DECISION
of 17 October 2005

Case Number: T 0376/04 - 3.2.05
Application Number: 96107479.6
Publication Number: 0742108
IPC: B41M 5/00
Language of the proceedings: EN

Title of invention:
Recording medium

Patentee:
Asahi Glass Company Ltd.

Opponent:
Canon Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Ground for opposition under Article 100(b) EPC withdrawn during opposition proceedings - not admitted in the appeal proceedings"
"Novelty - yes"
"Inventive step - yes"

Decisions cited:
G 0010/91

Catchword:
-
Case Number: T 0376/04 - 3.2.05

DECISION
of the Technical Board of Appeal 3.2.05
of 17 October 2005

Appellant: Canon Inc.
(Opponent) No. 30-2, Shimomaruko 3-chome
Ohta-ku
Tokyo 146 (JP)

Representative: Bühling, Stefan
Tiedke-Bühling-Kinne & Partner GbR
Bavariaring 4-6
D-80336 München (DE)

Respondent: ASAHI GLASS COMPANY LTD.
(Proprietor of the patent) 12-1, Yurakucho 1-chome
Chiyoda-ku
Tokyo 100-8405 (JP)

Representative: Müller-Boré & Partner
Patentanwälte
Grafinger Strasse 2
D-81671 München (DE)

Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 9 January 2004 rejecting the opposition filed against European patent No. 0742108 pursuant to Article 102(2) EPC.

Composition of the Board:
Chairman: W. Moser
Members: H. M. Schram
W. Widmeier
Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division posted 9 January 2004 rejecting its opposition against the European patent No. 0 742 108, which requested revocation of the patent as a whole, based on Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC).

II. Oral proceedings were held before the Board of Appeal on 17 October 2005.

III. At the end of the oral proceedings, the final requests of the parties were as follows:

The appellant requested that the decision under appeal be set aside and that the European patent No. 0 742 108 be revoked.

The respondent (patent proprietor) requested as a main request that the appeal be dismissed. As an auxiliary measure, the respondent requested that the decision under appeal be set aside and that the patent in suit be maintained on the basis of the following documents filed on 16 September 2005:

(i) claims 1 to 9 as first auxiliary request; or
(ii) claims 1 to 9 as second auxiliary request; or
(iii) claims 1 to 8 as third auxiliary request; or
(iv) claims 1 to 8 as fourth auxiliary request; or
(v) claims 1 to 6 as fifth auxiliary request.
IV. Independent claim 1 of the main request (claims as granted) reads as follows:

"1. A recording medium comprising at least one boehmite-containing porous layer on a substrate, wherein the porous layer has pores having a pore radius of from 1 to 30 nm in a pore volume of from 0.3 to 1.2 ml/g, pores having a pore radius of from 10 to 30 nm in a pore volume of from 0.2 to 1.0 ml/g and pores having a pore radius of from 30 to 100 nm in a pore volume of not more than 0.3 ml/g, the pore volume being measured by means of nitrogen adsorption-desorption method, wherein the boehmite has an orientation degree index of not larger than 0.5, the orientation degree index being defined by the following formula (2) based on a peak height ratio defined by the following formula (1) which is a ratio of a reflection peak height of (200) plane/a reflection peak height of (020) plane of boehmite determined in accordance with X-ray diffraction analysis:

\[
\text{Peak height ratio} = \frac{\text{peak height of (200) plane}}{\text{peak height of (020) plane}} \tag{1}
\]

\[
\text{Orientation degree index} = \frac{\text{Peak height ratio of boehmite in porous layer}}{\text{Peak height ratio of non-oriented boehmite}} \tag{2}
\]

V. The following documents were inter alia referred to in the appeal proceedings:

D1 EP-A 0 634 287

D3 EP-A 0 622 244
VI. The appellant argued in writing and at the oral proceedings essentially as follows:

