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**D E C I S I O N**  
of 12 October 1993

**Case Number:** T 0867/91 - 3.3.1

**Application Number:** 85102895.1

**Publication Number:** 0154994

**IPC:** G03C 1/68

**Language of the proceedings:** EN

**Title of invention:**

Improved surface tack-free photosensitive resin composition  
and a method using same

**Patentee:**

Asahi Kasei Kogyo Kabushiki Kaisha

**Opponent:**

W.R. Grace & Co.

**Headword:**

Tack-free printing plates/ASAHI

**Relevant legal norms:**

EPC Art. 52(1), 56, 84, 123  
EPC R. 64

**Keyword:**

"Admissibility of the appeal (yes)"  
"Inventive step (no)"  
"Incorporation into a known composition of a known agent for  
making use of its known properties"

**Decisions cited:**

T 0483/90

**Catchword:**

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**Case Number:** T 0867/91 - 3.3.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.1**  
**of 12 October 1993**

**Appellant:** Asahi Kasei Kogyo Kabushiki Kaisha  
(Proprietor of the patent)2-6, Dojimahama 1-chome  
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Osaka 530 (JP)

**Representative:** Strehl Schübel-Hopf Groening & Partner  
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**Respondent:** W.R. Grace & Co.  
(Opponent) Grace Plaza, 1114 Avenue of the Americas  
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**Representative:** Lawrence, Peter Robin Broughton  
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**Decision under appeal:** Decision of the Opposition Division of the European  
Patent Office of 9 July 1991, posted 9 September  
1991 revoking European patent No. 0 154 994  
pursuant to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. Jahn  
**Members:** P. Krasa  
J.A. Stephens-Ofner



## Summary of Facts and Submissions

I. The mention of the grant of patent No. 0 154 994 in respect of European patent application No. 85 102 895.1 filed on 13 March 1985, was published on 14 June 1989 (cf. Bulletin 89/24) on the basis of thirteen claims relating to a photosensitive resin composition for preparing a printing plate for flexography with reduced surface tack (Claims 1 to 10) and a method of preparing a photocured pattern structure free of surface tack from said photosensitive resin composition (Claims 11 to 13).

II. A notice of opposition was duly filed within the prescribed period (Article 99 EPC).

The grounds of opposition were, *inter alia*, that the subject-matter of the disputed patent lacked inventive step.

The opposition was based, *inter alia*, on

- (1) GB-A-1 425 271 and
- (7) US-A-4 139 436.

III. By a decision delivered orally on 9 July 1991, with written reasons being issued on 9 September 1991, the Opposition Division revoked the patent.

Amended Claim 1, which was then pending before the Opposition Division, read:

"A photosensitive resin composition comprising to be used for preparing a printing plate for flexography

which is improved with respect to surface tack-free characteristic after curing by exposure to actinic radiation, said photosensitive resin composition comprising:

- a) an ethylenically unsaturated prepolymer having a number average molecular weight of 5000 or more per double bond;
- b) an ethylenically unsaturated monomer; and
- c) a photoinitiator, characterized in that it further comprises:
- d) at least one compound represented by the general formula (I)



wherein  $R^1$  stands for a monovalent hydrocarbon residue represented by  $C_nH_{2n+1}$  or  $C_nH_{2n-1}$  in which  $n$  is an integer of from 11 to 21; and  $X$  stands for  $-COOH$ ,  $-CONH_2$  or  $-CH_2OR^2$  in which  $R^2$  stands for  $H$  or  $-CO-R^3-S-R^3-COOCH_2-R^4$  in which  $R^3$  is a divalent hydrocarbon residue having 1 to 6 carbon atoms and  $R^4$  has the same meaning as defined with respect to  $R^1$ , wherein the weight ratio of said component (d) to the photocurable composition comprising components (a), (b) and (c) is from 0.1/100 to 6/100, and said component (d) is present in the dissolved state in said photosensitive resin composition."

The Opposition Division held that the subject-matter of the patent in suit, while being novel and complying also with the requirements of Article 83 EPC, did not involve an inventive step. The problem to be solved was defined as the reduction of surface tack in curable

compositions for printing plates. The solution, which consisted in the addition of the compounds of component (d) to compositions, which were otherwise known from citation (1), was held to have been obvious in view of documents (2) to (6).

IV. The Appellant (Patentee) lodged an appeal against this decision on 14 November 1991 with payment of the prescribed fee.

