Datasheet for the decision of 9 January 2009

Case Number: T 1006/04 - 3.3.07
Application Number: 96109410.9
Publication Number: 0748855
IPC: C09D 11/10
Language of the proceedings: EN

Title of invention:
Heatset intaglio printing ink

Patent Proprietors:
SUN CHEMICAL CORPORATION

Opponents:
SICPA S.A.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Relevant legal provisions (EPC 1973):
EPC R. 67

Keyword:
"Assessment of novelty with respect to the closest prior art no fresh ground for opposition"
"Novelty (yes)"
"Inventive step (yes) - non-obvious combination of known features"

Decisions cited:
G 0001/95, G 0007/95

Catchword:
-
Case Number: T 1006/04 - 3.3.07

DECISION
of the Technical Board of Appeal 3.3.07
of 9 January 2009

Appellants: SICPA S.A.
(Opponents)
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Representative: Müller, Christoph Emanuel
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Respondents: SUN CHEMICAL CORPORATION
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 28 May 2004
rejecting the opposition filed against European
patent No. 0748855 pursuant to Article 102(2)
EPC.

Composition of the Board:
Chairman: S. Perryman
Members: F. Rousseau
B. ter Laan
Summary of Facts and Submissions

I. The Appellants (Opponents) lodged an appeal on 26 July 2004 against the decision of the opposition division posted on 28 May 2004 rejecting the opposition against European patent No. 0 748 855 which was granted on the basis of ten claims, claim 1 of which read as follows:

"1. A heatset intaglio printing ink comprising:

a) a resin present in an amount of 10 to 50 wt.%, based on the weight of the ink, comprising the reaction product of (i) 65-75 parts per hundred of the ester obtained from the esterification of about 40-60 parts per hundred of an epoxy resin with 60-40 parts per hundred of a drying oil partially conjugated unsaturated fatty acid having an iodine number of 125-185, an acid number of 180-210 and a degree of conjugation of 20-25%, said ester having an acid number below about 10, and (ii) 35-25 parts per hundred of a mixture of 20-28% of one or more unsaturated monobasic acids having a polymerizable double bond and 80-72% of one or more reactive monomers having a polymerizable double bond, said epoxy resin comprising the condensation product of bisphenol A and epichlorohydrin and having an epoxide equivalent weight of 400 to 1100 and represented by the structure below wherein n has a value of 0 to 8:
b) at least one glycol and/or glycol ether present in an amount of 5 to 30 wt.%, based on the weight of the ink;
c) at least one inorganic and/or organic pigment present in an amount of 5 to 40 wt%, based on the weight of the ink;
d) at least one drier, present in an amount of 0.1 to 5 wt.%, based on the weight of the ink; and
e) 0.1 to 5 wt.%, based on the weight of the ink, of a compound obtainable by reacting 1 part by weight of an amine/epoxy adduct (a) with 0.1 to 0.8 part by weight of a compound (b) selected from phenolic resins and polyhydric phenol compounds, said amine/epoxy adduct (a) obtainable by reacting an amino compound (1) of the general formula

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\begin{align*}
&\text{wherein } R_1 \text{ and } R_2 \text{ each represent an alkyl group having 1 to 5 carbon atoms and } X \text{ represents an alkylene group having 1 to 5 carbon atoms, or an amino compound mixture comprising said amino compound (1) and 1-amino-4-ethylpiperazine (2) in a weight ratio of (1) to (2) of 70/30 to 99/1,}
\end{align*}
\]
with an epoxy resin (3) having more than one adjacent epoxy group on the average in the molecule, in such a ratio that the amount of the epoxy groups in the epoxy resin (3) is 0.8 to 2.5 equivalents per equivalent of the amino group in the amino compound(s) (1) or (1) + (2)."

II. An opposition had been filed by the Appellants requesting revocation of the patent as granted in its entirety on the ground of lack of inventive step.

