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

Case Number: T 0657/90 - 3.3.1

Application Number: 84400012.5

Publication Number: 0148648

IPC: C07C 45/86

Language of the proceedings: EN

Title of invention:
A method for stabilizing aliphatic higher aldehyde compounds

Patentee:
Shin-Etsu Chemical Co., Ltd.

Opponent:
Ruhrchemie AG

Headword:
Stabilization of aldehydes/SHIN-ETSU

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (yes; after amendment)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0657/90 - 3.3.1

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

Appellant: (Proprietor of the patent)
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Representative:
-

Decision under appeal:
Decision of the Opposition Division of the European Patent Office dated 13 June 1990 revoking European patent No. 0 148 648 pursuant to Article 102(1) EPC.

Composition of the Board:

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

Summary of Facts and Submissions

I. The grant of European patent No. 0 148 648 in respect of European patent application No. 84 400 012.5 was announced on 22 July 1987 (cf. Bulletin 87/30).

II. A notice of opposition was filed on 20 April 1988 by Ruhrchemie AG (now Hoechst AG - Werk Ruhrchemie) requesting the revocation of the patent on the grounds of lack of novelty, lack of inventive step and lack of sufficiency of disclosure. The opposition was supported by the following four documents:

(1) DE-C-2 917 789,
(2) US-A-2 115 473,
(3) FR-A-851 775, and
(4) FR-A-855 144.

III. By a decision issued on 13 June 1990 the Opposition Division revoked the patent on the ground that the subject-matter of the claims did not involve an inventive step. The decision was based on Claims 1 to 6 filed on 25 January 1989, Claim 1 reading as follows:

"A method for the stabilization of an aliphatic higher aldehyde compound having an activity as a sex pheromone compounds of insects which comprises admixing said aldehyde compound with a stabilizer compound selected from the group consisting of tertiary amine compounds, benzophenone compounds selected from the group consisting of 2,4-dihydroxybenzophenone and 2-hydroxy-4-octyloxy benzophenone, benzotriazole compounds selected from the group consisting of 2-(2'-hydroxy-5'-methylphenyl) benzotriazole and 2-(2'-hydroxy-3'-tert-butyl-5'-methylphenyl) benzotriazole, the amount of the

stabilizer compound being in the range from 0.01 to 10 % by weight based on the aldehyde compound."

Dependent Claims 2 to 6 concerned further embodiments of the process of Claim 1.

The Opposition Division held that the subject-matter of Claim 1 did not involve an inventive step in the light of the disclosure of document (1). Documents (2) to (4) were considered as less relevant.

IV. An appeal was lodged against this decision on 7 August 1990 by the Patentee, and the appeal fee was paid on the same date.

A Statement of Grounds of appeal was submitted on 8 October 1990.

V. Together with the Statement of Grounds of appeal the Appellant filed new Claims 1 to 5, Claim 1 reading as follows:

"A method for the stabilization of an aliphatic higher aldehyde compound which comprises admixing the aldehyde compound with a stabilizer compound which is a combination of a benzophenone compound and of a tertiary amine compound selected from the group consisting of triethylamine, pyridine, quinoline, nicotinic acid amide and tocopherol nicotinate, the amount of the stabilizer compound being in the range from 0.01 to 10 % by weight based on the aldehyde compound."

The Appellant argued that the cited prior art did not disclose the use of a stabilisation agent as claimed in present Claim 1. Document (1) only disclosed the stabilisation of aldehydes by means of a tertiary amine and documents (2) to (4) were - as stated in the

decision under appeal - less relevant. Moreover, he submitted that the use of the claimed stabilisation agents provided a surprising improvement of the stabilising effect.

VI. The Appellant (Patentee) requested that the decision under appeal be set aside, and that the patent be maintained on the basis of the Claims 1 to 5 submitted on 8 October 1990.

The Respondent (Opponent) communicated by a letter filed on 21 February 1991 that, for the time being, he did not intend to reply. After that, no further reply was received.

Reasons for the Decision

1. *Admissibility*

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

2. *Amendments under Article 123 EPC*

Claim 1 as amended is based on granted Claims 1, 3 and 6 in combination with page 3, lines 4 to 5 and 15 to 20 of the specification of the disputed patent, and is also supported by Claims 1, 2, 4 and 9 in combination with page 3, line 22 to page 4, line 1, page 4, lines 20 to 23 and page 5, line 26 to page 6, line 2, of the patent application as filed.

Present Claims 2 to 5 correspond to Claims 4 and 7 to 9 as granted, and are supported by Claims 6 and 10 to 12 of the originally filed patent application.

Thus, all claims filed by the Appellant on 8 October 1990 comply with the requirements of Article 123 EPC.

3. *Novelty*

After examination of the cited prior art, the Board has reached the conclusion that the subject-matter as defined in all of the claims is novel because none of the cited documents discloses the use of the stabilisation agent as defined in Claim 1.

