BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 623/91 - 3.3.1

Application No.: 84 901 857.7

Publication No.: 0 141 839

Title of invention: Phosphorus-containing metal salts/sulfurised phenate compositions/aromatic substituted triazoles, concentrates, and functional fluids containing same

Classification: C10M 141/10

D E C I S I O N
of 16 February 1993

Proprietor of the patent: The Lubrizol Corporation

Opponent: Exxon Chemical Patents, Inc.

Headword: Lubricants/LUBRIZOL

EPC Article 56

Keyword: "Inventive step (confirmed) - after amendment"
"Disclaimer to trade mark - allowed"
"Dual technical problem - bonus effect"

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 623/91 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 16 February 1993

Appellant : (Proprietor of the patent)
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Decision under appeal :
Decision of the Opposition Division of the European Patent Office of 10 April 1991, with written reasons posted on 18 June 1991, revoking European patent No. 0 141 839 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.W. Andrews
J.A. Stephens-Ofner

Summary of Facts and Submissions

I. European patent No. 0 141 839 in respect of European patent application No. 84 901 857.7, which was filed on 9 April 1984, was granted on the basis of thirty claims on 29 July 1987 (cf. Bulletin 87/31).

II. A notice of opposition, which was filed on 29 April 1988, requested the revocation of the patent on the grounds of insufficiency and that its subject-matter did not involve an inventive step. The opposition was supported, inter alia, by the following documents

(1) US-A-4 308 154
(2) GB-A-1 388 247, and
(5) US-A-4 188 300.

III. In a decision delivered orally on 10 April 1991, with written reasons issued on 18 June 1991, the Opposition Division revoked the patent. The Opposition Division held that, although the disclosure of the patent was sufficient, its subject-matter did not involve an inventive step. The Opposition Division concluded that the technical problem underlying the disputed patent was not to provide compositions with improved hydrolytic stability as compared with those of document (1), but to improve some property of these prior art compositions so as to give reduced copper weight loss as measured by ASTM D-2619. In the Opposition Division's view the use of additive C, which was known for its metal passivating property in lubricant compositions, for solving this problem was obvious.

IV. An appeal was lodged against this decision on 13 August 1991 with payment of the prescribed fee. In his statement

of grounds of appeal filed on 18 October 1991 and during the oral proceedings held on 16 February 1993, the Appellant submitted that the results of his ASTM D-2619 tests clearly and validly show improved hydrolytic stability. The Appellant also contended that the disclosure of document (2), in particular in Table 2, would indicate to the skilled person that the presence of a metal deactivator would not positively influence performance in the ASTM D-2619 test. In fact, this document points away from the present invention.

With respect to the statement in document (5) that the "benzotriazole forms a coating on the copper thereby protecting it from attack", the Appellant argued that the skilled reader would know that this statement was in the context of the ASTM D-130 appearance test and in relation to materials containing active sulphur. Therefore, the skilled person would not expect that an additive that gave an improved result in this test with the co-sulphurised material of document (5) to similarly give an improvement in the ASTM D-2619 hydrolytic stability test with products arising from hydrolysis of the components present in the present compositions. The Appellant also contended that, from the fact that it was known that benzotriazole acts as a metal deactivator, it cannot be concluded that it would prevent copper weight loss in the ASTM D-2619-88 hydrolytic stability test (document (8)) or that the benzotriazole coating referred to in document (5) would be effective in protecting copper under different conditions. Therefore, the unexpected improvement in hydrolytic stability was not an inevitable consequence of the known properties of benzotriazoles.

With respect to the tests submitted by the Respondent during the opposition proceedings, the Appellant alleged that these were, in effect, a measure of the thermal

stability of the zinc salts rather than their hydrolytic stability.

In response to the Respondent's criticism of the results of the Shell Four Ball EP and Wear Tests filed with the grounds of appeal, the Appellant submitted the results of further tests which he claimed demonstrated the improved extreme pressure properties obtained with lubricants and functional fluids containing the present compositions.

V. The Respondent acknowledged that ASTM D-2619 was an important test, but he contended it was directed primary to copper corrosion. Particularly since, with most of the compositions acid number change of the fluid and total acidity of water could not be determined due to the basic nature of most of the compositions. The Respondent contended that the difference between the reported results for water acidity for the known and claimed composition for compositions comprising Amoco SX-20 as base oil was insignificant. Therefore, the Respondent argued that the determination of hydrolytic stability was equivalent to determining copper corrosion. Consequently, the problem was to improve resistance to copper corrosion and the proposed solution was obvious since it made use of the known property of benzotriazoles as inhibitors of copper corrosion.

