BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

A		B		C	X

File Number: T 731/90 - 3.3.1

Application No.: 84 114 235.9

Publication No.: 0 147 638

Title of invention: Coatings and coated papers for gravure printing

Classification: D21H 1/28

D E C I S I O N
of 15 October 1992

Proprietor of the patent: THE DOW CHEMICAL COMPANY

Opponent: ZANDERS Feinpapiere AG

Headword: Coated paper/DOW

EPC Articles 54(1) and 56

Keyword: "Novelty (yes) - hindsight interpretation of a prior art document not admissible"
"Inventive step (yes) - unobvious alternative"

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 731/90 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 15 October 1991

Appellant : (Proprietor of the patent)
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Decision under appeal :
Decision of Opposition Division of the European Patent Office of 31 May 1990 with written reasons posted on 11 July 1990 revoking European patent No. 0 147 638 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : K.J.A. Jahn
Members : R.K. Spangenberg
J.-C. Saisset

Summary of Facts and Submissions

I. The appeal, which was filed on 10 September 1990 and accompanied by the payment of the appropriate fee, lies from the decision of the Opposition Division of the EPO delivered orally on 31 May 1990, with written reasons posted on 11 July 1990, by which European patent No. 0 147 638 was revoked. This patent was granted in response to European patent application No. 84 114 235.9 filed on 26 November 1984 and claimed priority of 29 November 1983 from an earlier application in the United States. The patent specification contained seven claims. Independent Claims 1, 4 and 7 related to a coated paper, a coating formulation and a process for preparing such a paper, respectively. The decision under appeal was based on an amended Claim 1 submitted during oral proceedings held on 31 May 1990.

II. The Opposition Division, after consideration of the following documents,

(1) US-A-4 054 717
(2) Chem. Abstr. 99 (1983), 160237e, abstracting JP-A-58 89391
(3) Wochenblatt fur Papierfabrikation 10/1982, pages 327-337
(4) Wochenblatt für Papierfabrikation 6/1984, pages 176-183
(5) DE-A-2 822 321
(6) DE-A-2 911 679

held that the subject-matter of the above Claim 1 was not novel because document (1) disclosed a mineral-coated paper having all the features of the present Claim 1. In particular, document (1) disclosed a water soluble polymer which was obtainable from monomers of Formula II, and which may be a linear polyamidoamine prepared from an

alkylene diamine and an ethylenically unsaturated acrylate or methacrylate ester or acrylamide or methacrylamide. The amounts of this polymer overlapped with those specified in the present Claim 1 and the pigment had necessarily to be present in an opacifying amount. Since document (1) disclosed the same pigment and the same polyamidoamine in the same proportion as in Claim 1 the Opposition Division concluded that the same reaction as according to the present Claim 1, i.e. agglomeration or flocculation of the pigment, had necessarily taken place in the coating composition described in document (1) as well as on the paper coated with that composition. In the absence of any specific counter-arguments the papers coated with compositions comprising branched and quaternary ammonium polyamidoamines were regarded as non-inventive alternatives of the paper disclosed in document (1).

III. At the beginning of oral proceedings held on 15 October 1992 the Board drew the Appellant's attention to certain deficiencies in Claim 1 underlying the decision under appeal. In response to these objections the Appellant (the patent proprietor) filed a new set of amended Claims 1 to 7 and a description adapted thereto, marked "main request". He further submitted two sets of five and three claims, respectively, being marked "first subsidiary request" and "second subsidiary request", respectively. Claim 1 of the main request reads as follows:

"A coated paper comprising a paper substrate and a coating resulting from an aqueous coating formulation containing a pigment and a binder, characterized in that said coating formulation further contains a polyamidoamine selected from the group consisting of linear polyamidoamines having a backbone containing both amide and amine linkages, branched polyamido amines prepared by contacting the aforementioned linear polyamidoamine with an ethylenically unsaturated carboxylic compound under conditions

sufficient to produce a Michaels addition reaction between the amine moiety of the said linear polyamidoamine and the ethylenically unsaturated moiety of the carboxylic compound, and ammonium polyamidoamines and being present in an amount from about 0.01 to about 0.5 weight part per 100 dry weight parts of the coating formulation sufficient to cause the pigment to agglomerate or flocculate, after the paper is coated, and said pigment is present in an opacifying amount."

IV. In his Statement of Grounds of Appeal received on 12 November 1990, in further written submissions and during oral proceedings the Appellant submitted that document (1) related to a paper coating composition consisting essentially of an aqueous dispersion of a finely divided pigment and a binder comprising a negatively-charged latex polymer free of amino groups, wherein the binder additionally comprised a water-soluble polymer of units containing monoethylenically unsaturated monomer derived from acrylic or methacrylic acid amide having, in addition, a primary, secondary, or tertiary amino group. However, this reference did not disclose that both the amido and amino functional groups were incorporated into the polymer backbone. Thus, the novelty objection was based on considerations deduced with the benefit of hindsight.