4. *Inventive step*

4.1 Closest state of the art

The Board considers that document (1) represents the closest state of the art. It discloses a process for the stabilisation of saturated aliphatic aldehydes containing 3 to 14 carbon atoms by the addition of a tertiary amine, namely triethanolamine or dimethylethanolamine (cf. the claim and page 1, lines 11 to 52). The stabilisation agent can be used in an amount of 10 to 100 ppm based on the aldehyde compound (cf. page 1, lines 60 to 65).

4.2 The problem and its solution

4.2.1 The Appellant argued that by the use of a tertiary amine the stabilisation of higher aldehydes under atmospheric (outdoor) conditions, i.e. under influence of ultraviolet light, is not satisfactorily achieved (see also printed patent specification page 2, lines 30 to 42).

4.2.2 Therefore, in the Board's judgment, the technical problem underlying the disputed patent, in the light of the closest state of the art as represented by document

(1), is the provision of a method for the stabilisation of an aliphatic higher aldehyde whereby under atmospheric conditions, i.e. under ultraviolet light, an improved stabilisation is achieved (cf. also page 2, lines 8 to 44 of the disputed patent).

4.2.3 According to Claim 1 (as amended) of the patent in suit, this technical problem is solved by using a stabilisation agent which is a combination of a benzophenone compound and of a tertiary amine compound selected from the group consisting of triethylamine, pyridine, quinoline, nicotinic acid amide and tocopherol nicotinate.

4.2.4 The Board considers it plausible that the technical problem as defined above has been solved. This has never been disputed.

4.3 Inventiveness of the solution of the technical problem

4.3.1 As indicated above, document (1) representing the closest state of the art discloses all the technical features of the claimed process, save the use of the particular stabilisation agent as defined in present Claim 1. Thus the question is whether, in the light of the cited prior art, the use of this stabilisation agent involves an inventive step.

4.3.2 As indicated above, document (1) - like the claimed process of the disputed patent - is related to a process for stabilising aliphatic aldehydes, including higher ones having up to 14 carbon atoms. It discloses that by using triethanolamine or diethanolamine as stabilisation agent, instead of the prior art agent diphenylamine, the autoxidation and the forming of trimers can be reduced and, consequently, the stabilisation of the aldehydes can be improved (cf. page 1, lines 41 to 49). Both

amines are not encompassed by the claims of the disputed patent.

Documents (2) and (3) both concern the stabilisation of oxidisable organic substances, such as fatty oils, soaps, petroleum derivatives or aldehydes, and particularly of rubber (cf. (2), page 1, left-hand column line 55 to right-hand column, line 26, and (3), page 1, lines 7 to 30). According to document (2) the materials are stabilised by using compounds which contain a secondary amino group and a tertiary amino group, particularly a monoarylamino and a dialkylamino group, attached to a single aromatic ring (cf. Claims 1 to 3). A typical member of this class of compounds is p-dimethylamino diphenylamine (cf. Claims 4 and 5). Document (3) discloses stabilisation agents of the aromatic diamine type having a characteristic alkylarylamino (instead of a dialkylamino) group (cf. page 1, lines 31 to 43). A typical example of these stabilisation agents is N-methyl N,N'-diphenyl p-phenylenediamine (cf. page 2, lines 59 to 63 and the Table on page 3). Again, these amines are not covered by the present claims.

Document (4) - like documents (2) and (3) - also concerns the stabilisation of organic substances including aldehydes, and particularly rubber (cf. page 1, lines 1 to 15 and page 2, line 78 to page 3, line 48). This document discloses the use of a stabilisation agent which consists of the reaction product of an aliphatic ketone and of a tertiary diarylalkylamine (cf. page 1, lines 24 to 39). Typical examples of such agents are the reaction products of acetone and N-methyl or N-ethyl diphenylamine (cf. Examples 1 and 2). They are prepared by reacting the ketone with the amine at a temperature of at least 150°, preferably between 200° and 300°, in the presence of an

acid condensation catalyst such as $FeI_2.4H_2O$ (cf. page 2, lines 25 to 43 and Examples 1 and 2). Such condensation products are also not within the scope of the present claims.

4.3.3 Thus, the prior art amines, in the Board's judgment, differ from the claimed amine components to such an extent that they do not give any suggestion to the skilled person that he should choose the few particular tertiary amine components as defined in present Claim 1. In these circumstances, the presence of an inventive step can be properly accepted on the basis of the non-obvious use of these claimed amine components, so that it makes no difference whether the additional application of the benzophenone component as an UV-stabiliser might be trivial with respect to the outdoor-aspect (cf. page 3, lines 11 to 14 of the patent in suit).

4.3.4 In conclusion, the Board finds that the process 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 by using the stabilisation agent as claimed.

Dependent Claims 2 to 5, which relate to the preferred embodiments of the process claimed in Claim 1, are also allowable for the reasons stated above.

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 5 submitted by the Appellant in his letter (telecopy) of 8 October 1990 and a description to be adapted.

The Registrar: The Chairman:

E. Görgmaier K.J.A. Jahn