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D E C I S I O N
of 18 May 2004

Case Number: T 0028/01 - 3.4.2

Application Number: 89300086.9

Publication Number: 0325346

IPC: G03G 7/00, B41M 3/10

Language of the proceedings: EN

Title of invention:
Watermarked paper sheet for use in xerographic imaging processes

Patentee:
Arjo Wiggins Fine Papers Limited

Opponent:
AUSSEDAT REY
GIESECKE & DEVRIENT GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Proper construction of claim 1"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0028/01 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 18 May 2004

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 27 December 2000 revoking European patent No. 0325346 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: A. G. Klein
Members: A. G. M. Maaswinkel
M. J. Vogel

Summary of Facts and Submissions

I. European patent No. 0 325 346 (based on application No. 89 300 086.9) was revoked by the decision of the opposition division dated 27 December 2000.

II. On 8 January 2001 the patent proprietor filed an appeal against this decision and paid the appeal fee on the same day. The statement setting out the grounds of appeal was received on 14 April 2001.

III. Opposition had been filed against the patent as a whole by opponents 1 (Aussedat Rey) and opponents 2 (Giesecke & Devrient GmbH).

IV. The opposition by opponents 1 had been based on Article 100(a) EPC in combination with Articles 52(1), 54 and 56 EPC. During the oral proceedings before the opposition division the objection of lack of novelty (Article 54 EPC) raised in the written proceedings was abandoned. Opponents 2 had similarly raised objections under Article 100(a) EPC in combination with Articles 52(1) and 56 EPC. To support their objections the opponents referred *inter* alia to the following documents:

(D1) FR-A-2 588 583

(D2) Xerox Disclosure Journal, vol.2, no.3, May/June 1977

(D4) FR-A-2 097 011

(D8) Three delivery notes, norm CBS1 (three pages) and document TAPPI 1984 (five pages).

The set of documents D8 had been filed by opponents 1 at the oral proceedings before the opposition division. The opposition division had not admitted these documents pursuant to Article 114(2) EPC since, according to the division, they were not prima facie more relevant than the documents already on file. During the appeal proceedings respondents 1 submitted with the letter dated 25 October 2001 again documents D8 together with a further page showing the inverted symbol "NCR".

V. With a Communication pursuant to Article 11(1) of the Rules of Procedure of the Boards of Appeal sent on 10 February 2004 the Board summoned the parties to oral proceedings to take place on 18 May 2004.

VI. At the oral proceedings the appellants requested that the decision under appeal be set aside and that the patent be maintained as granted or auxiliarily on the basis of auxiliary requests I to VI as filed with the letter dated 16 April 2004.

Claim 1 of the main request (granted patent) reads as follows:

"An ion deposition, xerographic or magnetographic print receiving watermarked paper sheet, having a moisture content in the range 4% to 6%, a print receiving surface having a surface resistivity of between 5.10^{10} to 5.10^{12} ohms per square and a reverse surface, characterized in that the print receiving surface has a

Bendsten roughness of not more than 300 ml/min and in that the reverse surface underlying the print receiving surface is formed with a watermark.".

Remaining Claims 2 to 5 of this request are dependent claims.

The contents of the auxiliary requests are not relevant for the purpose of this Decision.

VII. Respondents 2 requested that the appeal be dismissed. Respondents 1, although duly summoned, did not attend the oral proceedings.

VIII. The arguments of the appellants may be summarised as follows:

The invention relates to watermarked and/or laid paper for use as a print receiving sheet in xerographic, magnetographic, ion deposition, and especially laser xerographic imaging processes. For understanding the background of the invention it is noted that watermarked paper had existed many years before the priority date of the patent in suit and that also paper for xerographic processing had been known a long time. The fact that the invention had not been carried out before is therefore already an indication of inventive step. Furthermore, paper manufacturing is a complex process involving many parameters. If a manufacturer wants to modify one particular aspect of this process he must ensure that all other features of the produced paper should be kept equal for the customers. This is documented in the TAPPI paper in the set of documents D8 cited by the respondents, see the penultimate page,

last two paragraphs of the right column "the mill should inform the producer of changes in their paper…"; and (last page) "…the interrelationship of various paper properties and the impossibility of changing one on the paper machine independent of the others". Therefore the skilled person needs a strong motivation before modifying the paper production process.

