hydrocarbyl phenate modified by reaction to incorporate from greater than 2 to less than 40% by weight based on the weight of the concentrate of either (i) at least one carboxylic acid having the formula:



wherein R is a C₁₀ to C₂₄ alkyl or alkenyl group and R¹ is hydrogen, a C₁ to C₄ alkyl group or a -CH₂-COOH group, or anhydride or ester thereof or (ii) a di- or polycarboxylic acid containing from 36 to 100 carbon atoms or an anhydride or ester thereof,

the concentrate having a TBN greater than 300 and a viscosity at 100°C of less than 1000 mm².sec⁻¹ (cSt)."

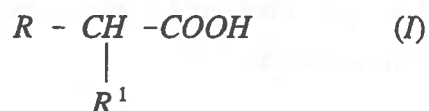
"29. A finished lubricating oil composition which composition comprises a lubricating oil and sufficient of the additive concentrate as claimed in claims 1 to 17 to provide a TBN in the range from 0.5 to 120."

IV. The Opposition Division held that in view of the cited documents the subject-matter of Claim 29 lacked novelty and the subject-matter of Claim 1 did not involve an inventive step.

V. The Appellant defended the patentability of the subject-matter of the patent in suit on the basis of the set of claims filed on 2 August 2000, whereby the above indicated Claim 29 was deleted, independent Claim 1 reading as follows:

"An additive concentrate suitable for incorporation into a finished lubricating oil which concentrate is obtainable by reacting in the presence of a catalyst at elevated temperature (A) either (i) a hydrocarbyl phenol or (ii) a hydrocarbyl phenol and sulphur, (B) a calcium, magnesium or barium base added in part to the initial reactants and the remainder in one or more portions at a subsequent stage or stages in the reaction, (C) either a polyhydric alcohol having from 2 to 4 carbon atoms, a di- or tri-(C₂ to C₄)glycol, an alkylene glycol alkyl ether or a polyalkylene glycol alkyl ether, (D) a lubricating oil, (E) carbon dioxide added subsequent to each addition of component (B), and

(F) sufficient to provide from greater than 10 to less than 40% by weight based on the weight of the concentrate of a carboxylic acid having the formula



wherein R is a C₁₀ to C₂₄ straight chain alkyl group and R¹ is hydrogen or an acid anhydride or ester thereof, the weight ratio of components (A) to (F) being such as to produce a concentrate having a TBN greater than 300 and a viscosity at 100°C of less than 1.000 mm².s⁻¹ (cSt)."

He emphasised that the additive concentrate according to present Claim 1 was essentially characterised by the incorporation of more than 10 to less than 40 wt.% of a carboxylic acid having formula (I), and that the provision of such an additive was not obvious in the light of the cited prior art.

VI. The Appellant (Patentee) requested in writing that the decision under appeal be set aside and that the patent be maintained on the basis of the set of claims submitted on 2 August 2000.

The Respondent (Opponent) informed the Board in his letter dated 2 August 2000 that he did not wish to take any further part in the appeal if the scope of the claims would not be extended beyond the scope of the set submitted with the Appellant's letter of 2 August 2000.

Both parties withdrew their request for oral proceedings in case the Board was prepared to reinstate the patent on the basis of the claims on file.

- VII. Oral proceedings were held before the Board on 8 August 2000 in the absence of the parties according to Rule 71(2) EPC.
- VIII. At the conclusion of the oral proceedings the Board's decision was pronounced.

Reasons for the Decision

1. The appeal is admissible.
2. Present Claim 1 is based on Claim 20 of the application as filed, and further supported by Claim 28 (presence of a catalyst), Claim 3 (concerning the specified alkaline earth metal bases), Claim 14 (regarding the amount of acid greater than 10 wt.%), Claim 9 (with respect to the nature of the carboxylic acid) and Claim 18 (concerning the viscosity condition) of the application as filed.

Present dependent Claims 2 to 12 are supported by Claims 2, 4, 5, 6, 7, 11, 10, 15, 16, 17 and 19, respectively, of the application as filed.

Present independent Claim 13 relating to a process for the production of the additive as claimed in present Claim 1 is based on Claim 21 of the application as filed, and further supported by the same disclosure as indicated above for present Claim 1.

Present dependent Claims 14 to 18 are supported by the Claims 22, 23, 24, 25 and 27 of the application as filed.

Present Claims 19 and 20 are supported by page 11, line 35 to page 12, line 5 of the specification of the application as filed.

Present Claim 22 corresponds to Claim 29 of the application as filed.

Moreover, the scope of the claims as granted is restricted by the introduction of the following features:

- a step-wise base addition as indicated in present independent Claims 1 and 13;
- the incorporation of the carboxylic acid in an amount from greater than 10 to less than 40% by weight; and
- the restricted definition of the carboxylic acid.

Therefore, the Board concludes that the present claims comply with the requirements of Article 123(2) and (3) EPC.

3. After examination of the cited prior art, the Board has reached the conclusion that the subject-matter of the present claims is novel. Since after the deletion of Claim 29 as granted novelty was not disputed anymore, it is not necessary to give reasons for this finding.
4. The remaining issue to be dealt with is whether the subject-matter of the present claims involves an inventive step.
 - 4.1 Article 56 EPC sets forth that an invention involves an inventive step if, having regard to the state of the art (in the sense of Article 54(2) EPC), it is not obvious to a person skilled in the art.

