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Aktenzeichen / Case Number / N^o du recours : T 345/86 - 3.3.2

Anmeldenummer / Filing No / N^o de la demande : 80 108 082.1

Veröffentlichungs-Nr. / Publication No / N^o de la publication : 0 031 566

Bezeichnung der Erfindung: Photosensitive negative - working tonable element
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement :

ENTSCHEIDUNG / DECISION

vom / of / du 17 October 1989

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

E.I. Du Pont de Nemours and Company

Einsprechender / Opponent / Opposant :

Hoechst AG

Stichwort / Headword / Référence : Photosensitive element/Du Pont

EPÜ / EPC / CBE Art. 54(2), 111(1)

Schlagwort / Keyword / Mot clé : "Novelty affirmed - no specific or implicit disclosure in the prior art" - "Remittal of the case".

Leitsatz / Headnote / Sommaire



Case Number : T 345 /86 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 17 October 1989

Appellant :
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Representative :
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Respondent :
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Representative :

Decision under appeal : Decision of Opposition Division of the European Patent
Office dated 29 July 1986 revoking European patent
No. 0 031 566 pursuant to Article 102(1) EPC.

Composition of the Board :

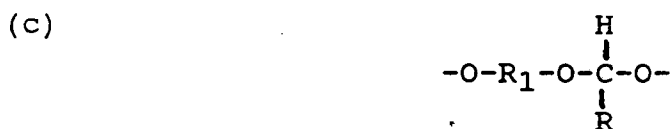
Chairman : S. Schödel
Members : F. Bauriedel
E. Persson

Summary of Facts and Submissions

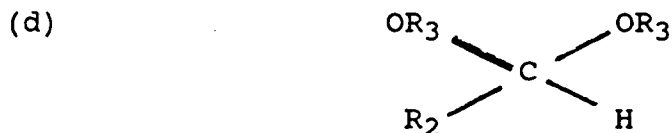
- I. European patent No. 31 566 was granted with nine claims on 14 March 1984 in response to European patent application No. 80 108 082.1 filed on 20 December 1980. Claim 1 was worded as follows:

"A photosensitive element comprising a support bearing a layer of a negative-working tonable photoimaging composition which comprises

- (a) at least one organic polymeric binder,
 (b) a photosensitizer,
 characterised in that binder (a) is at least one polymer of polyvinylformal, polyvinylpyrrolidone, polyacrylate, cellulose acetate, polymethacrylate and polyvinyl acetate; the photosensitizer (b) upon absorption of actinic radiation is capable of generating an acid; the composition, in addition, comprising at least one acetal compound taken from the group of



wherein R is hydrogen, alkyl of 1 to 18 carbon atoms, phenyl and substituted phenyl, and R₁ is taken from the group of alkylene of 2 to 12 carbon atoms and heteroalkylene of 2 to 12 carbon atoms, and



wherein R_2 is alkyl of 1 to 18 carbon atoms, furyl, substituted furyl, phenyl, substituted phenyl, naphthyl, and substituted naphthyl, R_3 is alkyl of 1 to 18 carbon atoms and OR_3 when taken together form a 5, 6 or 7 membered ring, the polymeric binder (a) being plasticized by the decomposition product of one of compound (c), compound (d) or the combination of compounds (c) and (d)."

II. Notice of opposition was filed by Hoechst AG, requesting revocation of the patent on the grounds that its subject-matter lacked novelty and did not involve an inventive step. The opposition was supported, inter alia, by document

(A) DE-B-2 718 254.

III. On 29 July 1986 the Opposition Division revoked the European patent, arguing that the subject-matter of Claim 1 lacked novelty in view of document (A), which disclosed - in different parts of the text - the support, the photosensitiser, the polyacetal, and the binder. Since there was no difference in composition between the claimed photosensitive element and the prior art material, the effects of both elements would be the same. The decomposition products of the polyacetal in document (A) would therefore plasticise the binder. Consequently, the known photosensitiser composition, although not toned, was considered to be tonable.