The ground for opposition under Article 100(b) EPC (lack of sufficiency of disclosure, Article 83 EPC) filed on 19 September 2005 was to be admitted by the Board into the appeal proceedings for the following reasons: The objection of insufficiency of disclosure had been filed and substantiated during the opposition proceedings, it was thus not a fresh ground for opposition within the meaning of the Opinion of the Enlarged Board of Appeal G 10/91 (OJ EPO 1993, 420, Examination of oppositions/appeals, point 18 of the Reasons). In a communication dated 21 November 2001 the Opposition Division had expressed its provisional opinion that, taking into account that the ground for opposition under Article 100(b) EPC was filed outside the nine months period of opposition and that said new ground did not prima facie appear to prejudice the maintenance of the patent in suit, the ground for opposition under Article 100(b) EPC was not to be admitted into the opposition proceedings. In view of the provisional opinion of the Opposition Division, and in view of the fact that the oral proceedings before the Opposition Division took place on a Friday, namely on 7 November 2003, this ground was not further pursued during the oral proceedings before the Opposition Division, but it was not withdrawn. The further objections raised under Article 100(b) filed on 19 September 2005 were highly relevant and the Board was therefore obliged to consider it. The European Patent Office should not maintain European patents that were invalid, to avoid litigation at the national level.
Claim 1 of the main request required that boehmite-containing porous layer had pores having a pore radius of from 1 to 30 nm in a pore volume of from 0.3 to 1.2 ml/g (feature b1), pores having a pore radius of from 10 to 30 nm in a pore volume of from 0.2 to 1.0 ml/g (feature b2) and pores having a pore radius of from 30 to 100 nm in a pore volume of not more than 0.3 ml/g (feature b3). Document D1 disclosed a recording medium comprising a boehmite-containing porous layer on a substrate having pores with a radius essentially in the range of from 1 to 15 nm having a pore volume of from 0.3 to 1.0 cc/g, wherein the b axis of the boehmite was vertical to the sheet surface, so that the boehmite had an orientation degree index of zero. It followed that the novelty of feature b3 was taken away by the porous layer of the recording medium known from document D1, since pores having a pore radius of from 30 to 100 nm were absent in said porous layer and thus had a pore volume of zero, in any case "not more than 0.3 ml/g" as required by claim 1 of the main request. The relation between pore radius and pore volume (known as the pore radius distribution) disclosed in document D1 was also novelty destroying for feature b1. Since the range for the pore radius described in document D1 overlapped with the pore radius range of feature b2, this feature was anticipated by document D1 as well (reference was made to the upper Figure in Attachment 5 of the letter dated 19 September 2005, showing examples of distribution of pore radius described in D1 0.5/0.3/0). The subject-matter of claim 1 of the main request was thus not novel with respect to document D1.
Assuming that the only difference between the subject-matter of claim 1 of the main request and the recording medium according to document D1 was that the pore volume for pores having a pore radius of from 10 to 30 nm was specified to be at least 0.2 ml/g, the subject-matter of claim 1 of the main request lacked an inventive step, since it was common general knowledge to adjust the majority of the pores within the pore radius range of 10 to 15 nm in order to secure sufficient absorbency of the recording medium, especially when used as ink jet recording medium. The person skilled in the art seeking to improve the beading behaviour of the recording medium according to document D1 would consider document D3, in particular Examples 13 to 16 showing a recording medium comprising an alumina hydrate which produced images free of beading (see pages 22 and 23, page 29, lines 30 to 46, and Figure 8). That Examples 13 to 16 related to an amorphous alumina hydrate, and not to a crystalline alumina hydrate as disclosed in document D1, would not deter the person skilled in the art from combining documents D1 and D3, because the form of the alumina hydrate, amorphous or crystalline, only mattered for the degree of transparency of the boehmite layer; it did not influence the beading properties of depicted layer. A straightforward calculation using the pore radius distribution shown in Figure 8 and the data in Table 9 showed that the ink receiving layer of Example 13 had pores having a radius of from 10 to 30 nm with a pore volume of 0.25 cc/g. Starting from document D1, it was obvious to include pores with a pore radius distribution having two peaks, one peak smaller than 10 nm and one peak within the range of from 10 to 20 nm, as known from the second aspect of the recording
medium according to document D3, in the recording sheet according to document D1, and thus to arrive at the subject-matter of claim 1 of the patent in suit. The subject-matter of independent claim 1 of the main request thus lacked an inventive step.