4.2 For deciding whether or not a claimed invention meets this criterion, the Boards of Appeal consistently apply the problem and solution approach, which consists essentially in (a) identifying the closest prior art, (b) assessing the technical results (or effects) achieved by the claimed invention when compared with the closest state of the art established, (c) defining the technical problem to be solved as the object of the invention to achieve these results, and (d) examining whether or not a skilled person starting from the closest prior art **would** arrive at something falling within Claim 1 by following the suggestions made in the prior art in the sense of Article 54(2) EPC.

If the technical results of the invention provide some improvement over the closest prior art, the problem can be seen as providing such improvement, provided this improvement necessarily results from the claimed features for all that is claimed. If, however, there is no improvement, but the means of implementation are different, the technical problem can be defined as the provision of an alternative to the closest prior art.

4.3 In the present case, the Board considers - in agreement with the submissions of both parties - that the closest state of the art is document (2).

This document discloses in the Board's judgment - in conformity with the point of view of both parties to these proceedings - additive concentrates suitable for incorporation into a finished oil composition corresponding to those as claimed in the patent in suit, except that they preferably comprise a small amount, suitably up to 2% by weight, of an acid, which

may be either a mineral acid or an organic acid, in order to enhance the ability of the additives to minimise emulsion formation in water (see page 8, third paragraph).

- 4.4 According to the patent in suit the technical problem to be solved was the provision of additive concentrates on the basis of overbased alkyl phenates suitable for incorporation into a finished oil composition having a TBN of greater than 300 and an acceptable viscosity, namely a viscosity at 100°C of less than 1000 cSt (see in particular page 4, lines 8 to 10, and page 4, line 52 to page 5, line 10).

However, in view of document (2), in particular Examples 10, 11 and 12 disclosing additive concentrates on the basis of overbased alkyl phenates having TBN's of 320, 352 and 357 respectively and viscosities of 669, 438 and 357 cSt respectively, this problem has already been solved.

Therefore, in the Board's judgment, the technical problem underlying the patent in suit in the light of the closest state of the art can only be seen in the provision of alternative additive concentrates having comparable properties concerning TBN and viscosity.

- 4.5 The patent in suit suggests as the solution to this problem, an additive concentrate according to Claim 1 which is characterised by the incorporation of more than 10 to less than 40% by weight of a carboxylic acid having formula (I) as defined in the claim.

- 4.6 In view of the technical information of the patent in suit, in particular Examples 1, 3, 5, 6, 14 to 17 and Example 4 (comparative example) showing that the incorporation of stearic acid in an amount of 9.8% by weight provided an additive concentrate having an

undesirable high viscosity, the Board considers it plausible that the technical problem as defined above has been solved. Actually, the Respondent did not contest the Appellant's submissions in this respect.

4.7 In assessing inventive step, the next question thus is whether a skilled person starting from document (2) and by following the suggestions made in the cited prior art as a whole, when trying to solve the technical problem indicated above, would arrive at something falling within Claim 1 of the patent in suit.

4.8 Document (2) discloses - as indicated above under point 4.3 - additive concentrates suitable for incorporation into a finished oil composition corresponding to those as claimed in the patent in suit, except that they preferably comprise a small amount, suitably up to 2% by weight, of an acid, which may be either a mineral acid or an organic acid, in order to enhance the ability of the additives to minimise emulsion formation in water (see page 8, third paragraph). Moreover, the skilled reader would derive from the examples in this document that the use of lower carboxylic acids, in particular glacial acetic acid, is apparently preferred (see Example 14 in comparison with Example 13 showing that the use of stearic acid not only gives a reduced improvement concerning the undesired emulsion forming with water, but also raises the viscosity). Therefore, this document (2) does not give any pointer to the skilled person that the technical problem underlying the patent in suit as defined above could be solved in accordance with present Claim 1 involving - as indicated above - the incorporation in the additive concentrate of more than 10 to less than 40% by weight of a carboxylic acid having formula (I) as defined in the claim.

4.9 Document (1), like document (2), also relates to additive concentrates suitable for incorporation into a finished oil composition on the basis of overbased hydrocarbyl phenates (see page 4, lines 8 to 21). Moreover, it discloses that certain carboxylic acids having a long, straight hydrocarbyl segment improve the properties of lubricating oil compositions containing overbased hydrocarbyl phenates by reducing their tendency to sedimentation and foaming and by reducing their viscosity when employed in relative small amounts (see page 1, lines 12 to 17, and page 4, second paragraph). In this context, it teaches in particular that the acids are used in amounts of from 0.1 to 10% by weight based on the weight of the additive concentrate, preferably from 2 to 6% by weight (see page 9, first and second paragraph). Therefore, the skilled person having regard to the teaching of this document would not have any reason to modify the additive concentrates of document (2) by incorporating carboxylic acids as used in accordance with document (1) in an amount of more than 10% by weight.

4.10 In conclusion, the Board finds that the composition according to present Claim 1 involves an inventive step in the sense of Article 56 EPC.

Since the present independent Claim 13 concerns a process for the production of the additive concentrates as claimed in Claim 1 involving the same inventive concept, and because Claims 2 to 12 and 14 to 22 (to be renumbered into 21) relate to particular embodiments of the subject-matter of Claims 1 and 13 respectively, they are also allowable.

Order

For these reasons it is decided that:

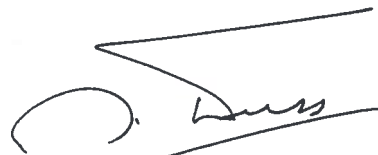
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to maintain the patent with Claims 1 to 22 submitted with the Appellant's letter dated 2 August 2000 and a description yet to be adapted.

The Registrar:



N. Maslin

The Chairman:



A. Nuss