In his Statement of Grounds of Appeal, filed 20 January 1992, and during the oral proceedings held on 12 October 1993, he submitted that the measures suggested in citation (1) to obtain printing plates for flexography with tack free surfaces, i.e. the physical insulation of the photosensitive resin from oxygen, were insufficient when photosensitive resin compositions were used, which comprised an ethylenically unsaturated prepolymer with an average number molecular weight of at least 5000 per double bond. He argued that the persisting tack of such compositions was not caused by polymerisation inhibition due to the presence of oxygen, but was rather an inherent feature of the photocured polymer resulting from the said prepolymer. Documents (2) to (6), relied on by the Opposition Division, were only concerned with decreasing the polymerisation inhibiting effect of oxygen by the blooming out of waxes and wax like compounds, which technical teaching did not relate to the said inherent tackiness. Therefore, so the Appellant concluded, documents (2) to (6) would not have led the skilled person to use component (d) for reducing the said persisting tack. There would not have been any reason for the skilled person to avail himself of the known anti-oxygen film forming properties of the

components (d) when oxygen insulation was already achieved by sandwiching the photo-curable resin composition layer between protective films.

The Appellant further submitted that the fresh documents, introduced by the Respondent in the appeal stage, were irrelevant to the present case, since none of them related to the new problem of persisting tack in photo cured printing plates caused by the use of prepolymers with a high molecular weight per double bond. He maintained that, in particular, citation

(15) US-A-4 218 294 (1980)

would have deterred the skilled person from incorporating the compounds (d) into the compositions known from document (1) as he would have expected the undesirable formation of emulsions and, furthermore, as the release type surface characteristics resulting therefrom were said to be similar to those of fluorocarbon polymers.

The Appellant, in the course of oral proceedings filed a new set of ten claims. The only independent Claim 1 reads:

"The use of a photosensitive resin composition comprising:

- a) an ethylenically unsaturated prepolymer having a number average molecular weight of 5000 or more per double-bond;
- b) an ethylenically unsaturated monomer;
- c) a photoinitiator;

d) at least one compound represented by the general formula (I)



wherein R<sup>1</sup> stands for a monovalent hydrocarbon residue represented by C<sub>n</sub>H<sub>2n+1</sub> or C<sub>n</sub>H<sub>2n-1</sub> in which n is an integer of from 11 to 21; and X stands for -COOH, -CONH<sub>2</sub> or -CH<sub>2</sub>OR<sup>2</sup> in which R<sup>2</sup> stands for H or -CO-R<sup>3</sup>-S-R<sup>3</sup>-COOCH<sub>2</sub>-R<sup>4</sup> in which R<sup>3</sup> is a divalent hydrocarbon residue having 1 to 6 carbon atoms and R<sup>4</sup> has the same meaning as defined with respect to R<sup>1</sup> wherein the weight ratio of said component (d) to the photocurable composition comprising components (a), (b) and (c) is from 0.1/100 to 6/100, and said component (d) is present in the dissolved state in said photosensitive resin composition, with the exclusion of compositions in which the ratio of component (a) to component (b) is as small as to result in final printing plates, being tack free without the addition of component (d) in a process of producing a printing plate for flexography by sandwiching a layer of the said composition between a substrate layer and a cover film, imagewise exposure to actinic radiation to produce a pattern having cured and uncured portions, and removing the remaining uncured portions from the layer of said composition, and conducting a subsequent post-exposure while immersing the photocured pattern structure in water or an aqueous solution containing an alkali metal salt or alkaline earth metal salt of sulfurous acid."

V. The Respondent submitted that the appeal should be dismissed as inadmissible for not complying with the

requirements of Rule 64 or, alternatively, for not being properly reasoned.

He also submitted that the new claims were inadmissible under Article 84 and/or Article 123 EPC.

Further, the Respondent maintained that the problem of persisting surface tack in polymerised products and the technology of avoiding it by incorporation of materials like stearic acid was well known in the art and, thus, it would have been obvious to apply such technology, known e.g. from document (15), to the flexographic printing plates disclosed in document (1).

VI. The Appellant requested that the appeal be allowed and that the patent be maintained on the basis of the claims submitted in the course of the oral proceedings. The Respondent requested that the appeal be dismissed. At the end of the oral proceedings the Chairman announced the decision of the Board to dismiss the appeal.

## **Reasons for the Decision**

### *1. Admissibility of the Appeal*

The Respondent, referring to the requirements of Rule 64 EPC, challenged the admissibility of the appeal.

1.1 The notice of appeal, filed by the Appellant's representative, designated the patent in suit by its number and the decision under appeal by its date. It

also contained the name of the Patentee, which, without being expressly stated, could be understood only to be that of the Appellant since the appeal requested that the clearly designated decision of the Opposition Division (i.e. to revoke the patent) be set aside. Furthermore, the notice of appeal contained the name and the address of the Appellant's representative. While it is true that the notice of appeal itself did not mention the Appellant's address, it provided sufficient information to identify the Appellant himself and his address, which e.g. could be taken from the patent in suit. Thus, the Board holds that the requirements of Rule 64(a) EPC are met (following Decision T 483/90 of 14 October 1992, No. 1 of the Reasons for the Decision, not published in the OJ EPO).