III. The contested decision was based inter alia on the following documents:

(1) US-A-5 100 934
(2) ANCAMINE 2014FG, Epoxy Curing Agents & Diluents, prospect from Air Products, 1992
(3) US-A-4 689 390 and
(7) US-A-5 346 933

IV. According to the contested decision the claimed subject-matter was novel over the cited prior art. As regards inventive step, the closest prior art was document (1), the distinguishing feature of the patent over document (1) being component (e) of the claimed composition. Based on the evidence on file, the problem solved by the claimed subject-matter over document (1) was the modification of the composition of document (1) in order to obtain a lower curing temperature without significantly having a negative influence on the other desired properties for a heatset intaglio ink, which included a short curing time. The Opponents' argument that said problem was not effectively solved over the whole breadth of the claim was lacking the necessary
experimental evidence, and therefore could not be taken into account. Although component (e) was known from documents (2) and (3), the skilled person could not reasonably expect that this compound would solve the problem stated. An inventive step was therefore acknowledged.

V. With the statement setting out the grounds for appeal, dated 28 September 2004, the Appellants submitted the following document:


VI. Oral proceedings before the Board took place on 9 January 2009.

VII. The Appellants' arguments can be summarized as follows:

(a) The opposition division had introduced into the opposition proceedings lack of novelty as a ground of opposition. Furthermore, the contested decision did not contain a reasoning regarding novelty over document (1) and therefore was not sufficiently reasoned within the meaning of Rule 68(2) EPC 1973.

(b) The class of hardeners (e) defined in claim 1 of the patent under dispute was the result of a selection out of the broader class of hardeners disclosed in document (1) and it comprised an extremely large number of compounds in a non-individualised form. According to decisions T 124/87 and T 133/92, the novelty of the claimed
subject-matter over document (1) was therefore to be denied.

(c) Concerning inventive step, document (1) represented the closest prior art. If novelty were to be acknowledged, the claimed subject-matter would solely differ from the compositions disclosed in document (1) in that it required the use of a subclass of amine hardeners.

(d) As acknowledged during the oral proceedings, the passage in paragraph [0005] of the patent represented a fair description of the problem to be solved. The problem solved by the claimed subject-matter over the closest prior art could be seen, as shown by the examples of the patent in suit, as the provision of a security document heatset intaglio printing ink meeting properties (a) to (g) as listed in paragraph [0006] of the patent, as did the inks of document (1), and which cured at lower temperature in order to minimize yellowing and concurrently maximize flexibility of the paper substrate.

(e) The property (f) as defined in paragraph [0006] of the patent, namely proper drying properties when printed at speeds of up to 200 m/min with engravings of up to 200µm, did not mean that the claimed intaglio printing inks could be cured within 0,1 to 2 s. It could be inferred from document (2) (first paragraph) and document (7) (column 1, lines 59-64 and column 3, line 56) that Ancamine 2014 AS which fell within the definition of curing agent (e) did not allow to obtain such a
short curing time. One could also deduce from the examples of document (3) that compositions containing a curing agent of the type (e) could require up to several hours curing. Document (8), which also concerned intaglio printing, clearly showed that the drying time of several hours were usual and perfectly acceptable for this type of process. Thus, the mere mention of the term "intaglio printing ink" in claim 1 did not imply that short curing times were achieved by the claimed compositions.

(f) The skilled person was perfectly aware of the curing mechanisms of epoxy resin with amines, leading to adhesion of the intaglio ink on the paper substrate. It was in particular known to the skilled person that the curing conditions of the epoxy resin composition of document (1) could be changed by varying the curing agent, which document disclosed the class of amine hardeners for this purpose. Furthermore, amine-adducts hardeners represented a particular case of the broader class of amine hardeners. In addition, curing agents of type (e) were known from documents (2) and (3) to provide lower curing temperatures. Document (7), which related to similar epoxy resins, taught that the compositions disclosed therein would be cured at temperatures ranging from 49 to 132°C. One of the amine hardeners employed in document (7) was Ancamine 2014 AS, which also was used in the patent in suit as a curing agent of type (e). Hence, it would have been obvious for the skilled person who wanted to cure the composition of document (1) at
a lower temperature, but not necessarily in a very short time, in view of either document (2), (3) or (7), to use a curing agent as defined in claim 1 of the patent under dispute. The claimed subject-matter lacked therefore an inventive step.

