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**Datasheet for the decision
of 13 June 2006**

Case Number: T 1173/02 - 3.5.04

Application Number: 95920296.1

Publication Number: 0815684

IPC: H04N 1/60

Language of the proceedings: EN

Title of invention:
Half-toning and printing method

Patentee:
Hewlett-Packard Indigo B.V.

Opponent:
Canon Kabushiki Kaisha

Headword:
-

Relevant legal provisions:
EPC Art. 84

Keyword:
"Amended claims - clarity (no)"
"Late-filed request - admitted (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 1173/02 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 13 June 2006

Appellant: Canon Kabushiki Kaisha
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Respondent: Hewlett-Packard Indigo B.V.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
28 August 2002 concerning maintenance of the
European patent No. 0815684 in amended form.

Composition of the Board:

Chairman: F. Edlinger
Members: M. Paci
J. Willems

Summary of Facts and Submissions

- I. This is an appeal by the opponent as sole appellant against the interlocutory decision of the opposition division that European patent No. 0 815 684, as amended according to the patent proprietor's auxiliary request, met the requirements of the EPC.
- II. The opposition had been filed against the patent on the three grounds of lack of novelty, lack of inventive step (Article 100(a) EPC) and insufficiency of disclosure (Article 100(b) EPC).
- III. In the statement of grounds of appeal the appellant (opponent) requested revocation of the patent on the grounds already raised in the notice of opposition and for the additional reasons that amendments made during the opposition proceedings caused claim 1 to be unclear (Article 84 EPC) and to contain subject-matter which extended beyond the content of the application as filed.
- IV. In a communication sent with a summons to oral proceedings the Board expressed doubts regarding the clarity and the disclosure in the original application of the expression "high fidelity", added to claim 1 during proceedings before the opposition division.
- V. By fax dated 12 May 2006 the respondent (patent proprietor) filed six different versions of claim 1 as auxiliary requests. In a fax and letter dated 17 May 2006, the respondent filed six complete sets of amended claims as auxiliary requests.

VI. With a letter dated 31 May 2006 the appellant (opponent) filed the following document which had been requested by the Board:

013: Copy of the 1993 Edition of the Specifications Web Offset Publications (SWOP), published by SWOP Inc., pages 9 to 15, and SWOP Frequently Asked Questions, March 2005 (www.swop.org).

VII. Oral proceedings before the Board were held on 13 June 2006 during which the respondent abandoned his previous main request, amended some of his auxiliary requests and filed a new auxiliary request 7.

VIII. The appellant's final requests are that the decision under appeal be set aside and that the patent be revoked.

IX. The respondent's final requests are that the patent be maintained in amended form on the basis of one of the following versions:

Main request

- claims: 1 to 10 filed during the oral proceedings;
- description: columns 1 and 2 filed during the oral proceedings and columns 3 to 5 of the patent specification.

Auxiliary requests 1, 3 and 7

- claims 1 to 10 filed during the oral proceedings;
- description: same as for the main request.

Auxiliary request 2

- claims 1 to 7 filed with letter of 17 May 2006;
- description: same as for the main request.

Auxiliary requests 4 to 6

- claims 1 to 10 filed with letter of 17 May 2006;
- description: same as for the main request.

X. Claim 1 according to **the main request** reads as follows:

"1. A method for printing a multicolor halftone image comprising:

determining, for a given half-tone image transfer printing process which produces printed solid color densities greater than those of the SWOP standard in a single print step, the relationship between printed regions of varying binary print coverage and an apparent color density for the varying coverages;

determining the color densities of an original image;

matching the determined color density with that of one of the varying coverages;

forming a halftone map, corresponding to the original image, in which areas having a given color density are replaced by binary print coverage in accordance with said half-toning scheme and said matching; and

printing the image using the halftone transfer printing process producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard."

- XI. Claim 1 according to **auxiliary requests 1 to 7** differs from claim 1 of the main request only by the following amendments (additions are shown in *italics* and deletions are ~~struck out~~):

Auxiliary request 1

"printing the image using the halftone transfer printing process *with toner* producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard."