In respect of inventive step he submitted that rotogravure printing required a paper quality much better than that required, for example, for offset printing. In particular, the problem of "missing dots" was specific to rotogravure printing. However, none of the documents cited during the opposition proceedings suggested the use of polyamidoamines of the types indicated in the present Claim 1 for making coated papers suitable for rotogravure printing.

V. The Respondent (the Opponent) submitted that document (1) disclosed a coated paper, the coating of which comprised a polymer obtained from a monomer which inevitably would polymerise via a Michael addition, thereby forming a linear polyamidoamine fulfilling the requirements of the present Claim 1. Since the concentrations of the various other constituents of the coating overlapped with those of the said Claim 1, its subject-matter lacked novelty.

Regarding inventive step, the Respondent submitted that the patent in suit related to a coated paper in general and was not limited to rotogravure printing. Thus, all documents relating to the manufacture of coated papers, regardless of the printing process for which they were intended, had to be taken into account. From documents (2) to (6) a person skilled in the art could see that a cationic additive had already been recommended in order to produce papers with a smooth surface of good printability. Even if none of these documents specifically disclosed using a compound as defined in the present Claim 1, they nevertheless suggested polyamidoamines of a closely related structure, in particular those crosslinked with epichlorhydrin. A person skilled in the art would therefore, as a matter of routine, also have tried the uncrosslinked polyamidoamines. Confirmation of this was to be found in the fact that the crosslinked polyamidoamines were included in the claims of the application as filed and were shown by the worked examples contained in the patent specification as being as effective as the uncrosslinked ones. Regarding the adaptation of the description, the Respondent suggested that the reference on page 3, line 23, to "curable" ammonium polyamidoamines should be deleted because it related to crosslinked products.

VI. The Appellant requested that the decision under appeal be set aside and the patent maintained on the basis of the documents submitted during oral proceedings, i.e. as main

request Claims 1 to 7 and the adapted description marked "main request", as first subsidiary request Claims 1 to 5 marked "first subsidiary request" and as second subsidiary request Claims 1 to 3 marked "second subsidiary request".

The Respondent requested that the appeal be dismissed.

At the end of the oral proceedings the decision of the Board to allow the Appellant's main request was announced.

Reasons for the Decision

1. The appeal is admissible.

2. Independent Claims 1, 4 and 7 of the main request differ from the respective claims as granted by replacing the expression "linear polyamidoamine" by "linear polyamidoamine having a backbone containing both amide and amine linkages" and by specifying that the branched polyamidoamines are "prepared by contacting the aforementioned linear polyamidoamine with an ethylenically unsaturated carboxylic compound under conditions sufficient to produce a Michaels addition reaction between the amine moiety of the said linear polyamidoamine and the ethylenically unsaturated moiety of the carboxylic compound".

These limitations are based on page 4, lines 31 to 32 and page 6, lines 3 to 9 of the description as filed (see the patent specification, page 3, lines 19 to 20 and 46 to 49). No objection pursuant to Article 123 EPC therefore arises with respect to these amendments.

3. The description has been adapted to the present wording of Claims 1 to 7. In particular, the references to the use of crosslinked polyamidoamines, the use of which is not covered by these claims, have been deleted. The Respondent's suggestion to delete the reference to "curable" ammonium polyamidoamines need not be followed because the fact that these compounds can be cured, as well as the linear and branched polyamidoamines to be used according to the present claims, for other purposes, does not imply that such cured polymers are to be used according to the present claims. Therefore, the description meets the requirements of Rules 27 and 34 EPC.

4. The novelty of the subject-matter of the patent in suit was disputed in respect of documents (1), (2) and (5).

4.1 Document (1) describes a coating composition adapted to coat papers consisting essentially of an aqueous dispersion of a finely divided pigmentary material comprising a predominant proportion of clay therein and a binder, in an amount of 5 to 50 weight percent based on pigment weight, comprising a negatively charged latex polymer free of amino groups and a water-soluble polymer of units containing a primary, secondary or tertiary amino group in an amount of 0.1% to 10% by weight of the pigment, but not more than 18% by weight of the binder material (see column 1, lines 27 to 39). The amino group containing polymer can be a homo- or copolymer of an amino group containing monomer selected from the classes of vinyl ethers, vinyl sulfides, acrylamides and acrylic esters. Among the acrylic acid derivatives are those having the following structure:

$$CH_2=C(R)CO-(X)_n-A-NR^*R^\circ \qquad (II)$$

wherein R is H or CH_3, X may be NH, A is an alkylene group having 2 to 4 carbon atoms if n is 1, and R* as well as R° may be H or methyl (see Formula II in column 2). N-ß-aminoethyl-acrylamide or -methacrylamide as well as the corresponding N-monomethylamino compounds are specifically mentioned (column 2, lines 47 to 49). The above monomers may be polymerised by solution polymerisation either alone or together with a great number of other ethylenically unsaturated compounds (column 4, line 50 to column 5, line 11). The only example given for such a "solution polymerisation" (Example A) shows that this expression relates to a free radical polymerisation process resulting in the formation of a polymer having only carbon atoms in the backbone. Such polymers are structurally quite different from those to be used according to the disputed patent.