In the classical Fourdrinier paper machine the papermaking ingredients are diluted in a water suspension which is distributed on an open wire mesh belt known as the Fourdrinier wire. Most of the water is drained but just before it is dry the solid fraction is redistributed by a dandy roll. The pressure exerted by the dandy roll on the top surface has the further effect of improving the smoothness of the top surface which is important for writing or printing purposes. Since the lower surface is determined by the Fourdrinier wire and is somewhat course and the top surface by the dandy roll and smoother, this paper is unsymmetrical in its structure. In fact, because of this unsymmetrical structure all xerographic papers at the priority date of the patent had a recommended print receiving surface, marked by an arrow on the packing to avoid the filling of the paper holder in a copying machine in the wrong orientation which often caused severe problems. Therefore the smoother print receiving side of the sheet was easily distinguishable from the paper rear side.

As the closest prior art either known xerographic paper or known watermarked office paper could be considered.

Xerographic paper is relatively cheap paper for making copies and should therefore bear no watermark that would make the paper more expensive, furthermore the copy should be easily distinguishable from the original, whence it should not have a watermark as the original. Moreover, xerographic paper should be smooth since smoothness is a feature that is desirable for the quality of the xerographic process. Since a watermark introduces some relief to the paper its presence on the toner receiving side affects the smoothness of the paper and may be detrimental to the copying quality, which is another reason why there is no incentive for a person skilled in the art to provide a xerographic paper with a watermark. In the decision under appeal document D1 was cited as disclosing a magnetographic print receiving paper, which is not equal but somehow similar to xerographic paper, having a surface resistivity and roughness as defined in Claim 1. This is a plain paper sheet. The technical problem defined by the difference of the paper sheet in Claim 1 over the prior art in document D1 could be seen in providing exclusivity to the paper. As mentioned before, this, as such, is not an obvious problem, because there is no reason to provide exclusivity to a xerographic paper sheet. Should the skilled person wish to add a distinguishing mark to the paper, this could also be done by adding a logo on the paper surface or a pseudo-watermark with which the problems in applying the toner would be avoided. In any case, the solution defined in Claim 1 of forming a watermark (or laid lines) on the reverse surface underlying the print receiving surface is not obtainable from the prior art in an obvious way. Document D4, referred to in the decision under appeal, does not disclose to form a watermark in the reverse

surface of the paper in order to provide exclusivity, but only to provide a visual aid to help people to write at a particular location of the paper. Since in case of document D4 the purpose of the frame is to enable that information may be written or printed *within* the frame indication, there is no interference between the markings and the printed area as in the invention, therefore the problem underlying the invention does not arise. Finally it is noted that the term "filigrane" in the description and Claim 1 of D4 is not used in the ordinary sense, because according to Claim 2 it may be an ink, according to Claim 3 the "filigrane" may be two small holes, and according to Claim 4 it may consist of indentations. It is also noted that the document does not disclose that there is an advantage of providing the markings on the reverse side. Document D4 does not disclose a watermark applied in the reverse side and made by displacing the paper fibers during the manufacturing process. In any case the skilled person working in the field of paper production of xerographic paper would not have considered this document because it discloses a very specialised sort of paper to be used by French notaries in only very small quantities.

