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**D E C I S I O N**  
**of 22 November 2001**

**Case Number:** T 0570/98 - 3.2.5

**Application Number:** 89313000.5

**Publication Number:** 0373903

**IPC:** B41M 5/30

**Language of the proceedings:** EN

**Title of invention:**

Thermo-sensitive recording label paper

**Patentee:**

TOMOEGAWA PAPER CO. LTD.

**Opponents:**

Papierfabrik August Koehler AG  
Stora Enso Publication Paper Aktiengesellschaft  
Renker GmbH & Co. KG  
New Oji Paper Co., Ltd.

**Headword:**

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**Relevant legal provisions:**

EPC Art. 83, 56

**Keyword:**

"Sufficiency of disclosure (yes)"  
"Inventive step (yes)"

**Decisions cited:**

G 0004/92

**Catchword:**

-





Case Number: T 0570/98 - 3.2.5

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.5**  
**of 22 November 2001**

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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 19 March 1998  
rejecting the opposition filed against European  
patent No. 0 373 903 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** W. Moser  
**Members:** W. R. Zellhuber  
P. E. Michel

## Summary of Facts and Submissions

- I. The appellants I, II and III (opponents 01, 02 and 04) lodged an appeal against the decision of the Opposition Division rejecting the oppositions against the European patent No. 0 373 903.
- II. Oppositions were filed against the patent as a whole and based on Article 100(a) EPC (lack of inventive step, Article 56 EPC) and Article 100(b) EPC (insufficiency of disclosure of the invention under Article 83 EPC). The Opposition Division held that neither of the cited grounds for opposition prejudiced the maintenance of the patent in suit as granted and rejected the oppositions.
- III. Oral proceedings were held before the Board of Appeal on 22 November 2001. Appellant I and the party as of right (opponent 03), although duly summoned, were not represented.
- IV. The appellants I, II and III requested that the decision under appeal be set aside and that the European patent No. 0 373 903 be revoked.

The respondent (patentee) requested that the appeals be dismissed, or, as an auxiliary request, 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 18 October 2001:

(a) claims 1 to 5 and

(b) description, pages 3 to 15.

The party to the appeal proceedings as of right under Article 107 EPC refrained from making any submissions.

V. Claim 1 of the patent in suit as granted (main request) reads as follows:

"1. A thermo-sensitive recording label paper comprising a laminate which comprises

- (1) a thermo-sensitive color-developing layer containing at least a colorless or lightly colored leuco-dye and a color-developer for developing the color of the leuco-dye provided on one surface of a paper support,
- (2) a protective layer provided on said color-developing layer, and
- (3) at least one of a back layer and a protective underlayer, said back layer being provided on the other surface of said paper support, and said protective underlayer being provided between said paper support and said color-developing layer;

said laminate having an internal bond strength of 2.5 kg-cm or more according to Tappi UM-403, and the surface of said protective layer of the laminate having a Bekk smoothness of 500 seconds or more according to JIS P8119."

VI. In the course of the appeal procedure, the following documents have, *inter alia*, been referred to:

A1: US 4 717 709;

A12: US 4 682 191;

A16: JP-A 63-15873 with partial English translation;

A17: JP-A 63-53093 with partial English translation;

TAPPI UM 403: "Test for interfiber bond using the internal bond tester", 66/1991 TAPPI Useful Methods, Technical Association of the Pulp and Paper Industry, New York.

VII. Appellants I, II and III argued essentially as follows:

According to TAPPI UM 403, the internal bond strength had the dimension of an energy, and the average, maximum and minimum value of that strength had to be reported. According to the patent in suit, however, only one single value was indicated using the apparently incorrect dimension "kg-cm".

Furthermore, the patent in suit did not disclose how the desired internal bond strength of the laminate, in particular that of the non-paper layers, could be achieved. It was further not conceivable that the internal bond strength of a paper support increased from a value of "3.2 kg-cm" to a value of "3.5 kg-cm" when included in a laminate, as pointed out in Tables 1 and 2 on pages 8 and 11, respectively, of the patent in suit.

Therefore, the patent in suit did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Furthermore, the subject-matter of claim 1 of the patent in suit did not involve an inventive step.

Document A1 was considered to represent the closest



prior art. It disclosed a thermo-sensitive recording label paper comprising a laminate of the same construction as that referred to in claim 1 of the patent in suit. The surface of the protective layer had a Bekk smoothness of 500 s. Document A1 did not mention the internal bond strength of the laminate. However, it suggested using high quality paper and providing good adherence between all the layers of the laminate.