(g) The right to be heard had not been complied with in breach of Article 113(1) EPC, because the Patent Proprietors (in these proceedings Respondents) had been allowed to reformulate the technical problem underlying the invention at a late stage of the opposition proceedings, whereas at the same time the Opponents were given the onus of proof for demonstrating that said problem was not effectively solved, but no opportunity to provide the necessary experimental evidence in support of their argument.

VIII. The arguments of the Respondents can be summarized as follows:

(a) Lack of novelty had not been introduced by the opposition division as a new ground for opposition. According to decisions G 1/95 and G 7/95 of the Enlarged Board of Appeal, a new ground for opposition could only be introduced at the appeal stage with the agreement of the Patent Proprietors, which however was not given. Moreover, document (1) only disclosed amines as curing agents, which could not be interpreted as reaction products of amines, so that the claimed subject-matter was not a selection of the composition disclosed in document (1) and novelty was given. The specific amine-adducts defined in claim 1 of the patent in
suit were not disclosed in document (1). Thus, the objection to lack of novelty over document (1) could not succeed.

(b) Document (1) constituted the closest prior art. The problem solved by the claimed subject-matter over document (1) was to provide a security document heatset intaglio printing ink that cured at a lower temperature in order to minimize or avoid yellowing and loss of flexibility of the printed paper substrate, but that also provided the same properties as those listed in document (1), including a short curing time. The formulation of this problem, which could be directly derived from paragraphs [0001] to [0008] of the patent in suit, could not therefore have taken the Opponents by surprise. The doubts expressed by the Appellants that the claimed resin compositions were not rapidly cured, were merely suppositions, not based on any experimental evidence, and therefore should be disregarded.

(c) The skilled person would not have used with a reasonable expectation of success the curing agent employed in document (2), (3) or (7) as a replacement for the amine curing agents used in document (1). The properties of an epoxy resin composition did not exclusively depend on the type of epoxy resin used, but on all the ingredients present in the composition, including the epoxy hardener. Document (2) only referred to laminating applications but did not give any hint to printing inks, let alone to complex heatset intaglio printing inks used for security documents papers.
Furthermore, the compositions of document (2) were incompletely cured at the temperatures used in that document. Document (3) which related to more remote compositions having a much longer curing time did not suggest that the problem of maintaining the curing time as short as in document (1) could be solved by using the same curing agent. The object of document (7) did not concern an ink for paper but for hard substrates such as glass or ceramics and therefore fundamentally differed from that of document (1). Thus, the skilled person would not have used the hardeners disclosed in documents (2), (3) or (7) in the process of document (1) in order to provide a security document heatset intaglio printing ink which provided the same properties as those listed in document (1), including a short curing time and which also cured at a lower temperature. The claimed subject-matter was therefore inventive.

IX. The Appellants requested that the decision under appeal be set aside and that the patent be revoked and that the appeal fee be reimbursed.

X. The Respondents requested that the appeal be dismissed.

XI. At the end of the oral proceedings, the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible
Novelty over document (1)

2. The patent had been opposed under Article 100(a) EPC solely on the ground that the claims lacked an inventive step in view in particular of document (1). In the appeal proceedings, the Appellants have raised an objection for lack of novelty in view of that document. This objection had been raised before the opposition division after expiry of the time limit laid down in Article 99(1) EPC. Regardless of whether the ground of lack of novelty based upon Articles 52(1) and 54 EPC should be considered to have been admitted into the proceedings by the opposition division or should be considered as a fresh ground for opposition which accordingly could not be introduced into the appeal proceedings without the agreement of the patentee (see G 1/95 and G 7/95 (OJ 1996, 615 and 626)), the allegation that the claims lack novelty in view of the closest prior art document, i.e. in the present case document (1) as shown hereinafter, will be considered in the context of deciding upon the ground of lack of inventive step (see G 7/95 (OJ 1996, 626)).

Inventive step

Closest prior art

3. Document (1) which is described in paragraphs [0004] and [0005] of the patent in suit as starting point for the present invention is considered by both parties to represent the closest prior art and starting point for the assessment of inventive step for the claimed ink compositions. Like the patent in suit, it relates to heatset intaglio printing inks suitable for printing of
currency. The inks employed in document (1) and those claimed in the patent under dispute contain the same components a) to d). The parties agreed that if the claimed ink compositions are distinguished from those described in document (1), then solely by the nature of the curing agent e). Thus, the Board too is satisfied that document (1) represents the closest prior art.

