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Aktenzeichen / Case Number / N<sup>o</sup> du recours : T 4/89 - 3.3.1  
Anmeldenummer / Filing No / N<sup>o</sup> de la demande : 84 100 905.3  
Veröffentlichungs-Nr. / Publication No / N<sup>o</sup> de la publication : 0 123 023

Bezeichnung der Erfindung: Aqueous composition and method of providing same  
Title of invention:  
Titre de l'invention :

Klassifikation / Classification / Classement : C08G 59/40

**ENTSCHEIDUNG / DECISION**  
vom / of / du 25 October 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet : Desoto Inc.

Einsprechender / Opponent / Opposant : BASF Lacke + Farbe AG

Stichwort / Headword / Référence : Composition/Desoto

EPÜ / EPC / CBE Article 56

Schlagwort / Keyword / Mot clé : "Inventive step (confirmed) - after amendment  
of claim"

**Leitsatz / Headnote / Sommaire**



Case Number : T 4 /89 - 3.3.1

DECISION  
of the Technical Board of Appeal 3.3.1  
of 25 October 1989

Appellant : Desoto Inc.  
(Proprietor of the patent) 1700 South Mt.  
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Des Plaines, Illinois 60018 (US)

Representative : Reitzner, Bruno, Dr. et al.,  
Patentanwälte Dipl.-Ing. R. Splanemann  
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Respondent : BASF Lacke + Farbe AG  
(Opponent) Max-Winkelmann-Strasse 80  
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Representative :

Decision under appeal : Decision of Opposition Division of the European Patent  
Office of 8 September 1988, posted on 28 October 1988,  
revoking European patent No. 0 123 023 pursuant to  
Article 102(1) EPC.

Composition of the Board :

Chairman : K.J.A. Jahn

Members : R.W. Andrews

J. Stephens-Ofner

## Summary of Facts and Submissions

- I. The mention of the grant of European patent No. 0 123 023 in respect of European patent application No. 84 100 905.3 filed on 28 January 1984 and claiming priority of 21 March 1983 from a prior application in the United States of America, was announced on 23 July 1986 (cf. Bulletin 86/30).
- II. On 22 April 1987 a notice of opposition was filed requesting the revocation of the European patent on the ground that its subject-matter did not involve an inventive step. During the opposition proceedings the Opponent cited, inter alia, the following documents:
- (2) US-A-3 925 180
  - (4) DE-A-2 265 195 and
  - (5) EP-A-0 051 297.
- III. By a decision delivered orally on 8 September 1988, with written reasons posted on 28 October 1988, the Opposition Division revoked the European patent. The Opposition Division concluded that the only difference between the compositions of the disputed patent and those disclosed in document (5) lay in the choice of the secondary amine employed. The Opposition Division considered that replacing diethanolamine exemplified in document (5) by a secondary amine containing ketimino groups did not lead to any unexpected improvement in the composition. The choice of the ketimino containing secondary amine was obvious, since it is a commercially available product (cf. "Handbook of Epoxy Resins", Lee and Neville, pages 7-25 and 7-26, 1967 (6); and document (2)) and its use in other epoxy-amine aqueous coating compositions is disclosed in document (4).

- IV. An appeal was lodged against this decision on 28 December 1988 with payment of the prescribed fee. A Statement of Grounds of Appeal and amended Claims 1 to 12 were filed on 28 February 1989.

In his statement the Appellant argued that in order to provide coatings that are hard, flexible and chemically resistant it was necessary to use cresol-formaldehyde resins. However, in systems containing these resins it was found that the fine and uniform particle size needed for good roll-coating could not be achieved using epoxy resins derived from hydroxy-functional secondary amines known from document (5). The Appellant has contended that the skilled chemist would not consider replacing hydroxy-amines by ketimine-blocked secondary amines since the chemistry involved in the cure is quite different.

The Appellant also submitted that the teachings of documents (2), (4) and (6) cannot properly be applied since they are neither related to the problem to be solved by the present invention, nor to the chemistry involved therein.