The only remaining object was thus to avoid breakage of the skeleton during its removal after die-cutting of the label paper.

If such problems occurred, then a person skilled in the art would consider strengthening the label paper and, consequently, would provide a label paper having an appropriate internal bond strength.

Moreover, document A16 suggested a cover paper applied to a release sheet, wherein, in order to avoid sheet rupture during re-release of the cover paper, the cover paper had an internal bond strength above 2.76 kpcm.

The patent in suit referred to the internal bond strength of the laminate. However, it had to be considered that, in the thermo-sensitive recording label paper according to the patent in suit, the thickness of the paper was a multiple of the thickness of the other layers. Thus, in order to avoid breakage, the paper layer had to have a sufficiently high internal bond strength, as indicated in the patent in suit, page 5, lines 39 to 40.

Document A16 might also be considered to represent the closest prior art. In that case, it would be obvious to

adapt the label disclosed in document A16 to a thermo-sensitive recording paper by adding the layers suggested for that purpose in document A1.

Furthermore, document A17 disclosed a thermo-sensitive recording paper comprising a base paper, a heat-sensitive recording layer, an underlayer and a protective overcoat layer. The base paper had an internal bond strength of up to 2.76 kpcm. Document A17 did not indicate the surface smoothness of the overcoat layer. However, a Bekk smoothness of 500 s or more of that surface, as claimed in claim 1 of the patent in suit, had already been suggested in the prior art (eg. in documents A1 and A12) for the purpose of providing a thermo-sensitive recording label paper having good printing properties.

Document A12 also suggested a thermo-sensitive recording paper comprising a paper support having an internal bond strength of 2.5 kpcm.

Thus, in order to avoid breakage of the skeleton of the label paper, a person skilled in the art had been motivated to provide a thermo-sensitive recording label paper comprising a laminate having an internal bond strength of 2.5 kpcm or more according to Tappi UM 403. The subject-matter of claim 1 of the patent in suit thus did not involve an inventive step.

VIII. The respondent argued essentially as follows:

The patent in suit indicated the values of internal bond strength in terms of kg-cm. However, in normal daily life, pound mass and pound weight were interchangeable terms. There was thus no cause to doubt

these indications.

Furthermore, the difference in internal bond strength between the paper support, referred to in Table 1 of the patent in suit, and the respective laminate, referred to in Table 2, were obviously the result of the lamination process.

The patent in suit indicated the value of internal bond strength of the laminate, and a person skilled in the art would readily be able to increase the bond strength of the laminate.

As regards the question of inventive step, document A1, which concerned a thermo-sensitive recording label paper, represented the closest prior art. The problem firstly addressed by the respondent was the breakage of the skeleton of a label paper in a die-cutting operation.

The solution to this problem was to use a laminate having an internal bond strength of 2.5 kg-cm or more. The paper support itself, the various layers on the paper support and the interface between the layers, all had to have an internal bond strength of 2.5 kg-cm or more. To arrive at such a solution had required the realisation that such breakage upon label processing (die cutting) was caused by impact forces imparted to the laminate in the thickness direction, which resulted in cracking occurring between layers of the skeleton. The mechanical properties conventionally considered to relate to the breaking phenomenon were tensile strength and tearing strength.

The cited prior art neither referred to the problem of

breakage of the skeleton, nor suggested a thermo-sensitive recording label paper having the combination of features specified in claim 1 of the patent in suit, in particular, a recording label paper wherein the laminate had an internal bond strength of 2.5 kg-cm or more.

Document A16 did not concern thermo-sensitive recording label papers. It was concerned with avoiding sheet rupture on re-releasing an adhesive sheet. The patent in suit, however, concerned papers used for price indication and bar code indication wherein re-release of the labels should be avoided.

Document A12 was concerned with the internal bond strength of the paper support and taught away from the use of higher internal bond strength above 2.5 kg-cm because of potential recording density problems.

Document A17 likewise taught away from the use of high internal bond strength and contained no teaching concerning the internal bond strength of the laminate.

## **Reasons for the Decision**

### *Main request*

#### 1. *Sufficiency of disclosure*

The patent in suit indicates the internal bond strength of a laminate by referring to the known test method Tappi UM 403. According to that test method, the internal bond strength has the dimension of an energy ("foot pound" or "kpcm"). Therefore, a person skilled

in the art would understand that the term "kg" used in the patent in suit has to be construed as representing a weight rather than a mass.