Novelty over the closest prior art

4. The curing agent component of document (1) is defined in claim 1 to be an amine curing agent, preferably a diamine according to column 4, line 10. Preferred compounds are according to column 4, lines 11 to 14 and claim 12, selected from ethylenediamine, diethylenetriamine, triethylenetetramine, tetraethylenepentamine, pentaethylenehexamine, hexaethyleneheptamine, dimethylaminopropylamine and mixtures thereof. The examples of document (1) exclusively use the diethylenetriamine as curing agent. Hence, contrary to the appellants' opinion, the curing agent defined in present claim 1 cannot be seen as a selection of the curing agents employed in document (1), because the disclosure of document (1) does not leave any room for interpretation by a skilled person that the amine curing agent of document (1) could encompass an adduct of an amine. Hence, the Appellants' line of argumentation which starts from the premise that the claimed compositions would constitute a selection within those disclosed in document (1) cannot succeed. The Board is furthermore satisfied that the features defining the amine-adduct curing agents of present claim 1, among others the reaction product of an epoxy resin with an amine comprising the compound of the
general formula \( R_1 \text{R}_2 \text{N-X-NH}_2 \), whereby said reaction product is further reacted with phenolic resins and polyhydric phenol compounds are not disclosed in document (1). Thus, the appellants' objection that the claimed subject-matter lacks novelty over the closest prior art must be rejected.

Problem solved

5. In view of this state of the art both parties agreed, making reference to the examples of the patent in suit, that the claimed ink compositions cured at lower temperature, thereby minimizing the yellowing and concurrently maximizing the flexibility of the paper substrate, while at the same time meeting the following properties (a) to (g):

(a) correct rheological properties in respect to transfer of the ink to the printing cylinder and transfer therefrom to the substrate;
(b) ability of the excess ink to be easily and quantitatively removed from the non-image areas of the die surface by the wiping cylinder (wipeability);
(c) ease of cleaning the wiping cylinder by means of a dilute aqueous caustic soda solution containing about 1% of NaOH and 0.5% sulfonated castor oil or other surfactants;
(d) stability of the ink on the printing rollers; i.e. control of the evaporation of volatile materials during the printing process;
(e) film-forming characteristics allowing handling of the webs carrying printed films of up to 200 µ thickness immediately after printing;
(f) proper drying properties when printing at speeds of up to 200 m/min with engravings of up to 200 mμ thickness;

(g) outstanding chemical and mechanical resistance of the printed document pursuant to specifications established by INTERPOL at the 5th International Conference on Currency and Counterfeiting in 1969 and by the U.S. Bureau of Engraving and Printing in BEP 88-214 (TN) §M5.

6. According to paragraph [0023] of the patent under dispute, the inks dry rapidly. Typically the imprinted substrate will be cured in ovens of 5-6 meters in length at temperatures of 80 to 180°C and a residence time of 0.1 to 2 seconds. Thus, a second colour may be printed almost instantaneously upon a previously-printed colour.

7. Hence, the proper drying properties (f) as defined in paragraph [0006] of the patent in suit mean that the claimed inks dry rapidly, such as to allow the printing of a second colour almost instantaneously upon a previously-printed colour. This statement is supported by the process exemplified in paragraphs [0030] and [0031] of the patent under dispute. The Board cannot find any support in the patent in suit that the time required for a complete cure of the claimed inks should take place within 0.1 to 2 seconds, as this curing time is not indicated to be met by all claimed compositions, but is only indicated as typical in the context of specific process conditions.
8. The Appellants cited documents (2), (3), (7) and (8) as evidence for the contention that some curing agents falling within the definition of compound (e) would not allow the claimed inks to dry rapidly.