- 1.2 Citations (1) to (6), on which the Opposition Division's decision was based, were discussed in detail in the Appellant's Grounds of Appeal. In particular reasons were given why, in the Appellant's opinion, the Examining Division's finding of obviousness had been based on hindsight (see No. VII, pages 15 ff. of the Grounds of Appeal). Hence, the requirements of Article 108, third sentence, EPC are met.

The appeal complies also with the other requirements of Rule 64 and of Articles 106 to 108 EPC and is, therefore, admissible.

2. *Admissibility of the New Claims*

The new Claim 1 differs from Claim 1 as granted mainly in the following three aspects:

- (i) instead of a product claim it is now a use claim directed to the use of a photosensitive resin composition as defined in a process of producing printing plates for flexography;
- (ii) additional features are incorporated for defining the photosensitive resin composition and the process more precisely;
- (iii) certain photosensitive resin compositions are disclaimed to exclude such embodiments where the problem to be solved (see also No. 4 below) will not be encountered.

2.1 The use of a photosensitive resin composition in a process of producing printing plates for flexography is equivalent to a process claim, which was originally disclosed (Claims 19 to 21) and retained in the granted patent (Claims 11 to 13).

2.2 The additional process features, are supported by Claim 11 as granted in combination - as far as the "sandwiching" is concerned - with page 8, lines 45 to 51 and the examples and - as far as post-exposure in water is concerned - with page 8, line 63 of the patent (Claim 19 and page 27, line 19 to page 28, line 5 and the Examples, and page 29, lines 3 to 4 of the application documents as originally filed). The additional composition features are supported by Claim 10 and page 6, lines 64 to 65 of the patent (Claim 18 and page 22, lines 11 to 12 of the application documents as originally filed).

2.3 Thus, none of the above discussed amendments is objectionable under Article 123 EPC. However, the Board doubts whether the new Claim 1 in view of the disclaimer is clear as required by Article 84 EPC. In the Board's view, the new Claim 1 imposes an undue burden to the public to establish the actual scope of the claim, i.e. to find out at which weight ratios of component (a) to component (b) does the surface tack problem exist and, thus, calls for solution. This is all the more true since such ratios will most likely vary with the chemical nature of these components. Be that as it may, this issue does not need to be decided under the prevailing circumstances of this case, because the appeal fails for other reasons.

3. *Novelty*

After examination of the cited prior art, the Board has reached the conclusion that the claimed subject-matter is novel. Since novelty of the present claims was finally conceded by the Respondent, it is not necessary to give detailed reasons for this finding.

4. *Problem and Solution*

4.1 The patent in suit relates to the use of photosensitive resin compositions for the preparation of printing plates for flexography, which photosensitive resin compositions comprise an ethylenically unsaturated prepolymer having a number average molecular weight of 5000 or more per double-bond (component (a)), an ethylenically unsaturated monomer (component (b)), and a photoinitiator (component (c)).

4.2 Such resin compositions and their use for the preparation of printing plates are known from document (1), which the Board considers as representing the closest prior art. This citation discloses photosensitive compositions, which are photopolymerisable by the action of actinic light (page 1, lines 6 to 9), and comprise an ethylenically unsaturated prepolymer having a number average molecular weight of 800 to 20000 and contains up to 6 C=C-double bonds (page 2, lines 18 to 19, in combination with formulae IV and V, and page 2, line 32 to page 3, line 23), at least one polymerisable ethylenically unsaturated monomeric compound (page 3, lines 24 to 25), and a photopolymerisation initiator (page 3, lines 26 to 27). This document also discloses the sandwiching of the photosensitive composition between two films, imagewise exposure of the resulting assembly, washing out of unexposed portions with e.g. water, drying, and postexposure of the resulting printing plate (document (1), page 11, lines 28 to 41).

4.3 According to the patent in suit, the surface tack of photocured structures produced from photosensitive resin compositions can be high and can cause various problems in the handling of the printing plates (page 2, lines 17 to 20 and lines 35 to 45). Known methods of removing the surface tack were said to be ineffective or troublesome (page 2, lines 55 to 60). Consequently, the problem to be solved was defined as "to provide a photosensitive resin composition, which is improved with respect to surface-tack free characteristic after curing by exposure to actinic light" (page 3, lines 23 to 25). The patent further discloses that the surface tack of a photocured pattern structure is considerably high, when the number average

molecular weight per double bond of the prepolymer is 5000 or more (page 5, lines 24 to 26).