Auxiliary request 2

"printing the image using the halftone transfer printing process ~~producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta,~~ so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard *in that the printed image comprises at least parts in which an apparent color density is provided of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, respectively.*"

Auxiliary request 3

"printing the image using the halftone transfer printing process *with toner* producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard,

wherein said color densities are produced by a pigment loading which is higher than that normally used."

Auxiliary request 4

"A method for printing a multicolor halftone image with liquid toner, comprising:

...

printing the image using the halftone transfer printing process with liquid toner producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard."

Auxiliary request 5

"A method for printing a multicolor halftone image with a liquid toner, comprising:

...

printing the image using the halftone transfer printing process with liquid toner producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard, wherein said color densities are produced by a pigment loading of the liquid toner which is higher than that normally used in liquid-toner printers."

Auxiliary request 6

"A method for printing a multicolor halftone image with a liquid toner, comprising:

...

printing the image using the halftone transfer printing process with liquid toner producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard, wherein said color densities are produced by a pigment loading of the liquid toner which is higher than that normally used in liquid-toner printers, and rheological properties suitable for liquid toner printing are achieved by using a polymer with lower viscosity for particles of said toner than that for the normal liquid toner process."

Auxiliary request 7

"A method for printing a multicolor halftone image with liquid toner, comprising:"

...

printing the image using the halftone transfer printing process with liquid toner producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, wherein said minimum solid print optical densities are produced by means of liquid toner having a pigment loading of at least 0,36 % by weight based on the weight of the liquid toner, and rheological properties suitable for liquid toner printing are achieved by

using a low viscosity polymer for particles of said toner."

- XII. The reasons given in the decision under appeal for maintaining the patent as amended according to the auxiliary request then on file may be summarised as follows:

Paragraph [0017] of the patent specification clearly shows that the invention will usefully expand the colour gamut printing at higher solid optical densities than the SWOP standard, and the set of relevant toners is disclosed in paragraph [0026] of the patent specification. The invention is therefore sufficiently disclosed.

Paragraphs [0020] and [0025] of the patent specification disclose the feature of high fidelity reproduction yielding a linear input output density mapping. No prior art document shows a transfer function with high fidelity. The only prior art document which discloses values of solid print optical density above the SWOP standard exhibits a nonlinearity between the input original and the output printing value in this range, and discloses a linear gamma curve for the values below the SWOP standard. Since only a linear curve represents a high fidelity reproduction of an image, the method of claim 1 is not obvious to a person skilled in the art in view of the available prior art.

- XIII. Regarding the clarity of amended claim 1 of the main request and auxiliary requests 1 to 6, the appellant (opponent) essentially argued as follows:

- The expression "color fidelity" does not have a clear meaning.
- The reference to the SWOP standard at the end of claim 1 is unclear because such a standard is liable to change over time.
- The reference to the SWOP standard is also unclear because it could refer either to the whole standard or only to the colour densities specified by the standard.
- The expression "the printed image matches the color density of the original image with higher color fidelity" is ambiguous because the matching of the colour density could refer either to the specific colour densities of the original image or to the range of colour densities of the original image.

Auxiliary request 7 should not be admitted into the proceedings because it was only submitted in the oral proceedings and contains features taken from the description which come as a surprise to the appellant. The filing of this request at this very late stage puts the appellant's representative at a huge disadvantage because he cannot get instructions from his client.

XIV. The respondent's arguments regarding the clarity of amended claim 1 of the main request and auxiliary requests 1 to 6 can be summarised as follows:

- The expression "higher color fidelity" means that the printed image will have a deeper colour in those areas where such deeper colours were present in the original image, thus resulting in a printed

image having visibly richer colours (see paragraphs [0002], [0020] and [0025] of the description of the granted patent specification).