8.1 Document (2) relates to the curing agent used in the examples of the patent in suit, namely Ancamine 2014FG and describes its use for metal-to-metal, plastic-to-plastic bonding and solvent free laminating applications. On the basis of the indication in document (2) that Ancamine 2014AS, i.e. a curing agent of type (e) according to the patent in suit, exhibits a lower reactivity than Ancamine 2014FG, the Appellants alleged that inks according to the patent in suit which contain Ancamine 2014AS would not dry rapidly and thus would not solve the problem formulated above. According to paragraph [0021] of the patent in suit, which is confirmed by document (2) itself, Ancamine 2014AS and Ancamine 2014FG differ from one another only in their particle size and not in their chemical nature. The mere indication in document (2) that Ancamine 2014AS is described, in the context of epoxy compositions for metal-to-metal, plastic-to-plastic bonding and solvent free laminating applications, to exhibit a lower reactivity than Ancamine 2014FG cannot serve as evidence that Ancamine 2014AS when used in a different context and with a different type of resin composition, would not provide a curing fast enough to allow the printing of a second colour almost instantaneously upon a previously-printed colour. The passage relied on by the appellants is inconclusive, as these less reactive curing agents, even if they might be expected to need a longer curing time, may still give a curing time which is fast enough for the purpose of the present invention,
namely allowing printing of a second colour almost instantaneously upon a previously-printed colour. Thus, it cannot be deduced from document (2) that the problem mentioned above is not solved for compositions comprising Ancamine 2014AS as curing agent.

8.2 Document (7), which relates to one-part epoxy compositions systems employed in coating operations, was cited in order to show that Ancamine 2014 AS would provide a latency period of up to several hours at temperature comprised between 120° and 270°F (i.e. 49 and 132°C) (column 1, lines 59-64 and column 3, line 56). The latency period of the compositions taught in document (7) is according to column 3, line 40 and claim 1 of document (7) about 30 minutes at those temperatures. The Appellants' argumentation, however, ignores the fact that the latency period addressed in document (7) does not result from the use of ANCAMINE 2014AS, but rather from dicyandiamine or dicyandiamide-aromatic amine adducts used as latent curing agent, as shown in claim 1 and column 3, lines 26-48. ANCAMINE 2014AS is merely described in document (7) as an agent which for some unspecified applications might provide an adequate latency and at the same time be able to accelerate the curing process (column 3, lines 49-58). The mere indication that for some applications, ANCAMINE 2014AS might provide the required latency, which however is not further specified, is insufficient to allow any conclusions as to whether under the specific conditions and compositions used in the patent in suit, ANCAMINE 2014AS would or would not allow the printing of a second colour almost instantaneously upon a previously-printed colour. Therefore, reliance on document (7) cannot be considered as adequate evidence
that the problem addressed above is not solved, when Ancamine 2014AS is employed as curing agent.

8.3 As acknowledged in paragraph [0021] of the patent in suit document (3) describes the preparation of compounds (e) defined in present claim 1. This document does not relate to printing inks, but to adhesives for structural materials (column 1, lines 12-16, lines 18-20 and lines 51-59), in line with the measurements of the tensile strength on the exemplified cured products (see Tables 1 to 9). The nature of the resins cured in the examples of document (3) and the type of applications envisaged, are however so different from those concerned in the patent in suit, that it is impossible, solely based on the knowledge of the curing time employed in document (3), to draw any conclusions concerning the curing time that would be required for the presently claimed compositions in printing ink applications.

8.4 Document (8) concerns intaglio printing inks of types other than the type employed in the patent in suit. It does not concern a printing ink containing a resin a) as defined in present claim 1, nor does it disclose the use of the curing agents of type e). Document (8) does not provide, therefore, any indication on the curing time typically obtained with the presently claimed compositions.