The Respondent also maintained that if Table 2 of document (2) was correctly analysed, it did not teach away from the present invention.

Although the Respondent admitted that the test used by him to determine hydrolytic stability was not a standard method, he maintained that the results were valid.

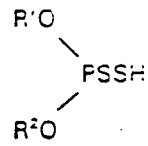
With respect to the alleged improvement in extreme pressure properties obtained by the claimed compositions, the Respondent contended that the effect had not been credibly demonstrated. Even if this effect existed, the Respondent submitted that it would be irrelevant since, if the provision of a composition to solve a particular problem was obvious, the provision of the same composition does not become patentable because an additional effect is discovered which renders the composition even more advantageous.

VI. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the documents submitted in the course of oral proceedings. Independent Claims 1, 29 and 30 of this request read as follows.

"1. A composition comprising

A. at least one metal salt of a mixture of acids comprising

(A)(I) at least one acid of Formula I



I

wherein R^1 and R^2 are the same or different and each of R^1 and R^2 is a hydrocarbon-based group, and

(A)(II) at least one aliphatic or alicyclic carboxylic acid containing from 2 to 40 carbon atoms; and

B. at least one sulfurized Group II metal phenate; characterised in that the composition additionally contains

C. a stabilizing amount of at least one triazole selected from benzotriazole and alkyl substituted

benzotriazoles containing up to 15 carbon atoms in the alkyl substituent; with the proviso that a base oil, if present, is not Amoco HX-10.

29. An additive concentrate comprising a substantially inert, normally liquid organic diluent, characterised in that the concentrate also contains the composition of any one of Claims 1-28; with the proviso that a base oil, if present, is not Amoco HX-10.

30. A lubricant or functional fluid comprising a major amount of a lubricating oil, characterised in that the fluid also contains a minor amount of the composition of any one of Claims 1-28; with the proviso that the base oil for said lubricant or functional fluid is not Amoco HX-10"."

The Respondent requested that the appeal be dismissed.

VII. At the conclusion of the oral proceedings, the Board's decision to maintain the patent on the basis of the documents submitted during oral proceedings was announced.

Reasons for the Decision

1. The appeal is admissible.

2. There are no objections to the present version of the claims. Claims 1, 29 and 30 correspond to Claim 1, 29 and 30 as filed and granted apart from the insertion of the provisos.

2.1 Table 1 of the Hydrolytic Stability Test Results (ASTM D-2619) submitted by the Appellant on 8 March 1991

demonstrate that the hydrolytic stability of compositions containing the base oil Amoco HX-10 and tolyltriazole was no better than that of the control lubricant. Therefore, these compositions do not solve the hereinafter defined technical problem.

It is clear that the effect relied upon for patentability must operate throughout the whole range of compositions being claimed and if the evidence before the Board shows that this is not the case albeit only in a minority or an extremely small proportion of instances, the compositions which do not provide the effect must be disclaimed.

By the provisos the Appellant sought to exclude a range of base oils by reference to a trademark or trade designation under which they were sold by a company who was not a party to the proceedings. Clearly, in order to satisfy the requirements of Article 84 EPC this trademark or trade designation had to refer to a unique and definitive range of base oil compositions. It was accepted by both parties that the physical parameters normally quoted for such base oils, namely sulphur content, boiling point etc. were determinative of the range of chemical composition, as indeed common sense would suggest. The Respondent argued however that it was not inconceivable and perhaps even probable that base oils having a different range of compositions and therefore physical parameters had been and would continue to be sold under self-same trademark or trade designation. During one of the many adjournments in the oral proceedings the Appellant consulted his American clients on this point and they stated that to the best of their knowledge and belief such changes in the range of chemical composition would not be likely without a corresponding change in the trade name or trademark. The Respondent's expert witness stated that, although he did not have any knowledge concerning these particular base

oils supplied by the Amoco Corporation, he did not believe this to be the case. However, the Board concluded that the Appellant's evidence on this point was more credible. It follows that the exclusion from the amended claims of the non-working base oils by reference to the above-mentioned trademark or trade designation will not introduce uncertainty and therefore offend Article 84 EPC.