Furthermore, the patent in suit indicates specific values of internal bond strengths of a laminate and paper layers. The patent in suit does not concern a test report on the internal bond strength of specific specimens. Only the latter would, according to Tappi UM 403, require, among others, an indication of the average, maximum, and minimum values resulting from these tests for both principal directions of the specimen.

Moreover, there is no indication that the test method according to Tappi UM 403 could not be applied to laminates. There is further no evidence that a person skilled in the art would not be able to produce a laminate having the indicated internal bond strength. From the patent in suit, page 5, lines 52 to 54, it follows that "the internal bond strength of the coat layer itself and the adhesive strength thereof with the support is controlled by suitably selecting the kind and the amount of the binder ... to give a desired internal bond strength of the intended label paper". The patent in suit further mentions a number of substances and binders to be used for making such a recording label paper, cf. in particular, page 7, and discloses, in detail, a plurality of examples of making recording labels having the desired properties, cf. pages 8 to 15. It can further not be excluded that, due to lamination and calendering, the internal bond strength of the laminate exceeds that of the paper material used for making the laminate.

Thus, the patent in suit discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Hence, the patent in suit meets the requirements of Article 83 EPC, and the ground laid down in Article 100(b) EPC does not prejudice its maintenance.

2. *Inventive step*

2.1 Closest prior art

The patent in suit concerns a thermo-sensitive recording label paper suitable for being used as a label for price and bar code indications in POS systems (point-of-sale systems). It comprises a paper support, a thermo-sensitive colour-developing layer, an underlayer or back layer and, in order to prevent the penetration of foreign matter into the colour-developing layer, a protective cover layer, cf. page 3, lines 5 to 7 and 24 to 33 of the patent in suit. These label papers are subjected to die-cutting and, thereafter, the skeleton is removed, cf. page 3, lines 34 to 41 of the patent in suit.

Document A1 also concerns a thermo-sensitive recording paper suitable for use as a label for attachment to commercial articles for indicating prices, article and shop names, cf. column 1, lines 6 to 12 and 55 to 59. It also discloses a label paper including a laminate comprising a paper support, a thermo-sensitive colour-developing layer, an underlayer layer, and a protective cover layer of high smoothness, cf. abstract and column 2, lines 4 to 7.

Due to these similarities in purpose and structure of

the label paper, document A1, in the Board's view, represents the closest prior art.

## 2.2 Problem-Solution

The problem underlying the patent in suit may be seen in providing a thermo-sensitive recording label paper superior in die-cutting processability, recording sensitivity, and readability of recorded images.

The problem is solved by providing a thermo-sensitive recording label paper comprising in combination the features specified in claim 1 of the patent in suit.

Whilst document A1 already suggests a Bekk smoothness of at least 500 s of the protective cover layer in order to provide good image quality, the object of a superior die-cutting processability is solved, according to the patent in suit, by providing a label paper comprising a laminate having an internal bond strength of 2.5 kg-cm (corresponding to 2.5 kpcm) according to Tappi UM 403.

## 2.3 Non-obviousness

- 2.3.1 The patent in suit reports attempts which had been made "... to increase the cutting speed of label paper and to decrease the width of cut residue called a "skeleton" resulting from the cutting for the purpose of improving the yield and productivity", cf. page 3, lines 39 to 41 of the patent in suit. However, this led "to an increase of the mechanical impact force given to the skeleton on cutting, which is liable to cause breakage of the skeleton, and to make difficult the removal of the skeleton from the label", cf. page 3,

lines 41 to 44 of the patent in suit.

According to the patent in suit, conventionally, "the mechanical properties of thermo-sensitive recording label paper that relate to breaking phenomena of a skeleton upon die-cutting have been considered to be tensile strength (JIS P8113) and tearing strength (JIS P8116)", cf. page 5, lines 21 to 23. However, it had been found "that skeleton breakage is caused principally by low internal bond strength of the thermo-sensitive recording label ... This means that the breaking phenomenon does not principally correlate with the tensile strength in longitudinal and lateral directions, but has to be understood as a mechanical behaviour caused by impact force imparted to the label paper in the thickness direction upon die-cutting. Analysis of the breaking reveals that cracking occurs between layers of the skeleton by impact force in the thickness direction caused by separating the skeleton from the release paper immediately after the die-cutting, and that the breaking is induced by concentration of the tensile stress generated by winding the skeleton", cf. page 5, lines 26 to 33.