VII. The respondent argued in writing and at the oral proceedings essentially as follows:

The ground for opposition under Article 100(b) EPC filed in the appeal proceedings was a fresh ground for opposition, since it was not part of the decision under appeal. No approval was given to the Board to consider this ground for opposition.

The subject-matter of claim 1 of the main request was novel with respect to document D1. This document disclosed a porous layer of pseudo-boehmite having pores with a radius within the range of from 1 to 15 nm. By way of contrast, claim 1 of the main request postulated the existence of pores "having a pore radius of from 30 to 100 nm" (cf. feature b3). Document D1 was silent about feature b2, in particular there was no disclosure that pores having a pore radius of from 10 to 30 nm had a pore volume of at least 0.2 ml/g.

The inventors of the present invention had found that if the pore volume for pores having a pore radius of from 10 to 30 nm was less than 0.2 ml/g, the ink-absorbing speed became unsatisfactorily slow and beading occurred. The prior art did not hint or suggest a recording medium comprising a boehmite-containing porous layer having the pore radius distribution function described by features b1 to b3. The person
skilled in the art would not combine the teaching of documents D1 and D3, because the former was concerned with boehmite in the crystalline form, whereas the latter was mainly concerned with boehmite in the amorphous form. In particular, Examples 13 to 16 of document D3 related to amorphous alumina hydrate. Hence the subject-matter of claim 1 of the main request was to be considered to involve an inventive step.

Reasons for the Decision

1. Objection of lack of sufficiency of disclosure

1.1 It is stated in the minutes of the oral proceedings before the Opposition Division which took place on 7 November 2003 from 9.05 to 10.48 hrs, that "The late filed new ground of opposition (Art. 100 (b) EPC), which was introduced by the opponent in his letter of 23.10.2001, and which was not admitted in the procedure according to Art. 114 (2) (cf. provisional opinion issued by the opposition division on 21.11.2001), was not maintained by the opponent." see point 1, second paragraph, of said minutes. In the opinion of the Board, the statements in points 6, 7, 11 and 12a of the section of the decision entitled FACTS AND SUBMISSIONS are in agreement herewith.

The correctness of the minutes was not contested by the appellant. However, the appellant has argued that the expression "The late filed new ground of opposition ... was not maintained by the opponent" merely meant that the ground for opposition under Article 100(b) EPC was not maintained by the opponent during the oral
proceedings before the Opposition Division, it did not mean that said ground for opposition was withdrawn altogether (see point VI above).

In the judgement of the Board, the statement in the minutes that "The late filed new ground of opposition ... was not maintained by the opponent" expresses that the objection under Article 100(b) EPC was not upheld by the appellant. Consequently, in the section entitled REASONS FOR THE DECISION in the decision under appeal, the grounds for opposition under Article 100(b) EPC are not dealt with by the Opposition Division.

If the appellant had been of the opinion that the ground for opposition under Article 100(b) EPC should have been dealt with in the decision under appeal, arguments in this respect should have been presented in the statement of grounds of appeal (Article 108 EPC), because the statement of grounds of appeal must contain the appellant's complete case (see Guidance for parties to oral proceedings and their representatives, OJ EPO 2003, 419, point 2.1).

That the appellant did not mention the ground for opposition under Article 100(b) EPC in his statement of grounds of appeal supports the view that the objection under Article 100(b) EPC was not upheld by the appellant in the oral proceedings before the Opposition Division.

The Board thus concludes that the ground for opposition under Article 100(b) EPC filed on 19 September 2005, i.e. four weeks before the oral proceedings before the Board, is a fresh ground for opposition (see e.g.
of 29 October 2003, point 1 of the decision), which, according to point 18, penultimate sentence, of the Opinion G 10/91 (loc. cit.) of the Enlarged Board of Appeal, "may not be dealt with in substance in the decision of the Board of Appeal" (if the patentee does not agree to the introduction of a fresh ground for opposition, which is the case here).