If one starts from watermarked office papers as the closest prior art, it is noted that these papers have been manufactured for a long time and their production process is optimised. Patterning and the watermark are applied by the dandy roll on the face side of the paper. Unlike the pseudo-watermark paper, in which locally the transparency of the paper is modified by oil or chemical treatment and with which the invention is not concerned, the watermark applied by a dandy roll

or other means induces crests in the print receiving surface. Therefore if this watermark paper is used in a xerographic process, the irregularities in the paper surface from the presence of real watermarks or laid lines result in an imperfect contact between the receptor surface to the sheet and imperfect transfer of the toner image. Should the skilled person intend to use a watermarked office paper sheet in a xerographic process and find that the quality of the copy is insufficient for the above reason, he might wish to improve the xerographic process or he might, instead of using a real watermarked paper, use a pseudo-watermark paper which does not carry relief variations in its surface. This shows that the skilled person would have a plurality of possibilities in improving the process. In any case none of the documents on file teaches or suggests to modify the known watermark applying process as defined in Claim 1. This also holds for document D4 for the reasons given before.

As to the late-filed set of documents D8, their relevance is contested, since it has not been evidenced that all documents have been disclosed to the public prior to the priority date of the patent. Furthermore, as already mentioned, the Tappi document supports the fact that a modification of a single parameter in the paper producing process is not straightforward whence the skilled person would not consider a major modification of applying a watermark to the reverse side of the paper as obvious. The Norm CBS1 prescribes in point 1.6 the requirement for MICR (magnetic ink character recognition) printed vouchers that "lightly watermarked paper is acceptable". From this it is clear that the type of watermarks is quite restricted to

watermarks with low relief and that it is applied to the print receiving surface. As to the page showing the inverted symbol "NCR" to be applied to a dandy roll, the fact that the symbol is inverted on the roll actually is a further proof that the watermark printed with this dandy roll is printed on the print receiving surface of the paper in order to legibly display the symbol "NCR".

IX. The arguments of respondents 2 may be summarised as follows:

Claim 1 of the patent in suit defines a plain paper sheet having a certain surface roughness, having a watermark, and which can be imprinted. According to the patent specification, see column 2, lines 22 to 25, the type of watermark or the manner in which it is applied to the paper sheet is not restricted. Furthermore, as expressed in the appellants' letter of 16 April 2004, page 8, third paragraph from bottom, a prior art paper sheet carrying a watermark on the ink receiving side can still be laser printed, from which it follows that in fact both sides may be imprinted. Possibly one of the paper sides may be smoother and this side may be better suitable for being imprinted, but this is not defined in Claim 1. Therefore the concept of "print receiving surface" and "reverse surface" is ambiguous and the only limitation in Claim 1 in this respect is that the paper sheet should carry a watermark whence, accordingly, a watermarked paper is the closest prior art. This is also acknowledged in the patent specification, see column 1, lines 41 to 46. In the notice of appeal of 14 April 2001, page 7, point 4.1, the appellants have accepted that it was obvious for

the skilled person, seeking to make the known watermarked paper more suitable for printing by laser xerographic processes, to modify the paper by adjusting its moisture content and surface resistivity levels so as to match more closely those of unwatermarked plain office copier papers. He would find the solutions for the optimisation in documents D1 (smoothness) and document D2 (moisture content and resistivity) and would thereby arrive at the subject-matter of Claim 1 without an inventive step being involved.

It is emphasised that it is in any case a natural wish of paper manufacturers to manufacture a paper having maximum smoothness on both surfaces and which paper may therefore be printed upon at both surfaces. Since a user feeding a xerographic copying machine with this watermarked paper may feed the paper tray with the paper's either side up, he would, in case the paper is inserted with the watermarked side at the reverse side, automatically obtain the subject-matter of Claim 1.

X. In the letter of 21 October 2001 accompanying the set of documents D8 and the page showing the inverted symbol "NCR" respondents 1 provided arguments concerning the relevance of these documents. These may be summarised as follows:

From the layout design for the dandy roll "NCR" showing the inverted watermark "NCR", from the order form of this roll, and from the Norm "CBS1" which discloses the necessity of using a smooth paper (Bendtsen roughness <150 ml/mm) and which specifies that the watermark should not change the quality of MICR printing it is known to produce smooth vouchers with watermarks. In

the document TAPPI the requirements for magnetic symbols printing (MICR) in particular with laser printers are discussed. It is indicated that the humidity of the paper should be adapted and that the roughness should not be too high. Therefore it is concluded from these documents that it was known that vouchers can be imprinted with a laser printer; that these may contain watermarks; and that the conditions for the paper roughness and humidity are defined. Furthermore it is known that for paper to be used in laser printers the conductivity must be selected. Therefore these documents destroy the novelty of the patent in suit.

Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of the late filed documents*

In response to the grounds of appeal respondents 1 had filed with the letter of 25 October 2001 the set of documents D8 together with a layout design for a dandy roll carrying the inverted symbol "NCR". Documents D8 had not been admitted by the opposition division since these were late filed and were not more relevant than the other documents on file. In the above letter the respondents 1 did not explain in detail why the position of the opposition division not to admit D8 was incorrect and restricted themselves to the arguments summarised in Section X *supra*. In the letter dated 16 April 2004 the appellants argued why this set of documents including the "NCR" dandy layout sheet was

not relevant, which arguments are reproduced in Section VIII. The Board agrees that the late-filed documents are not particularly relevant and sees therefore no reason to question the opposition's decision not to admit them into the proceedings.

3. *Main request*

3.1 Proper construction of Claim 1

3.1.1 During the oral proceedings respondents 2 had argued that, in particular since paper manufacturers aim at fabricating paper with both sides having smooth surfaces so that the sheets can be inserted in a copying machines with either side up, a paper sheet would have two smooth print receiving surfaces and the concept of one "print receiving" and one "reverse" surface was wrong, whence, in consequence, the feature in Claim 1 that the watermark is formed in the reverse surface underlying the print receiving surface is ambiguous or not limiting. The respondents also objected with reference to the patent specification that the term "watermark" in Claim 1 is not restricted to any particular type of watermark.

3.1.2 The Board does not concur with this position. According to the passage in column 2, lines 22 to 25 of the patent specification referred to by respondents 2, whatever the shape of the watermark (laid lines, trade marks or in form of an image), this is applied by *patterning*, for instance by a dandy roll. Therefore the paper sheet defined in Claim 1 clearly comprises a patterned watermark on one of its surfaces and an opposite surface -defined as the print receiving

surface- with surface resistivity and Bendtsen roughness as defined in Claim 1, and the claimed paper sheet further exhibits a moisture content as defined in Claim 1.

3.1.3 Concerning the definition in Claim 1 of the "print receiving surface" which is opposite the reverse surface formed with a watermark, both the wording of the claim and the whole description make it clear that it is an essential feature of the claimed invention that the surface opposite the watermark is actually dedicated to receive printing.

In particular, the Board finds the arguments of the appellants credible, that as a consequence of the fabrication in the Fourdrinier process which was the standard process at the priority date of the patent (1988), the paper surface pressed by the dandy roll had a smoother structure than the surface on the Fourdrinier wire and that this type of laid paper was therefore intrinsically unsymmetrical in its structure, with a well defined smoother print receiving surface: because of this unsymmetrical structure of the paper used in copying machines and the technological status of these copying machines at that time it was necessary to insert the copying paper in the correct orientation in the paper tray as indicated an the arrow on the packing.

3.2 Novelty

Novelty is not in question. The objection of lack of novelty had been abandoned during the opposition proceedings, and taken up again in the appeal only by

respondents 1 on the basis of documents not admitted into the procedure because of their lack of relevance.

3.3 Inventive step

3.3.1 Closest prior art

In the written proceedings respondents 2 had expressed their agreement with the position of the opposition division in the decision under appeal that the closest prior art is reflected by document D1, which discloses a magnetographic print receiving paper which has surface resistivity and roughness values falling under the scope of Claim 1 of the patent.

During the oral proceedings before the board respondents 2 referred to conventional watermarked papers as the closest prior art.

3.3.2 Document D1 as closest prior art

The subject-matter of Claim 1 differs from the magnetographic print receiving paper sheet in the features that the sheet defined in Claim 1 has a moisture content in the range 4% to 6% and in that its reverse surface underlying the print receiving surface is formed with a watermark.