It is, however, true that among the acrylic monomers of the above formula there are some, in particular N-ß-aminoethyl-acrylamide or -methacrylamide as well as the corresponding N-monomethylamino compounds, which are capable of being polymerised not only by a free radical initiated process but also by a Michaels addition reaction, thereby yielding polymers of the type used according to the disputed patent. Nevertheless, there is no evidence before the Board that, as submitted by the Respondent, such Michaels addition products, i.e. polymers having amido and amino functional groups in the polymer backbone, would have been obtained as an inevitable result of the polymerisation method disclosed in document (1). Further, in the Board's judgment, polymers resulting from a Michaels addition reaction are not disclosed in document (1) in the form of a technical teaching merely because the generic expression "polymerisation" may be regarded as comprising, among other possibilities, the polymerisation

by a Michaels addition reaction (see also T 167/84, OJ EPO 1987, 369, item 6 of the reasons, and T 296/87, OJ EPO 1990, 195, item 7.1 of the Reasons). Consequently, the document does also not teach to incorporate polymers resulting from a Michaels addition reaction into a paper coating composition. On the contrary, in the Board's judgment, the Respondent's interpretation of the disclosure of document (1) can only be arrived at with the knowledge conferred by the disputed patent, in other words, it is based on hindsight. Therefore, in the light of the proper interpretation of the disclosure of document (1), the claimed subject-matter is novel in respect of that document.

4.2 Document (2), according to the example given in the abstract, and document (5), according to Claim 3 and page 6, lines 9 to 12, solely disclose the use in paper coating formulations of polyamidoamines which are crosslinked with epichlorhydrin. The use of such polymers is however clearly not covered by the present Claim 1. It is true, however, that such polymers were referred to in the patent specification as being used in accordance with the claimed invention. Any possibility of misinterpreting the scope of the present Claim 1, however, has been removed by the amended description. Thus, the subject-matter of the disputed patent is novel in respect of documents (2) and (5).

5. It falls to be decided whether the subject-matter of the patent in suit according to the main request involves an inventive step.

5.1 The patent is concerned with the production of a coated paper specifically designed for rotogravure printing (page 2, lines 1 to 16). No particular prior art relating to papers suitable for rotogravure printing is cited in

the patent specification. The only prior art documents cited during the opposition proceedings relating to such papers are documents (3) and (6). In the disputed patent it is stated that the main problem in the art of rotogravure printing is that of insufficient ink transfer which causes missing gravure dots, particularly at high printing speeds (see page 2, lines 12 to 14 and 54 to 57). Since, among the cited documents, document (3) is the only one which mentiones the problem of "missing dots" (see page 330, right-hand column, last paragraph) this document can be regarded as representing the closest state of the art. In the absence of a demonstrated improvement in respect of this state of the art the technical problem underlying the disputed patent is seen as providing a further coated paper suitable for rotogravure printing which has a comparably good printability. In respect of the test results contained in Examples 1 and 2 of the patent this technical problem can be regarded as being solved. This was not in dispute between the parties.

5.2 According to the present Claim 1 the solution of the above problem consists essentially in employing certain polyamidoamines as agglomerating agents. Therefore, it has now to be investigated whether a person skilled in the art, having regard to the cited documents, would have considered these polyamidoamines with a view to solving the above-defined technical problem.

5.3 It was disputed among the parties whether or not a person looking for possibilities to obtain a paper specifically adapted for rotogravure printing, in particular in respect of the problem of "missing dots", would consider documents relating to papermaking in general, regardless of the intended use of the paper.

In the disputed patent it is stated that the coated paper according to Claim 1 is also suitable for offset printing and that the coating formulations of Claim 4 can also be used for other purposes (page 2, lines 39 to 41. This statement, however, does not contradict the Appellant's submission that a paper suitable for rotogravure printing must be of higher quality, in particular must be more ink receptive than a paper intended for use in offset printing, where ink transfer proceeds much easier. The Board accepts this view and concludes that a paper of sufficient quality for use in rotogravure printing will normally be also suitable for offset printing, but not all papers suitable for offset printing will also be useful in rotogravure printing. Moreover, it follows from document (3) page 330, right-hand column, last paragraph, that the problem of avoiding "missing dots" in rotogravure printing is not simply one of providing a sufficiently smooth surface, which is also desirable in other printing methods, in particular offset printing. Therefore, in the Board's judgment, the requirements for papers intended for use in offset printing and for rotogravure printing are not comparable in the sense that a person skilled in the art would, as a matter of routine, consider a coating formulation suitable for manufacturing offset papers or other coated material with a view to solving a specific problem in the art of manufacturing rotogravure papers. Therefore, a person skilled in the art faced with the present technical problem would not consider documents such as (1), (2), (4) and (5), which do not relate to rotogravure printing.