3. The disputed patent relates to compositions which are useful in preparing additive concentrates and functional fluids comprising at least one metal salt of a mixture of acids comprising phosphorus acids and aliphatic or alicyclic carboxylic acids and at least one sulphurised Group II metal phenate.

Document (1), which is considered to represent the closest prior art, also discloses compositions comprising these ingredients (cf. Claim 1 in combination with Example C). These compositions were said to improve the properties of lubricants and functional fluids (cf. column 1, lines 33 to 37). However, it was found that the hydrolytic stability of these prior art compositions was not entirely satisfactory. Therefore, in the light of this closest state of the art, the technical problem underlying the disputed patent is to improve the hydrolytic stability of the compositions disclosed in document (1) (cf. also page 2, lines 47 and 48 of the disputed patent).

3.1 According to the patent in suit, this technical problem is essentially solved by the addition of a stabilising amount of at least one triazole selected from benzotriazole and alkyl substituted benzotriazoles containing up to 15 carbon atoms in the alkyl substituent.

3.2 To demonstrate that the solution proposed in the patent in suit solved this technical problem, the Appellant

submitted on 8 March 1991 the results of tests in which compositions of the disputed patent and of document (1) were subjected to the hydrolytic stability test designated as ASTM D-2619-88. According to paragraph 4.1 of the published standard, the method was designed to differentiate the relative stability of hydraulic fluids in the presence of water under conditions of the test. It is important that hydraulic fluids are hydrolytically stable since unstable ones form acidic and insoluble contaminants which can cause hydraulic system malfunctions due to corrosion, valve sticking, or change in viscosity of the fluid.

The results obtained (cf. Tables I and II filed on 8 March 1991) using this standard method demonstrate the compositions according to the current claims have improved hydrolytic stability as compared with those of document (1).

3.3 Therefore, in the Board's judgment, these results, which were obtained by an industry-standard test method for assessing hydrolytic stability of fluids, renders it plausible that the above-defined technical problem has been solved.

3.4 On 11 March 1991, the Respondent submitted test results which were intended to demonstrate that the technical problem underlying the disputed patent had not been solved. This qualitative test, which, as the Respondent admitted during the oral proceedings, is an in-house screening test, relies on the detection of hydrogen sulphide formation as an indication of hydrolytic stability. During oral proceedings before the Opposition Division, the Appellant submitted the results of tests carried out according to the Respondent's procedure. These results were in complete contradiction to those of the

Respondent. In these circumstances, and since the test is a non-standard qualitative test, the Board considers that the Respondent's results cannot serve to demonstrate that the above-defined technical problem has not been solved.

3.5 With his grounds of appeal and during the course of oral proceedings, the Appellant submitted the results of experiments in which a composition of the disputed patent and one of document (1) were subjected to the Shell Four Ball EP and Wear Test. This test is designed to measure the protection a lubricant affords under conditions of high unit pressure and moderate sliding velocities and is used to evaluate the extreme pressure, anti-wear and anti-weld properties of lubricants and hydraulic fluids.

The results submitted with the grounds of appeal cannot be taken into consideration in any determination of the technical problem underlying the disputed patent since the composition alleged to be in accordance with the patent in suit differed from that of document (1) not only in that it contained tolyltriazole, but also in that it included the Mannich base prepared from tolyltriazole, formaldehyde and di-2-ethylhexylamine in a 1:1:1 molar ratio. Thus, the tested compositions fell outside the scope of the present claims.

Although the composition according to the disputed patent used in the tests, the results of which were submitted during oral proceedings, are not open to the above criticism, the Respondent maintained that the mere indication of small difference in scar diameters without any indication of the weld point did not demonstrate the superior extreme pressure properties of the claimed compositions. Since the Board from its own knowledge is not able to resolve this dispute and in view of the fact that it found the proposed solution to the technical problem of improving the hydrolytic stability of the compositions of document (1) inventive, the Board has

decided not to take into consideration the additional problem of improving the extreme pressure properties of these known compositions.