- The expression "higher color fidelity than for the SWOP standard" refers to the higher solid print optical densities. The higher colour fidelity than for the SWOP standard is thus the automatic consequence of using solid print optical densities of at least 1.3, 1.5 and 1.7 for yellow, cyan and magenta, respectively, ie well in excess of those (1.0, 1.33 and 1.47 for yellow, cyan and magenta, respectively) of the SWOP standard.
- The appellant did not provide any evidence that the solid print densities implied by the SWOP standard have changed since 1993.
- Finally, the matching of colour densities clearly refers to the range of colour densities, not to a particular colour density.

Auxiliary request 7 should be admitted because it was submitted to more clearly specify the pigment loading of suitable liquid toners which apparently posed problems in the oral proceedings. The features could be derived by a calculation from values disclosed in column 5 (in particular in paragraph [0028]) of the patent specification.

Reasons for the Decision

1. The appeal is admissible.
2. *Disclosure of the invention in the patent specification*
 - 2.1 The invention aims at increasing the colour saturation for the entire range of colours of a printed image to recover, if possible, the full saturation which was available in the original image (paragraphs [0008], [0015], [0019], [0020] and [0025]). Higher than standard SWOP solid print optical densities are not achieved in the standard offset lithographic printing process due to rheological limitations and transfer problems of the printing plate to paper (paragraph [0002]). The final printed version may thus have a narrower colour gamut than that of the original images (paragraph [0003]). In order to improve printing which is not optimum and to reproduce images with "high fidelity" (paragraph [0004]), or "a higher color fidelity" (paragraph [0020]) or "greatly improved color fidelity" (paragraph [0025]), the prior art required at least additional printing steps. The invention uses "a printing process and inks which enable printing higher printed solid densities with a single printing step utilizing inks or toners having a higher pigment loading" (paragraph [0007]). With a specific printer platform a higher colour saturation than that previously available and solid print optical densities of up to 2.0 or more can be achieved (paragraphs [0010], [0015] and [0030]). Other printing methods are also useful "to the extent that inks or toners which can be printed to high printed solid optical densities are available and which have rheology appropriate to the

particular printing or imaging process" (paragraphs [0016] and [0031]). The colour gamut can be usefully expanded with any half-toning process in accordance with the invention where "the matching is with effective halftone optical densities based on printing at higher solid print optical densities." The "difference between the present invention and the standard use of the same half-toning schemes is that the range of color densities available from the half-toning process is increased in proportion to the printed solid optical density achieved" (paragraphs [0017] and [0018]). A liquid toner of a preferred embodiment is described in paragraphs [0026] to [0029].

- 2.2 It follows from the patent specification, in particular the passages cited in the preceding paragraph, that high colour fidelity in the meaning of the patent corresponds to a desired result (true to the original) and the relative expression "higher color fidelity" used in claim 1 of the main request and the auxiliary requests 1 to 6 compares the result of the printing step with the colour fidelity achieved by printing according to the SWOP standard. In the judgement of the Board, high fidelity in the context of the patent specification does not mean "a linear input output density mapping" (with a certain degree of tolerance), as the opposition division seems to have understood the corresponding expression in claim 1 of the request on which the decision under appeal is based. More specifically, there is no disclosure in the patent specification that a printing process producing a certain range of solid print optical densities automatically yields a specified degree of colour fidelity. Rather, the general teaching is to increase

the colour saturation and to produce a solid print optical density beyond that of the SWOP standard (higher values being more preferable; paragraph [0010]). There is no general teaching either that this is achieved with a particular group of inks or toners, or a particular range of pigment loadings or suitable parameters concerning rheology or viscosity, etc.

Main request

3. *Clarity - Article 84 EPC*

3.1 According to Article 102(3) EPC, the patent and the invention to which it relates, taking into consideration the amendments made during the opposition proceedings, must meet the requirements of the EPC. Before it can be decided to maintain the patent as amended it has to be examined *inter alia* whether the claims comply with Article 84 EPC, which has been disputed by the appellant.