IV. Notice of appeal was lodged by the Patentees (Appellants) on 26 September 1986. The appeal fee was paid on the same day.

A Statement of Grounds was submitted in due time together with a new set of Claims 1-7, followed by further proposals for amendments. In a communication dated 22 August 1989 pursuant to Article 110(2) EPC, the Board raised objections to these claims under Article 123(3) EPC.

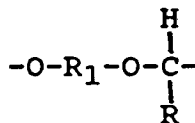
During oral proceedings before the Board on 17 October 1989 the Appellants presented finally a new main request and also an auxiliary request, each consisting of six claims.

Claim 1 of the main request reads:

"A photosensitive element comprising a support bearing a layer of a photoimaging composition which comprises

- (a) at least one organic polymeric binder, wherein that binder is at least one polymer of polyvinylformal, polyvinylpyrrolidone, polyacrylate, cellulose acetate, polymethacrylate and polyvinyl acetate;
- (b) a photosensitizer, which upon absorption of actinic radiation is capable of generating an acid; the composition, in addition, comprising if so desired at least one polymeric acetal compound taken from the group of

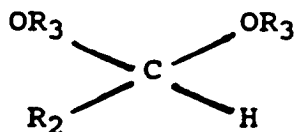
(c)



wherein R is hydrogen, alkyl of 1 to 18 carbon atoms, phenyl and substituted phenyl, and R₁ is taken from the group of alkylene of 2 to 12 carbon atoms and heteroalkylene of 2 to 12 carbon atoms, characterized in that said composition comprises in addition at

least one monomeric acetal compound taken from the group of

(d)



wherein R₂ is alkyl of 1 to 18 carbon atoms, furyl, substituted furyl, phenyl, substituted phenyl, naphthyl, and substituted naphthyl, R₃ is alkyl of 1 to 18 carbon atoms and OR₃ when taken together form a 5, 6 or 7 membered ring, the polymeric binder (a) being plasticized by the decomposition product of compound (d) or the combination of compounds (c) and (d) to give a negative-working tonable photosensitive element.". (Emphasis added)

Claim 1 according to the auxiliary request differs from that of the main request in adding numerical proportions for the binder (a) and the monomeric acetal (d).

V. The arguments put forward by the Appellants in their written submissions and at the oral hearing can be summarised as follows:

No prior art taught the use of monomeric acetals to plasticise the binder after imagewise exposure to radiation, nor that the photosensitive elements as claimed were suitable for negative-working tonable photo-imaging compositions.

The binder/acetal combinations disclosed in document (A) would be unlikely to have a plasticising effect. They were in any case not designed for tackifying by means of an in situ plasticiser, but for washing out using an externally applied solvent. Thus, document (A) did not disclose a plasticisable system capable of negative toning.

The instructions for the preparation of compounds according to "method B" in document (A), columns 17 to 18, provide no hint that the polymeric acetals thus manufactured would still contain any monomeric acetals after purification.

Consequently, the photosensitive element as claimed should be novel vis-à-vis the cited prior art.

VI. The Respondents (Opponents) argued substantially as follows:

Claim 1 of the main request is still inappropriately worded, since the "negative-working tonable photosensitive element" could never exist as such. While the element remained unexposed to light, it was not tonable; once exposed, it was no longer photosensitive.

Restricting the claim to the presence of monomeric acetals did not result in novelty, since the polymeric acetals used in document (A) were prepared from monomeric acetals by a process which would result in residual monomer acetal also being present.

According to "general instruction B", the polymeric acetals (in particular compounds 47 to 50) in Table 2 of the cited document are prepared by reacetalisation from monomeric acetals, i.e. from starting materials identical to those used in the patent in suit. However, this is an equilibrium reaction, which would result in a mixture consisting of polymeric and monomeric acetals, as may be inferred from the yields specified in Table 2.

To avoid unnecessary costs, highly purified substances were not generally used in the manufacture of technical

products. The photo-sensitive elements disclosed in document (A) - like those of the patent in suit - would thus contain a mixture of monomeric and polymeric acetals in their light-sensitive layers.