3.6 If the proven solution involves overcoming a dual problem, that is to say a problem having two distinct technical aspects of similar importance, it cannot validly be argued that if the solution of one part of that problem is obvious, this in itself renders the solution of the second part, and therefore the entire solution, obvious as well. Such an approach, relying upon what has become known as the "bonus effect", has no sound basis in the Board's jurisprudence including the decision of the Technical Board of Appeal in case T 192/82, upon which the Opponent had relied during the oral proceedings, for that case had to deal with a special circumstance of selection. Furthermore, that case clearly does not exclude the patentability of compositions containing ingredients that lead to some expected improvements if these ingredients also result in an additional effect, provided that the achievement of this effect is not obvious, see paragraph 16 of the Reasons. Accordingly the Opponent's legal submission under this heading must stand rejected.

4. After examination of the cited prior art, the Board finds that the claimed subject-matter is novel. Since novelty was not in dispute, it is not necessary to give detailed reasons for this finding.

5. It still remains to be decided whether the claimed subject-matter involves an inventive step.

5.1 As previously mentioned, Example C of document (1) discloses a composition comprising the present ingredients (A) and (B). This document also teaches that the mixed metal salts, component (A), function in lubricants and

functional fluids as anti-oxidants and extreme pressure agents having improved thermal stability as compared with ordinary phosphorodithoic acid salts (cf. column 4, lines 19 to 24). Although this document indicates that additives, such as detergents and dispersants of the ash-producing or ashless type, corrosion and auxiliary oxidation inhibiting agents, pour point depressing agents, auxiliary extreme pressure agents, colour stabilisers and anti-foam agents, may be used in combination with the mixed metal salts, it does not provide any teaching pointing towards the proposed solution to the problem of improving their hydrolytic stability (cf. column 6, line 1 to column 8, line 34).

5.2 It is known, for example, from Encyclopedia of Chemical Technology, Kirk Othmer, Third Edition, page 136, that benzotriazole and tolyltriazole inhibit copper corrosion. Although it is believed that these compounds operate through chemisorption, it appears that a single compound may utilise different mechanisms to be effective.

Furthermore, document (5) discloses a lubricant additive comprising a cosulphurised blend of a lard oil having a low fatty acid content and an olefin which contains chemically combined therewith 5 to 25% by weight of sulphur (cf. Claim 1). According to column 3, lines 12 to 19 of this document, the copper strip test rating of the cosulphurised product may be improved by the addition of minor amounts of suitable benzotriazoles which protect the copper from attack by forming a coating thereon.

The copper strip rating is determined by ASTM D-130 (cf. column 3, line 39 to 40) which is designed to assess the relative degree of corrosivity of the sulphur compounds contained in a petroleum product. The test is carried out by immersing a polished copper strip in a given quantity

of sample, heating at a temperature and for a time characteristic of the material and comparing the copper strip after it has been washed and dried with the ASTM Copper Strip Corrosion Standards. In this test, in contrast to the above-mentioned hydrolytic stability test, it is emphasised that any contact of the copper strip with water, before, during or after completion of the test run must be avoided.

In the Board's judgment, the skilled person, although aware of the copper corrosion inhibiting properties of benzotriazoles and their ability to form a protective layer on copper under the conditions of the Copper Strip Tarnish Test ASTM D-130, would not conclude that the same products would give improved results in the Hydrolytic Stability Test, ASTM D-2619, since he would not be in a position to know whether the benzotriazoles would maintain their ability to form a layer on copper by chemisorption under the conditions employed in this test.

Therefore, even though the improved hydrolytic stability is demonstrated by a decrease in copper weight loss, the proposed solution to the technical problem underlying the patent in suit is not obvious in the light of the skilled person's common general knowledge of the copper corrosion inhibiting properties of benzotriazoles or of the disclosure of document (5).

5.3 Document (2) discloses a hydraulic fluid comprising a base oil of lubricating viscosity and containing from 0.1 to 1.5% by weight of zinc di(primary isooctyl) dithiophosphate; from 0.03 to 0.2 parts by weight of a C_{6-24} alkenylsuccinic acid per weight of said zinc salt; and from 0.01 to 1 part of a metal deactivator per part of said zinc dithiophosphate when the latter is present in a concentration equal to or above 1% by weight (cf.

Claim 1). Suitable metal deactivators include triaryl or trialkyl phosphates, aryl or alkyl phosphites, alkylphenol sulphides, phosphorus pentasulphide-terpene addition products, benzotriazole, phenothiazine, bis(octyldithio)thiadiazole, phenyl-1-naphthylamine and combinations thereof (cf. page 2, lines 79 to 89).