4.4 Thus, the Board finds that the objectively existing problem which can be directly inferred from the patent in suit was to remove or at least to decrease the surface tack of printing plates for flexography known from document (1).

4.5 According to the patent in suit, this problem is to be solved by incorporating the additional component (d) into the photosensitive resin compositions, which are to be used in the said process, taking into account also the other process-parameters of Claim 1. The comparative tests and the Examples 4 to 10 show, that this addition of component (d) eliminates or substantially removes the surface tack of photocured relief-imaged plates, while the omission of this component results in plates with considerable surface tack (see page 12, line 46 to page 13, line 45). In view of this, the Board accepts that the above technical problem is indeed solved by the claimed use.

5. *Inventive Step*

This leads to the need to decide whether or not the claimed process results from an inventive step.

5.1 The compositions which were used in the process according to document (1) and which resulted, as explained, in printing plates with an undesirable surface tack, differ from the present ones only in that they are lacking component (d). Document (15), which refers to release surfaces, discloses that, *inter alia*,

"a higher alkyl alcohol or acid or oleamide" may be used in amounts "of one tenth of 1% and a few percent ... e.g., between about 0.1% and about 10% by weight" as a release coating or oxygen barrier in radiation curable liquids comprising

(a) an unsaturated prepolymer mixed with

(b) acrylic monomers and

further additives (column 5, lines 21 to 29 in combination with column 2, lines 45 to 48). Preferred prepolymers result from the reaction of a polyether triol (i.e. a trimethylol propane - propylene oxide condensation product) having a molecular weight between about 300 and 4500 with three moles of toluene diisocyanate and then reacting preferably all remaining isocyanate groups with an ethylenically unsaturated, active hydrogen containing compound, preferably hydroxy lower alkyl acrylate or methacrylate (column 3, lines 5 to 22).

The further additives are

(c) a photoinitiator (column 4, lines 63 to 66) and

(d) e.g. the said higher alcohol or acid or oleamid.

5.2 Thus, the skilled person would have found a clear teaching in document (15) that "higher alcohol or acid or oleamid" served as release agents in photocured polymeric compositions which were closely similar to the present ones, the only difference being in a lower molecular weight per double-bond of the unsaturated

prepolymer. Such an release agent exerts its release property by lowering the adhesion of the respective surfaces which in turn means that it reduces their tackiness. Therefore, this was a clear pointer to use the respective compounds as additives in the compositions known from citation (1) for solving the existing technical problem.

The Appellant submitted that "release properties" also meant to be non-wettable, which property would have rendered these compositions useless for flexography. However, it is stated in document (15) that release surfaces of low adhesion are, *inter alia*, useful for transfer printing (column 1, lines 26 to 27). Therefore, the Board holds that this argument is not valid.

- 5.3 The Appellant submitted that the skilled person would not have availed himself of the oxygen shielding effect of these compounds, since the respective compositions were already protected against the polymerisation decreasing effect of oxygen by the sandwiching technique. Thus, so the Appellant concluded, the skilled person would not have expected any beneficial effect of a further measure against the negative effect of oxygen.

However, this argument is not convincing because, as indicated, the anti-tack effect of these compounds is disclosed in document (15) independently from their oxygen barrier forming properties and without referring to a particular mechanism. Hence, in the Board's judgment, document (15) held out a prospect that the present technical problem could be solved by

incorporating these additives into the compositions known from document (1).

- 5.4 The Appellant further pointed out that document (15) disclosed that the components (d) were only slightly soluble in the acrylic coating formulation and formed an emulsion or fine suspension (column 5, lines 29 to 31). In his submission, the expectation of light scattering thereby caused would have deterred the skilled person from using the components (d) in compositions intended for flexography.

However, as the Respondent credibly submitted, there was not to be expected a detrimental effect owing to light scattering, so long as the particle size remained below a certain value. Thus, while the skilled person would have realised that there was a possible risk of shortcomings, this would not have deterred him from routine experimentation to establish whether such risks existed in reality and, if necessary, to find out how to overcome them by establishing the proper parameters and particle size. As Mr Smith, a former managing director of a company active in this field, now acting as an expert for the Respondent submitted, which submission was not contested, such experiments would have amounted to merely a few man-days' work of a technical assistant which in this area of a "trial and error business" was quite normal.

In these circumstances, the Board accepts that the notional practitioner would have tried out whether the promised anti-tack effect of component (d) would be achieved rather than having speculated on possible failures of such experiments.

5.5 It follows that the subject-matter of Claim 1 does not result from an inventive step as required under Articles 52(1) and 56 EPC. Dependent Claims 2 to 10 fail together with Claim 1.

## **Order**

**For these reasons, it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

A. Jahn