Formula I in column 4 covered monomeric acetals (with index $n = 1$ and R_3 and $R_6 = \text{alkyleneoxy}$).

- VII. The Appellants requested that the impugned decision be set aside and the case remitted to the Opposition Division for further prosecution on the basis of Claims 1-6 of the main request or Claims 1 to 6 of the auxiliary request.

The Respondents requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is therefore admissible.
2. As to the main request, there is no formal objection to the present statement of claims under Article 123(2) and (3) EPC.

Claim 1 differs from the granted Claim 1 mainly in being restricted to two types of photosensitive elements, the third type comprising compounds (a), (b) and (c) having been deleted. The insertion of "polymeric" before "acetal compound" under item (c) is justified, being supported by statements in the description contained in the original documents (cf. page 3, line 7) and in the published patent specification (cf. page 2, line 55). The obviously incorrect formula under item (c) in the former Claim 1 was amended by deleting the superfluous symbol for oxygen next to the carbon atom. The term "... a negative-working

tonable ... element ..." was shifted from the precharacterising part to the end of the claim.

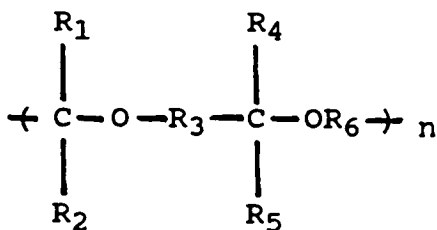
Claims 2-6 correspond to the former Claims 3-7.

3. As to the use of the last-mentioned term in Claim 1, the Board considers that this wording is sufficiently clear for the skilled person to understand that the claimed photosensitive layer becomes tonable only after exposure to radiation. Thus, no objection under Article 84 EPC arises.
4. The patent in suit relates to a negative-working photosensitive element providing coloured photographic reproductions by dusting with coloured toner powder, especially for use in direct colour-separation technology.
5. The main issue to be decided in this appeal is the question of novelty vis-à-vis document (A) (Article 54 EPC).
 - 5.1 Document (A) describes positive-working radiation-sensitive copying materials, i.e. materials whose copying layers become soluble in the exposed areas. The copying compositions include
 - a photosensitiser (b'),
which is a compound capable of forming an acid under the influence of actinic radiation (e.g. an onium salt, a halogen compound, a quinone diazide sulfochloride);
 - an organic polymeric compound (c'),
which contains recurrent acetal or ketal groupings in its main chain and whose solubility in a liquid developer is increased by the action of an acid, and advantageously
 - a polymeric binder (a'),

which is preferably soluble or at least swellable in aqueous alkaline solvents (cf. Claims 1 and 6, column 11, paragraph 3).

According to the descriptive part of document (A), suitable binders (a') are phenol resins, especially the novolaks and other alkali-soluble resins such as copolymers of maleic anhydride and styrene, or of vinylacetate and crotonic acid, or of methylmethacrylate and methacrylic acid. Additionally, the known systems may incorporate numerous other resins such as polyvinylacetates, polyacrylates, polyvinylethers and polyvinylpyrrolidones (cf. column 11, paragraph 4).

Of particular relevance among the polymeric compounds (c') are those polymeric acetals which conform to formula I:



where inter alia,

n is an integer from 1 to 40, R₁ and R₄ are H, alkyl or aryl groups, R₃ and R₆ are alkyleneoxy groups, and R₂ and R₅ are alkyl or aryl groups.

5.2 The patent in suit, on the other hand, is concerned with negative-working tonable photosensitive elements. Claim 1 of the main request relates to two types of such elements, which can be briefly characterised as "3-component elements" and "4-component elements". The first type comprises

(a) a binder

- (b) a photosensitiser and
- (d) a monomeric acetal

and the alternatively claimed second type comprises

- (a) a binder
- (b) a photosensitiser
- (c) a polymeric acetal and
- (d) a monomeric acetal.