- V. The Appellant requested that the decision under appeal be set aside and that a patent be maintained on the basis of Claims 1 to 12 filed on 28 February 1989. Claim 1 of this amended statement of claim reads as follows:

"An aqueous coating composition adapted to thermoset on baking comprising, water having dispersed therein diglycidyl ether of a bisphenol having a 1,2-epoxy equivalency of at least 1.2 and an average molecular weight of from 2000 to 5000, adducted with a stoichiometric proportion, based on epoxy and secondary amine, of diprimary amine having a single secondary amine group and

each primary amine group blocked by a ketimine group, at least 50% of the amine groups of said adduct being protenated with a volatile acid, said ketimine groups being hydrolyzed in the aqueous medium to provide primary amine groups therein, and from 20% to 50%, based on total resin solids, of water insoluble, heat-hardening cresol-formaldehyde resin curing agent",

Claims 2 to 10 relate to preferred compositions in accordance with Claim 1. Claims 11 and 12 relate to methods of providing aqueous compositions.

The Respondent has neither replied to the Statement of Grounds of Appeal nor filed any requests in respect of the appeal.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. There are no formal objections under Article 123 EPC to the present claims since they are supported by the original disclosure and do not extend the scope of protection conferred.

The replacement of the expression "phenol-formaldehyde" in granted Claims 1 and 11 by "cresol-formaldehyde" is justified by the disclosure on page 2, line 11 of the published patent application (cf. also column 1, lines 53 to 54 of the printed patent specification). Amendments to Claims 5 and 7, which are a consequence of the amendment to Claim 1, and the change in the dependency of Claim 5 are also allowable.

3. The patent in suit relates to thermosetting aqueous coating compositions containing epoxy resins and phenoplast curing agents. Such compositions are known from document (5). This document, which is considered to represent the closest prior art, discloses compositions comprising epoxy resins based on, for example bisphenol A and epihalohydrins, having molecular weight between 300 and 30 000 secondary amines, in particular alkylalkanolamines and dialkanolamines, inorganic or monocarboxylic acids and phenolic resins in the form of methylol compounds of substituted polyphenol compounds based on combinations of optionally substituted phenols and formaldehyde (cf. Claim 1 in combination with page,5, lines 1 to 13 and page 8, lines 15 to 22). These compositions are suitable for roll-coating application and yield, after stoving, deformable, sterilisable coatings which may be used as internal coatings for food containers, since they do not impart any taste to the contents thereof (cf. page 4, lines 15 to 17, page 10, line 15, page 13, lines 3 to 6, page 14, lines 25 to 31 and page 17, lines 2 to 7).
- 3.1. In the light of this closest prior art the technical problem underlying the disputed patent may be seen in providing further thermosetting aqueous coating compositions which are suitable for application by roll coating and which yield hard, flexible, sterilisable and solvent-resistant coatings. In addition, if the coatings are applied to the interior of food or beverage containers, they should not affect the taste of their contents.
- 3.2. According to the patent in suit this problem is essentially solved by compositions comprising adducts of epoxy resins with an average molecular weight of between 2 000 to 5 000 with secondary amines having two ketimino groups in which at least 50% of the amino groups are protonated with volatile acids and from 20 to 50%, based on total

resin solids, of water-insoluble, heat-hardening cresol-formaldehyde resin curing agents.

In the light of the Example, the Board is satisfied that this technical problem has been plausibly solved.