8.5 Hence, none of the documents cited by the Appellants provides any evidence that the curing agents falling within the definition of compound (e) would not allow the claimed inks to dry rapidly enough to allow the
In view of the processes exemplified in the patent in suit (see Test Results in paragraphs [0030] to [0032] and Table I), it has been rendered credible that the claimed ink compositions cured at lower temperature, thereby minimizing the yellowing and concurrently maximizing the flexibility of the paper substrate, while at the same time meeting the above listed properties (a) to (g), in particular a drying time allowing the printing of a second colour almost instantaneously upon a previously-printed colour. Therefore, the burden of proof for the allegation that the claimed ink compositions would not exhibit a drying time which allows the printing of a second colour almost instantaneously upon a previously-printed colour rests upon the Appellants. It is noted in this context that the Appellants, who had complained that the opposition division had not given them the opportunity to provide the necessary experimental evidence in support of their argument, did not avail themselves of the opportunity to present in the appeal proceedings experimental evidence for their contention. In the absence of such experimental evidence, the Board therefore considers the Appellants' allegation, that the claimed compositions would not allow for some curing agent (e) a drying time which allows the printing of a second colour almost instantaneously upon a previously-printed colour, as mere speculation, which therefore is disregarded. Summing up, the Board is satisfied that the solution provided by the patent under dispute successfully solves the problem underlying the invention as defined in point 5 above.
Obviousness

10. It remains to be decided whether or not the skilled person starting from document (1) and wishing to solve the above defined problem would have been guided by the available prior art to the claimed solution, namely the use of curing agent (e) while keeping components (a) to (d) identical.

10.1 Contrary to the Appellants' opinion, the disclosure of document (1) does not leave any room for interpretation by a skilled person that the amine curing agent of document (1) could encompass an adduct of an amine (see point 4. above). Hence, the closest prior art itself contains no pointer which would lead the skilled person to the claimed solution.

10.2 The Appellants also argued that it would have been obvious to follow the teaching of documents (2), (3) and (7), which showed that the curing agent (e) defined in the present claims cured at lower temperature. The question to be answered is however not whether documents (2), (3) and (7) teach that curing agents of type (e) provide lower curing temperatures, but whether they suggest that this type of curing agent would allow to meet properties (a) to (g) as defined in point 5 above. Documents (2), (3) and (7) do not relate to intaglio printing inks, but to different applications where other expectations concerning the properties of the epoxy resins exist. These documents are silent as to the properties sought to be obtained in the patent under dispute. Furthermore, the curing agents disclosed in documents (2), (3) or (7), as they are reaction
products of amines with an epoxy resin and at least one compound consisting of phenolic resins and polyhydric phenol compounds, are structurally not closely related to those used in document (1). Moreover, the properties of the inks of document (1) other than the curing time also depend on the nature of the curing agent utilized, which in the patent under dispute can be contained in an amount of 0.1 to 5 wt% compared to the 10 to 50 wt% of the resin. The mere information that the curing agent (e) may be reactive at lower temperature, which at most might lead the skilled person to consider this curing agent as a potential candidate among other curing agents, also reactive at lower temperatures, for solving a part of the addressed problem, namely avoiding yellowing of the paper, does not make it obvious, that the curing time required would be sufficiently low to avoid yellowing and that at the same time properties (a) to (g) could be obtained, as no relationship between the curing temperature and properties (a) to (g) has been demonstrated to exist. Thus, documents (2), (3) and (7) do not lead to the claimed solution in an obvious manner.

10.3 The other documents cited by the Appellants do no disclose the curing agent used in the present invention and therefore cannot lead to the claimed composition.

10.4 Therefore, there is no case made out that the skilled person in view of the prior teaching available would have arrived at the subject-matter of present claim 1 in an obvious manner.
11. Consequently, the subject-matter of present claim 1 and by the same token that of dependent claims 2 to 10 meets the requirements of Article 56 EPC.

Procedural matters

12. In accordance with Article 1(5) of the Decision of the Administrative Council of 28 June 2001 on the transitional provisions under Article 7 of the Act revising the European Patent Convention of 29 November 2000 ("Revision Act"), Rule 67 EPC 1973, first sentence remains applicable to considering the request for reimbursement of the appeal fee in this case, since the time limit for making such request had expired before the Revision Act entered into force.

13. Rule 67 EPC 1973, first sentence, provides for the refund of the appeal fee where the Board of Appeal deems an appeal to be allowable and such a reimbursement is equitable by reason of a substantial procedural violation. In the present case the Board cannot find any procedural violation in the conduct of procedure by the opposition division. There is however no need to provide any details on this matter, as the appeal of the patent proprietor has not been allowed, and therefore reimbursement of the appeal fee cannot be ordered for this reason alone.
Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar                                    The Chairman

C. Eickhoff                                     S. Perryman