3.2 In the present case, the following wording (shown in *italics*), not present in granted claim 1, was added at the end of claim 1 during the opposition appeal proceedings:

"printing the image using the halftone transfer printing process *producing a minimum solid print optical density of 1.3 for yellow, 1.5 for cyan, and 1.7 for magenta, so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard.*"

3.3 In the Board's view, the phrase which poses problems is "*so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard*". Indeed, as pointed out by the appellant, it raises at least the following questions:

- (a) What is the meaning of "color fidelity"?
- (b) Does the contested phrase merely express the automatic consequence of the minimum solid print optical densities for yellow, cyan and magenta being 1.3, 1.5 and 1.7, respectively, or does it define an additional requirement which must also be met?
- (c) Does the matching of the colour density of the original image refer to a specific colour density produced or to the range of colour densities?

3.4 Regarding question (a), the respondent submitted that "higher color fidelity" meant that the printed image will have a deeper colour in those areas where such deeper colours were present in the original image, thus resulting in a printed image having visibly richer colours. As to question (b), the respondent argued that higher colour fidelity than for the SWOP standard was the automatic consequence of producing solid print optical densities (ie at least 1.3, 1.5 and 1.7 for yellow, cyan and magenta, respectively) well in excess of those (1.0, 1.33 and 1.47 for yellow, cyan and magenta) of the SWOP standard. Finally, regarding question (c), the respondent stated that the matching referred to the range of colour densities. The respondent referred in particular to paragraphs [0002], [0020] and [0025] of the description of the patent specification as supporting his interpretations.

3.5 The Board is not, however, convinced by the respondent's arguments that "higher color fidelity" merely means "higher printed color densities". As the respondent explained during the oral proceedings in the context of the discussion of the prior art for the assessment of inventive step, a high printed colour density alone does not enable the reproduction of colours with higher colour fidelity than that of the SWOP standard if the graph of the printed colour density versus the original colour density is not sufficiently linear at colour densities greater than those of the SWOP standard. Thus a better linear response is an additional requirement implied by the method step "printing the image ... so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard". This seems to be part of the matter for which the appellant seeks protection, as can be seen from the arguments relating to "high fidelity" which convinced the opposition division regarding the presence of an inventive step (see point XII *supra*).

3.6 Moreover, producing higher solid print optical densities for yellow, cyan and magenta does not guarantee that an original image will be reproduced with higher colour fidelity in the sense of the colours of the printed image being truer to the original, which would be the commonly accepted meaning of the expression "with higher color fidelity". In fact, depending on the original image, the colour fidelity of the printed image could be worse with higher colour densities, all other parameters remaining the same. Indeed, if the number of halftone levels remains

unchanged and the solid print optical density is increased, the ability to accurately reproduce low density colours diminishes because the same number of halftone levels must cover a wider range of colour densities, thereby increasing the density difference between two successive halftone levels and thus resulting in a coarser approximation of the density of the original image at low densities. The Board is thus not convinced that higher colour fidelity can be regarded as the automatic consequence of higher solid print optical densities, as alleged by the respondent. Such a relationship is not supported by the description either (see point 2.2 above). Higher colour fidelity must therefore imply other unidentified features for the printing step, which casts doubt on the matter for which protection is sought by claim 1.

3.7 Finally, the Board also notes that the 1993 SWOP standard (see 013) does not provide any definition of "color fidelity" and therefore cannot contribute to the clarification of the expression "with higher color fidelity than for the SWOP standard". This means that the yardstick with which the result of the printing step is to be compared does not define a clear lower limit for colour fidelity.

3.8 For the above reasons the Board considers that the method step "printing the image ... so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard" does not have a clear meaning. Hence claim 1 does not meet the requirement of clarity of Article 84 EPC.

- 3.9 Accordingly, the respondent's main request is not allowable (Article 102(3) EPC).

Auxiliary requests 1 to 6

4. *Clarity - Article 84 EPC*

- 4.1 Claim 1 according to each of auxiliary requests 1 to 6 contains the same contested wording "*so that the printed image matches the color density of the original image with higher color fidelity than for the SWOP standard*" as claim 1 of the main request. Claim 1 according to each of auxiliary requests 1 to 6 does not meet the requirement of clarity of Article 84 EPC because the additional features of claim 1 of these requests do not clarify this unclear feature for the following reasons.