1.2 It may be noted that if the appellant had wished to present his case with respect to Article 83 EPC during the oral proceedings before the Opposition Division, he could have easily done so. The argument presented by the appellant in his letter of 23 October 2001 under the heading "Sufficiency of disclosure on the basis of D2 (JP 7-2430B)", viz. that the disclosures of document D2 in the name of the respondent and of the specification of the opposed patent were inconsistent and incompatible with respect to the minimum value of the pore volume specified in feature b2, was relatively short and straightforward. Alternatively, the appellant could have requested a decision on the basis of his written submissions during the oral proceedings before the Opposition Division. In both cases he would have obtained an appealable decision with respect to why the ground for opposition under Article 100(b) EPC was not admitted into the opposition proceedings, or, if the Opposition Division had admitted said ground, why said ground did not prejudice the maintenance of the patent in suit as granted.

The additional argument of the appellant that he did not wish to argue the objection of insufficiency of disclosure during the oral proceedings before the Opposition Division because they took place on a Friday
is not entirely understood by the Board. It is clear from the minutes of the oral proceedings before the Opposition Division that the ground for opposition under Article 100(b) EPC was one of the first items to be discussed. It is not apparent from the minutes that there was any time pressure on the parties to present their respective cases. The oral proceedings before the Opposition Division were apparently conducted in a speedily manner, since they were closed at 10.48 hrs. Hearing the parties' views on Article 100(b) EPC and deciding on this point would probably not have prolonged the oral proceedings much. The right of parties to be heard (Article 113(1) EPC) applies at all times and is not forfeited or restricted, if oral proceedings before departments of the European Patent Office happen to be conducted on a Friday.

Main request

2. Objection of lack of novelty

2.1 Interpretation of claim 1

The boehmite-containing porous layer comprised in the recording medium of claim 1 of the patent in suit has

b1 pores having a pore radius of from 1 to 30 nm in a pore volume of from 0.3 to 1.2 ml/g,

b2 pores having a pore radius of from 10 to 30 nm in a pore volume of from 0.2 to 1.0 ml/g and

b3 pores having a pore radius of from 30 to 100 nm in a pore volume of not more than 0.3 ml/g.
In the opinion of the Board, the positive wording of claim 1, viz. "wherein the porous layer has pores ...", indicates that pores in each of the three ranges defined for the pore radius are present, in particular that pores are present having a pore radius in the range of from 30 to 100 nm. The range for the pore volume in feature b3, viz. "of not more than 0.3 ml/g" includes, in a mathematical sense, the value of 0 ml/g, which in turn implies that the number of pores having a pore radius in the range from 30 to 100 nm must also be 0. This mathematical interpretation would thus lead to the conclusion, that the boehmite-containing porous layer has no pores having a pore radius of from 30 to 100 nm, which is in conflict with the wording of feature b3 itself. In the judgement of the Board, the person skilled in the art trying to interpret the claim in a technically meaningful way would therefore not equate the expression "in a pore volume of not more than 0.3 ml/g" with "in a pore volume of from 0.0 to 0.3 ml/g". The statement "Thus, it is more preferable that pores having a pore radius exceeding 30 nm are not present so much, and that the pore volume of pores having a pore radius in the range of from 30 to 100 nm is not more than 0.1 ml/g." on page 3, lines 8 to 9, of the patent in suit is not in conflict with the above interpretation, nor with the wording of feature b3 of claim 1 in this respect.

2.2 The appellant has submitted that the subject-matter of claim 1 of the main request (patent as granted) lacked novelty with respect to document D1.
Document D1 discloses a recording medium comprising a boehmite-containing porous layer "consisting essentially of pores with a radius of from 1 to 15 nm and having a pore volume of from 0.3 to 1.0 cc/g" (which corresponds to a pore volume of from 0.3 to 1.0 ml/g), see column 1, lines 43 to 56. Since the boehmite crystals are said to be preferably oriented, so that the b axis is vertical to the sheet surface (see column 1, lines 46 to 50), the Board is satisfied that document D1 discloses the feature of claim 1 of the main request that "the boehmite has an orientation degree index of not larger than 0.5". In fact, if all of the b-axes of the boehmite crystal particles are oriented vertically to the surface of the substrate, the value of the orientation degree index is 0 (see page 3, lines 28 to 30, of the patent in suit).