5.4 However, even if these documents would have been considered with a view to solving the present technical problem, their content would not have assisted the person skilled in the art in finding the present solution to the above-defined technical problem because none of these

documents relates to the use of the polyamidoamines having the same chemical structure as those which are used according to the patent in suit. As already stated in point 4.1 above, document (1) relates to the use of polymers having only carbon atoms in the backbone. Moreover, they are intended for improving the water-resistance of the coated papers made from coating formulations containing them (column 1, line 62 to column 2, line 3). This technical problem is unrelated to that of the patent in suit. Documents (2) and (5) are concerned with crosslinked polyamidoamines, a type of polymers not covered by the disputed patent (see item 4.2 above), as additives for either ink-jet printing sheets (see document (2), the title) or coated paper in general, with the only specific mentioning of offset printability (see document (5), in Example 3, page 11, second table, last line).

Document (4) mentiones on page 176, right-hand column, the paragraph following pictures 1 and 2, "polyaminoamide-fatty acid compounds" and "cationic dispersants based on polyaminoamides" as suitable additives for paper-coating. There is no further information in this document as to what chemical structures are envisaged by the above vague expressions. Thus, it is even doubtful whether or not these classes of compounds are covered by the present claims. Moreover, it follows from the titles of Tables 1a and 1b that the coating formulations of this document were specifically adapted for manufacturing papers for offset printing. In these circumstances, there is no need to decide whether or not the content of this document, being published after the priority date of the disputed patent but being said to reproduce the content of a lecture held before that date, belongs to the state of the art according to Article 54(2) EPC.

Since it already follows from what is stated above that the problem of avoiding "missing dots" must be regarded as being specific for rotogravure printing and cannot be expected to be solved by proposals made in a different technical context, it is even less possible that such proposals could be modified with a reasonable expectation of solving the said problem without exercising inventive skill.

5.5 Of the remaining two documents, (3) recommends the addition of a cationic galactomannan, such as cationic guar, to a paper coating formulation. In the last paragraph of the right-hand column of page 330 it is stated that a paper coated with such a coating formulation shows less "missing dots than a paper coated with a formulation containing carboxymethylcellulose (CMC), an anionic additive. It may further be inferred from the first paragraph on page 332 that the cationic nature of the guar is essential for obtaining this improvement. However, it cannot be inferred from this disclosure that any cationic polymer would serve the same purpose. On the contrary, it is stated on page 327, left-hand column, in the last paragraph of the introduction that cationic additives in general have an undesirable influence on water retention. According to page 330, right-hand column, second paragraph of Chapter 2, cationic guar shows only slightly reduced water retention and improved printability. Therefore, these properties are not disclosed as being attributable to any cationic additive. However, no suggestion can be derived from document (3) as to which other cationic substances may also be suitable. Certainly, this document does not give any hint to the skilled person to consider polyamidoamines instead of cationic galactomannans.

5.6 In document (6) it is also emphasised that the selection of a suitable cationic additive is critical (see page 6, lines 4 to 8 and the last paragraph on page 7). The cationic substances considered in this document (see all examples) are quaternary ammonium salts of low molecular weight which have no structural similarity to the polyamidoamines used according to the disputed patent. Thus, it does not suggest substituting the said quaternary ammonium compounds by these polyamidoamines.

5.7 The fact that the application as filed also comprised the use of crosslinked polyamidoamines which were shown to be equivalent to the linear polyamidoamines still claimed because the latter did not provide a surprising effect in respect of the former compounds, has no relevance to the issue of inventive step, since it is clearly based on knowledge only derivable from the patent itself, i.e. on inadmissible hindsight considerations.

6. For these reasons, which mutatis mutandis apply to the subject-matter of all three independent claims as well as to that of the dependent Claims 2, 3, 5 and 6, which relate to specific embodiments of Claims 1 and 4, respectively, the subject-matter of the main request involves an inventive step.

Thus, the Board is satisfied that the patent in the text submitted as main request meets the requirements of the EPC. The patent can therefore be maintained on that basis. Consequently, there is no need to consider the auxiliary requests.

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 on the basis of Claims 1 to 7 and the adapted description submitted as the main request during oral proceedings.

The Registrar: The Chairman:

E. Görgmaier K.J.A. Jahn