The Board agrees with the reasoning of the opposition division and respondents 2 that from these differences an objective technical problem consisting of two independent partial problems may be formulated, namely improving the quality of reproduction in the

xerographic process and adding security or aesthetic features to the paper sheet.

The solution of the first partial problem, improving the quality of reproduction in the xerographic process, may be found in document D2, which discloses that the use of copying paper with a surface resistivity in the range from about 10^{11} to about 10^{12} ohms/cm^2 at 5 percent moisture content reduces the problem of toner disturbances in the xerographic process.

According to respondents 2, the security is improved by adding a watermark, watermarked papers being known in the art. They refer in particular to document D4 which teaches in the context of a special paper form to add a watermark on the rear surface of a form to be used by notaries, and submit that it would have been obvious for the skilled person to implement the teaching in document D4 on the prior art paper sheet disclosed in document D1.

In this latter point the Board does not share the position of respondents 2. Although watermarked papers were known in the art, which was not disputed amongst the parties, it is not obvious why the skilled person wishing to add security or exclusivity to the magnetographic print receiving paper of document D1 *would* form this watermark in the *reverse* surface underlying the print receiving surface of the sheet, because in the prior art paper manufacturing machines via the Fourdrinier process a watermark is normally patterned via imprint by the dandy roll which provides the smoother, and therefore print-receiving, side. Document D4, also relied upon by the opposition

division in its decision, discloses that by providing indication marks on the front or rear surface of a notary form the text to be written on this form can be kept within the margins defined by the marks. In the Board's view, the skilled person wishing to add security or aesthetic features to the paper sheet disclosed in document D1 would however not have had any obvious reason to consider this teaching in D4 if not with the benefit of hindsight, since the marks in document D4 are for a specific purpose which has no relevance in the context of the copying paper sheet of document D1, i.e. for providing a visual aid defining a frame in order to correctly position machine-typed text on a notary form.

Therefore the subject-matter of Claim 1 of the main request does not follow in an obvious way from the teaching of document D1 as the closest prior art, if combined with that of document D2 and either a known watermarked paper or the paper form disclosed in document D4.

3.3.3 *Conventional watermarked paper as the closest prior art*

According to the patent specification, see column 1, lines 41 to 46, conventional watermarked and/or laid papers used in office correspondence have moisture contents typically about 7% and unspecified surface resistivity. Furthermore the watermarks and laid lines are formed on the print-receiving surface of the sheet.

The subject-matter of Claim 1 differs from these watermarked sheets by the specified range for the moisture content of the paper, by the surface resistivity of the print receiving side and by the combined requirement that whereas the print receiving surface has a Bendtsen roughness of not more than 300 ml/min, the reverse surface underlying the print receiving surface is formed with a watermark. These latter requirements are interrelated, as discussed in Section 3.1 *supra*.

The technical problem in this case may be formulated as improving the quality of xerographic printing on the classical watermarked sheets. The skilled person would find in document D2 the information how the paper should be modified in order to obtain the correct surface resistivity and moisture content for reducing any problems with the toner in xerographic printing. However, during the proceedings no documentary evidence was presented disclosing or suggesting to modify the classical watermarked or laid paper as defined in Claim 1. In the opinion of the Board such a modification would not have been obvious, because in the classical watermarked paper the smoothness of the print-receiving surface and the watermarked and/or laid lines patterned in the *same* surface are both a result of the processing by the dandy roll in the paper manufacturing process. In order to also obtain the required smoothness at the second (not watermarked) surface the skilled person would have had to modify the paper manufacturing process, for which measure no evidence was presented.

4.1 It is therefore concluded that Claim 1 of the main request meets the provisions of Article 52(1) EPC.

4.2 Claims 2 to 5 are dependent claims and equally fulfil these provisions.

4.3 For these reasons, the patent can be maintained unamended in accordance with the appellants' main request.

Since the appellants' main request is allowable, there is no need to address 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 as granted.

The Registrar: The Chairman:

P. Martorana A. Klein