2.3 The expression "consisting essentially of pores with a radius of from 1 to 15 nm" employed in the passage in column 1, lines 51 to 56, of document D1 indicates that pores having a pore radius larger than 15 nm or smaller than 1 nm are practically not present in the porous layer and that the associated pore volume is negligible. The pore radius range "from 30 to 100 nm" defined in feature b3 is far removed from the range pore radius range "from 1 to 15 nm" disclosed in document D1. The Board concurs with the appellant that pores having a pore radius of from 30 to 100 nm are not present in the boehmite-containing porous layer known from document D1. The Board does not agree with the appellant that feature b3 leaves it open whether pores having a pore radius of from 30 to 100 nm are present or not in the boehmite-containing porous layer defined in claim 1 as
explained in point 2.1 above. In the opinion of the Board, feature b3 is thus not disclosed in document D1.

2.4 Document D1 does not disclose what the shape is of the pore radius distribution as a function of the pore radius. In particular, document D1 does not disclose what the pore radius distribution is in the sub-ranges from 1 to 10 nm and from 10 to 15 nm. The latter range is the range of "overlap" between the full range disclosed in document D1 and the range of from 10 to 30 nm mentioned in feature b2. It can only be inferred from document D1 that the sum of the pore volumes corresponding to pores having a pore radius in the sub-range from 1 to 10 nm and pores having a pore radius in the sub-range from 10 to 15 nm, viz. the total pore volume, must be in the range from 0.3 to 1.0 cc/g. Stated differently, document D1 does not disclose how the total pore volume is split up between the sub-ranges of pore radii from 1 to 10 nm and pore radii of from 10 to 15 nm. In particular, document D1 does not disclose that pores having a pore radius of from 10 to 15 nm have a pore volume of from 0.2 to 1.0 ml/g. It follows that document D1 does not disclose feature b2.

The appellant has argued that document D1 disclosed every pore radius distribution function for which the statement or condition "consisting essentially of pores with a radius of from 1 to 15 nm and having a pore volume of from 0.3 to 1.0 cc/g" was fulfilled. The Board cannot accept this argument. A distinction must be made between what falls under the ambit of a statement such as the above statement and what is directly and unambiguously derivable from that
statement. It is the latter that counts when assessing novelty.

2.5 Document D3 does not disclose a recording medium with all the features of claim 1. Since this was not contested by the appellant, there is no need for further substantiation.

2.6 It follows from the above that the subject-matter of independent claim 1 of the main request is novel within the meaning of Article 54 EPC.

3. **Objection of lack of inventive step**

3.1 An object of the invention is "to provide a recording medium having an ink-receiving layer having a satisfactory ink-absorbing speed without impairing the transparency of the layer" (see paragraph [0007] of the patent in suit).

This problem is solved by the subject-matter of claim 1, in particular by the feature that the recording medium comprises at least one boehmite-containing porous layer on a substrate, which layer has a pore distribution function (see point 2.1 above) as defined by the features b1, b2 and b3, wherein the boehmite has an orientation degree index of not larger than 0.5. The upper and lower values of the pore volume in the ranges for the pore radius "from 1 to 30 nm", "from 10 to 30 nm" and "from 30 to 100 nm" (cf. features b1, b2 and b3, respectively) are elucidated in paragraphs [0010], [0011] and [0012], respectively, of the patent in suit. The upper value for the orientation
degree index is elucidated in paragraph \[0016\] of the patent in suit.

The object of the invention to provide a recording medium having an ink-receiving layer having a satisfactory ink-absorbing speed is closely related to a phenomenon called beading. Beading occurs because of an insufficient ink absorptivity of the recording medium. It is, after printing, visually recognized as colour unevenness shaped like beads (see page 2, lines 22 and 23, and page 6, lines 17 and 18, of the patent in suit, see also for example document D1, column 3, lines 4 to 10). It is necessary for the boehmite-containing porous layer that the pore volume of pores having a pore radius in the range of from 10 to 30 nm is from 0.2 to 1.0 ml/g (see feature b2). If the pore volume of pores having a pore radius in the range of from 10 to 30 nm is less than 0.2 ml/g, the ink-absorbing speed becomes unsatisfactorily slow.