This document is also concerned with the problem of hydrolytic stability of hydraulic fluids. According to this document, the use of the alkenylsuccinic acid with the particular zinc dithiophosphate reduces the corrosion by 10 to 40 fold under strong hydrolysing conditions (as determined by ASTM D-2619-67) over that of the zinc di(isooctyl) dithiophosphate alone or even over the combination of alkenylsuccinic acid with zinc di(n-octyl) dithiophosphate (cf. page 1, lines 61 to 65 and page 2, lines 16 to 24). From the details relating to the ASTM D-2619-67 test given in this document (cf. page 3, lines 25 to 39), it is clear that this test procedure is the same as that described in document (8).

From the teaching of this document, particularly Table 2, the skilled person would conclude that the problem of improving hydrolytic stability of hydraulic fluids is solved by the combination of a specific zinc dialkyldithiophosphate and an alkenylsuccinic acid.

In order to determine whether the metal deactivator makes any contribution at all to the enhanced hydrolytic stability of these compositions, the skilled person would examine Table 2 of this document.

Thus, from a detailed study of the results of the Hydrolytic Stability Test, ASTM, D-2619-67, in this Table, the skilled person would consider that, if the metal deactivator plays any role at all in enhancing hydrolytic

stability, it only does so in those compositions which contain the specific zinc dialkyldithiophosphate and 0.03 to 0.2 parts by weight of the alkenylsuccinic acid per weight part of said zinc dialkyldithiophosphate (cf. Formulations 6 to 9 and 12). A comparison of the results obtained with Formulation (1) (2.3 mg/cm^2 copper weight loss) with that of Formulation 10 (2.5 mg/cm^2 copper weight loss) which differs from Formulation 1 in that besides a different base oil, it also contains 0.06% of tetrapropenylsuccinic acid and 0.05% of tricresyl phosphate, would not suggest that the addition of a metal passivator has any influence on performance in the hydrolytic stability test ASTM 2619-67. Similarly, a comparison of the result for Formulation 5 (0.24 mg/cm^2 copper weight loss), with that of Formulation 15 (2.06 mg/cm^2 copper weight loss), which differs from Formulation 5 in that it contains 0.05 tricresyl phosphate but no tetrapropenylsuccinic acid, would not lead the skilled person to conclude that the metal passivator has any effect on hydrolytic stability.

Therefore, the disclosure of this document alone or combined with the skilled person's general knowledge concerning the known properties of benzotriazoles would not provide the skilled person with any incentive to add benzoztriazoles to the compositions of document (1) in the expectation of improving their hydrolytic stability.

6. Thus, in the Board's judgment, the proposed solution to the technical problem underlying the disputed patent is inventive. Consequently, the subject-matter of independent Claims 1, 29 and 30 involve an inventive step. Claims 2 to 28, which relate to preferred embodiments of the compositions according to Claim 1 are also allowable.

7. At the outset of the oral proceedings, the Appellant reiterated his earlier written objection to the late filing by the Respondent of his response to the Statement of Grounds of Appeal. In those written submissions he had specifically requested the postponement of the oral proceedings, or a ruling that the points raised in the response were inadmissible. In answer to the question put by the Board the Appellant admitted, however, that the issues raised in the response were not new and were but amplifications or further developments of those already in the appeal. Indeed, the Appellant was able to submit evidence in reply to some of the points raised in the response. Although, it is stated that this evidence had to be compiled in great haste and, as it turned out, was open to some degree of technical criticism.

The Respondent was able to give an entirely satisfactory explanation for his tardiness which, the Board accepts, was not motivated by any reprehensible desire to spring a surprise on the Appellant. In view of the above, all matters put forward by both parties were admitted into the appeal and the Appellant did not, in the end, pursue his earlier request for an award of costs against the Respondent. The Board would nevertheless wish to observe that timely and complete presentation of each party's case is not only highly desirable in the interest of streamlining proceedings, but is now clearly supported by the jurisprudence of the Boards.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of Claims 1 to 30 submitted in the course of oral proceedings, and the description also submitted in the course of oral proceedings.

The Registrar: The Chairman:

E. Görgmaier K.J.A. Jahn

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