- 2.3.2 None of the cited documents mentions the problem of skeleton breakage and, as a consequence, none of these documents suggests, in order to solve that problem, providing a laminate having an internal bond strength of 2.5 kg-cm or higher.

The fact that the prior art does not mention the problem of skeleton breakage does not allow the conclusion that the problem has already been solved in the prior art, in particular, by the label paper disclosed in document A1.



2.3.3 Document A1 focuses on the adhesive properties between the various layers of the laminate and suggests using a high quality paper. However, it is silent about the problem of skeleton breakage and about the internal bond strength of any of these layers. Thus, the disclosure of document A1 alone does not lead a person skilled in the art to focus on the internal bond strength of the laminate in order to improve the strength of the label paper and the skeleton.

2.3.4 Document A16 does not relate to a thermo-sensitive recording label paper. It concerns a re-release paper and suggests using a fibre sheet having an internal bond strength of 2.76 kpcm or more in order to avoid sheet rupture during re-release. This represents an application different from, if not contrary to, that of the patent in suit and the closest prior art wherein a transfer of a label, eg. a price indicating label, from one object to another should be prevented or at least made difficult.

Thus, there was no motivation to apply the fibre sheet suggested in document A16 to the label paper disclosed in document A1, for the purpose of improving its re-release properties.

Moreover, any combination of the teachings of documents A1 and A16 (with document A1 or document A16 considered to represent the closest prior art) does not result in a label paper wherein the internal bond strength of the whole laminate amounts to 2.5 kpcm or higher.

2.3.5 Document A17 concerns a heat-sensitive recording paper giving clear recorded images excellent in gradient and suggests using a base paper having an internal bond

strength of 2.76 kpcm (0.200 ft lb/in<sup>2</sup>) or lower. Document A17 does not refer to the internal bond strength of the whole laminate and, as far as the base paper is concerned, gives preference to using papers having a substantially lower internal bond strength than those usually used, cf. translation of page 2, left bottom column, lines 1 to 4.

Thus, there is no indication in document A17 of a thermo-sensitive recording label paper comprising in combination the features of claim 1 of the patent in suit, and a combination of the teachings of documents A1 and A17 further does not result in such a thermo-sensitive recording label paper.

- 2.3.6 Document A12 concerns a heat-sensitive recording paper. However, it does not disclose a recording paper including a laminate comprising an underlayer or back layer, and a protective cover layer. It further suggests using a paper having an internal bond strength of 2.5 kpcm or less in order to obtain high recording densities, cf. abstract and column 3, lines 12 to 25.

Thus, document A12 does not suggest a thermo-sensitive recording label paper wherein a laminate comprising a protective layer and an underlayer or back layer has an internal bond strength of 2.5 kpcm or more.

- 2.3.7 To sum up, the cited prior art (documents A1, A12, A16 and A 17) does not refer to the problem of skeleton breakage. Furthermore, it only refers to the internal bond strength of the paper substrate (documents A12, A16 and A17) and, when used in combination with a thermo-sensitive recording layer (documents A12 and A17), gives preference to the use of papers having

lower internal bond strengths. Thus, the cited prior art does not suggest the thermo-sensitive recording label paper according to claim 1 of the patent in suit wherein the laminate has an internal bond strength of 2.5 kpcm or more.

Although the paper layer of a thermo-sensitive recording label paper may form the thickest layer within the laminate, the latter as a whole may have an internal bond strength different from that of the paper layer, and it is the patent in suit which firstly focuses on the internal bond strength of the laminate and each of its components.

2.3.8 The other documents cited in the course of the appeal procedure are less relevant than the above mentioned documents.

2.3.9 Therefore, the subject-matter of claim 1 of the patent in suit as granted (main request) involves an inventive step within the meaning of Article 56 EPC. The subject-matter of claims 2 to 5 which are appendant to this claim 1 similarly involves an inventive step.

It is, accordingly, not necessary to consider the auxiliary request of the respondent.

3. The present decision is not based on facts or evidence put forward for the first time during oral proceedings. Thus, the decision could be given orally at the end of these proceedings even in the absence of appellant I and the party as of right (cf. decision G 4/92; OJ EPO 1994, 149).

**Order**

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

The appeals are dismissed.

The Registrar:

The Chairman:

M. Dainese

W. Moser