3.2 Document D1 relates to a recording medium comprising a boehmite-containing porous layer on a substrate, which has adequate absorptivity and high transparency due to the chosen pore radius/pore volume characteristics and the orientation of the crystals in the pseudo-boehmite porous layer (see column 1, lines 43 to 58). The recording medium according to document D1, which represents the closest prior art, comprises a boehmite-containing porous layer consisting essentially of pores having a pore radius of from 1 to 15 nm in a pore volume of from 0.3 to 1.0 ml/g, see column 1, lines 43 to 56.
The true object of document D1 is to provide a recording sheet excellent in scratch resistance (see column 1, lines 32 to 34). This object is solved by providing a recording sheet comprising a substrate, a porous layer of pseudo-boehmite having a thickness of from 10 to 100 µm formed on the substrate and a layer of silica gel having a thickness of from 0.1 to 30 µm formed on said porous layer (cf. claim 1). To avoid beading, the amount of binder in the silica gel should be less than 30 wt% (see column 2, line 52, to column 3, line 10). It may be noted that a silica gel layer having a thickness of from 0.1 to 30 µm is also preferably be used in the patent in suit to impart abrasion resistance to the recording medium, see paragraph [0022] of the patent in suit.

3.3 The subject-matter of claim 1 differs from the recording medium disclosed in D1 inter alia in that the boehmite-containing porous layer according to the invention must have a pore structure satisfying features b2 and b3 (see points 2.3 and 2.4 above).

3.4 In the judgement of the Board, the prior art cited by the appellant cannot suggest to the person skilled in the art to provide the porous layer having pores with a pore radius of from 1 to 15 nm in a pore volume of from 0.3 to 1.0 ml/g known from document D1 with a pore structure as claimed in claim 1 of the main request.

Document D3 discloses a recording medium comprising an alumina hydrate having an average pore radius of 20 to 200 Å (2 to 20 nm) and a half breadth of pore radius distribution of 50 to 150 Å (5 to 10 nm) (see claim 1). The general idea of document D3 is that problems with
recording media, such as beading, bleeding, insufficient ink absorptivity, and cracking in the ink receiving layer, which are associated with prior art proposing a narrow distribution of pore radius (see in particular page 2, lines 50 to 53, and page 3, lines 27 to 33, relating to the problem of beading) can be overcome by a recording medium having a wide pore radius distribution (see page 7, line 57, to page 8, line 18). The average pore radius should not be smaller than 2 nm to prevent beading (see page 8, lines 14 to 16). The appellant has referred in particular to the second aspect of the invention described on page 9, line 17, to page 10, line 1, and pages 22 and 23, showing embodiments 13 to 16. According to the second aspect of the invention, the ink-receiving layer must have at least two peaks. On page 9, lines 18 and 19, it is stated that the solvent component in an ink is absorbed by relatively large pores, while the dye in the ink is adsorbed by relatively small pores. If the solvent is quickly absorbed, images free of beading can be provided, see page 29, lines 35 and 36.

Apart from the fact that document D3 does not directly and unambiguously disclose the pore structure claimed in claim 1 of the main request (but rather a pore structure of an alumina hydrate resulting in a recording medium having a pore structure falling within the ambit of claim 1 of the main request), the recording media according to the second aspect of document D3 have a porous layer containing alumina hydrates in amorphous form, see page 22, lines 7 and 8.
In contrast, the boehmite crystals of the porous layer of the recording medium known from document D1 are preferably oriented for imparting high absorptivity and transparency (see column 1, lines 45 to 50, of document D1).

3.5 In the judgement of the Board, the person skilled in the art seeking to improve the recording medium according to document D1 would thus not have an incentive to combine the teaching of document D3 with the teaching of document D1.

3.6 Consequently, the Board comes to the conclusion that the subject-matter of claim 1 according to the main request is not obvious to the person skilled in the art and therefore involves an inventive step within the meaning of Article 56 EPC. It follows that the patent in suit can be maintained as granted.

Auxiliary requests

3.7 Since the main request of the respondent is allowable, there is no need to consider any of the auxiliary requests (i) through (v) of the respondent.
Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Dainese W. Moser