4. After examination of the cited documents, the Board has reached the conclusion that the subject-matter of the disputed patent is novel. Since novelty is not in dispute it is not necessary to consider this matter in detail.
5. It still remains to be examined whether the requirement of inventive step is met by the claimed subject-matter.
  - 5.1. According to document (5) the phenolic resins are methylol compounds which, in the case of dispersions contain alkyl, alkenyl, aryl and/or aralkyl groups as substituents and, in the case of colloidal solutions, contain hydrophilic groups such as hydroxyalkyl groups (cf. page 5, lines 16 to 27). If these substituents are introduced into the condensation product obtained by reacting phenol and formaldehyde in the presence of protonic or Lewis acids, i.e. a novolak, the alkyl groups preferably contain 4 to 12 carbon atoms (cf. page 6, lines 14 to 19). Alternatively, substituted novolaks may be prepared by the co-condensation of phenol and substituted phenols with formaldehyde. Suitable alkylphenols are preferably p-alkylphenols, such as p-propyl- and isopropyl-phenol, p-tert.-butylphenol, p-octyl- and isooctylphenol, p-nonyl- and isononylphenol and p-dodecylphenol (cf. the paragraph bridging pages 6 and 7).

Thus, there is no teaching in this document that would direct the skilled person's attention to cresol-formaldehyde resins or that part of the solution to the

technical problem lay in their selection as the phenoplast curing agents.

- 5.2. The other components of the compositions of document (5) are the salts obtained by treating the reaction products obtained from epoxy resins based on diphenylolalkanes and epihalohydrins and secondary amines with inorganic or monocarboxylic acids (cf. Claim 1). According to this document suitable secondary amines are alkyl-alkanolamines and dialkylalkanolamines or the lower alkyl ethers thereof, or highly basic amines such as dimethylamine, diethylamine or dipropylamine (cf. page 8, lines 15 to 22).

Thus, if the secondary amines specifically mentioned in this document contain any additional functional groups, these are hydroxy or lower alkoxy groups. This document is wholly silent with respect to secondary amines having primary amino groups as additional functional groups or to secondary amines containing two protected primary amino groups. Therefore, the skilled person could not deduce from the teaching of this document that, if a cresol-formaldehyde resin curing agent is employed, it is necessary to adduct the epoxy resin with a diprimary amine having a single secondary amine in which each primary amino group is protected by a ketimino group in order to solve the problem underlying the patent in suit.

- 5.3. Document (2) discloses an electrodepositable composition comprising an aqueous dispersion of an acid-solubilised polyamino-containing resin and a pigment paste containing a partially neutralised adduct resulting from the reaction of a fatty glycidyl ether or ester and a secondary amine or tertiary amine salt with a pigment dispersed therein (cf. Claim 1). According to the sentence bridging columns 1 and 2 of this document, the diketimino deriv-



ative prepared from one mole of diethylenetriamine and two moles of methyl isobutyl ketone, which is a commercially available product, is suitable for reacting with the glycidyl compound to form the basic nitrogen adduct. However, this document is not concerned with chemically resistant coating compositions and would not provide the skilled person with any teaching relevant to the solution of the above-defined technical problem.

- 5.4. Document (4) is also concerned with electrodepositable aqueous compositions. These compositions comprise resins containing amino and hydroxy groups in which the amino groups have been neutralised by acids. The resin, which may be cured by urethane crosslinking, is obtained from an epoxide and a polyamine having primary amino groups protected by ketimino groups and at least one secondary amino group (cf. Claim 1).

The subject-matter of this document is also not relevant to the technical problem underlying the disputed patent and, therefore, would not assist the skilled person in his search for a solution to this problem.

- 5.7. Document (6) discloses that ketimines are useful semi-latent curing agents for epoxy resins. However, the very general teaching of this document would not provide the skilled person with any incentive to use such curing agents in aqueous coating compositions containing cresol-formaldehyde resins.
6. In the Board's judgment, the proposed solution to the technical problem of providing further thermosetting aqueous coating compositions which are suitable for application by roll coating and which yield hard, flexible, sterilisable and solvent resistant coatings is inventive.

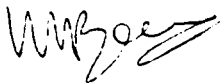
Therefore, the subject-matter of Claims 1 and 11 involves an inventive step. Dependent Claims 2 to 10 and 12, which relate to preferred embodiments of Claims 1 and 11 respectively, derive their patentability from these claims.

**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 12 filed on 28 February 1989, with a description to be brought into agreement with these amended claims.

The Registrar:



M. Beer

The Chairman:



K. Jahn