The binders (a) are taken from the group consisting of polyvinylformal, polyvinylpyrrolidone, polyacrylate, cellulose acetate, polymethacrylate and polyvinylacetate. Particulars of the photosensitiser (b) can be found in section 5.1(b'). The acetalic components claimed are defined in greater detail under items (c) and (d) of Claim 1, using their general formulas; typical examples of components (c) and (d) are formaldehyde-1,5-pentandiol-polyacetals and 2-phenyl-1,3-dioxane.

When exposed to light, the acetals and polyacetals of the light-sensitive layer are cleaved in an acid-catalysed reaction. The products of cleaving (aldehydes and alcohols) plastify (tackify) the binder in the relevant areas and it can then be developed by dusting with toner powder.

- 5.3 When the claimed and the known systems are compared it becomes evident that they may contain a number of identical binders (i.e. polyvinylacetates, polyvinylacrylates and polyvinylpyrrolidones, $a = a'$), identical photosensitisers ($b = b'$) and identical polymeric acetals ($c = c'$). This is not disputed by the parties.

With regard to the monomeric acetal (d) a closer analysis of the prior art document reveals that nothing in (A)

points to the presence of any such component in the known systems:

- 5.4 Monomeric acetals (d), being an active ingredient of the light-sensitive layer, are not expressly mentioned in document (A).

Nor does document (A) disclose a specific monomeric acetal (d) derivable from general formula (I), as alleged by the Respondents. In accordance with the principle laid down in Decision T 7/86 (OJ EPO 1988, 381), a group of acetals and ketals, defined only by a general structural formula having several variables (i.e. index n and substituents R_1 to R_6) does not specifically disclose each of the individual compounds which would result from the combination of all the possible variables.

Also, general formula (I) clearly relates to polymeric compounds and not to monomeric ones (cf. column 4, line 38).

- 5.5 Moreover, document (A) contains no implicit disclosure of a "4-component composition", i.e. of a photosensitive system containing a mixture of polymeric and monomeric acetals. If one follows the instruction given under "method B", Examples 47 to 50, the polymeric acetal may contain a certain quantity of monomeric starting material owing to the resulting equilibrium in the reaction mixture. However, there follows no further instruction to process this polymeric material immediately after its preparation in the form of the raw material. In any case, a purification stage is required to remove the low-boiling ingredients, which is achieved by distillation either at high vacuum ($T = 100-150^\circ\text{C}$) or using an entrainer (under milder conditions). The reaction product thus purified should therefore contain no monomeric component.

It cannot be concluded from the yields specified in Table 2 of document (A) that the polymeric acetal employed is inevitably mixed up with monomeric components. Nor is there a general rule which would dispose the skilled person to use unpurified polymers when manufacturing light-sensitive products.

- 5.6 In a situation like this, where the parties make contrary submissions concerning the presence of the monomeric acetal in component (c') and the Board is in no position to establish the facts of its own motion, the burden of proof lies with the Opponents (here: the Respondents). In the absence of any evidence, the Respondents' allegation can only be considered as an unproven supposition, which fails to prove that the monomeric acetals (d) containing photosensitive systems are disclosed in document (A) (cf. T 219/83 -OJ EPO 1986, 211).
- 5.7 In these circumstances, there is no need to determine whether functional features such as "... binder (a) being plasticized by the decomposition product ..." or "... to give a negative-working tonable photosensitive element ..." contribute to establishing that the claimed subject-matter is new.
6. For these reasons, the subject-matter of Claim 1 of the main request is considered novel. The same applies *mutatis mutandis* to dependent Claims 2 to 6.

The other requirements for patentability, such as inventive step, have not yet been examined by the Opposition Division. The Board therefore deems it appropriate to remit the case to the department of first instance for further prosecution (Article 111(1) EPC).

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance for further prosecution on the basis of Claims 1 to 6 of the main request.

The Registrar:

The Chairman:

M. Beer

S. Schödel