- 4.2 Claim 1 of auxiliary requests 1 and 3 to 6 specify additional components used in the printing process, such as toner (and higher pigment loading), liquid toner (and higher pigment loading) and a combination of all these features with liquid toner having suitable rheological properties and using a polymer with lower viscosity for particles (auxiliary request 6). These additional features specify the printing step as to how the higher solid print optical densities are produced, but there is no support in the description (see point 2.2 above) for any of the combinations specified in claim 1 of these requests automatically leading to a result with higher colour fidelity of a clearly specified minimum degree.

4.3 Claim 1 of auxiliary request 2 defines the result of the printing step ("higher color fidelity") in a different way: "in that the printed image comprises at least parts in which an apparent color density is provided...". This may be construed as specifying that an aspect of higher colour fidelity is improved, namely the apparent colour density. If this feature is interpreted in the light of the description it seems to mean that the specified values of apparent colour densities are "minimum" values (as specified in claim 1 of all other requests). Images printed in accordance with the method of claim 1 would have at least parts where the apparent colour density is of these values (or higher) provided that the original had higher colour densities (whereas printing in accordance with the standard colour schemes would have truncated the higher colour densities to the lower values of the SWOP standard; see paragraphs [0003] and [0020] of the patent specification). Leaving aside the fact that claim 1 of auxiliary request 2 is not clear in itself as to the definition of the desired result, an additional objection under Article 84 EPC arises in that it does not specify the essential features of the printing process to achieve the (higher) apparent colour density values. Claim 1 does not specify inks or toners at all, in particular not suitable ones to overcome rheological limitations and transfer problems. Nor does it specify a particular half-toning scheme which, when used with any ink or toner, would provide higher colour fidelity than for the SWOP standard (see point 2.1 above).

4.4 Hence the respondent's auxiliary requests 1 to 6 are not allowable.

5. *Admissibility of auxiliary request 7*

5.1 According to the established practice of the Boards of Appeal, amendments which are not submitted in good time prior to oral proceedings may be disregarded (see, for example, "Case Law of the Boards of Appeal of the European Patent Office", 4th edition, 2001, VII.D. 14.1 and 14.2, pp 545-548; "Guidance for parties to oral proceedings and their representatives", OJ EPO 1996, 342, point 3.3).

5.2 With the summons to oral proceedings the Board had set a final date for filing amendments or observations (one month before the oral proceedings). The respondent filed six different versions of claim 1 as auxiliary requests before the final date. Further amendments to the main request and to some of the auxiliary requests filed with the subsequent letter dated 17 May 2006 were admitted in the oral proceedings because they did not substantially change the subject-matter of these requests and were responsive to objections raised in the oral proceedings. Auxiliary request 7 was filed for the first time by the respondent in the oral proceedings before the Board. Claim 1 according to this request includes a new feature which was not present in any of the previous requests ("*a pigment loading of at least 0,36 % by weight based on the weight of the liquid toner*"), nor in any of the dependent claims as granted. The respondent did not contest that this value of pigment loading was not explicitly disclosed in the patent specification, but explained that this value could be derived by a calculation from specific values

disclosed in column 5 (in particular in paragraph [0028]) of the patent specification.

5.3 This late-filed request therefore raised fresh issues, such as its allowability under Article 123(2) EPC and the support in the description for claiming an open range of "at least 0,36 %" in view of the specific disclosure. Since the new feature had not previously been discussed, the appellant could not have been expected to anticipate such an amendment and to carry out a further search in the prior art. Moreover, the appellant's representative was not in a position during the oral proceedings to take instruction from his client. Admitting this late-filed request would have taken the appellant by surprise and put him at an unfair disadvantage.

5.4 Since the issue of how the printing step achieved the matching with high fidelity had already been raised in the statement of grounds of appeal and addressed by the Board in the summons to the oral proceedings, the Board saw no convincing reason why this request could not have been filed earlier and decided not to admit the request at this late stage of the procedure.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

D. Sauter

F. Edlinger