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Datasheet for the decision of 12 January 2010

Case Number: T 0694/08 - 3.2.05

Application Number: 01991530.5

Publication Number: 1349733

IPC: B41J 11/00

Language of the proceedings: EN

Title of invention:
Method and apparatus for inkjet printing using UV radiation curable ink

Patentee:
3M Innovative Properties Company

Opponent:
Océ-Technologies B.V.

Headword:
-

Relevant legal provisions:
EPC Art. 56, 83

Relevant legal provisions (EPC 1973):
-

Keyword:
"Admissibility of fresh ground of opposition after amendment (yes)"
"Sufficiency of disclosure (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0694/08 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 12 January 2010

Appellant: (Opponent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 6 February 2008 concerning maintenance of European Patent No. 1349733 in amended form.

Composition of the Board:

Chairman: W. Zellhuber
Members: P. Michel
M. J. Vogel

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent No. 1 349 733 in amended form.

II. Oral Proceedings were held before the Board of Appeal on 12 January 2010.

The appellant requested that the decision under appeal be set aside and that the European patent No. 1 349 733 be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed.

III. Claims 1 and 17 as maintained by the opposition division read as follows:

"1. Inkjet printing apparatus for radiation curable ink comprising:
a support for receiving a substrate;
a print head for directing radiation curable ink toward a substrate received on the support;
a curing device for directing radiation toward ink received on the substrate;
a controller having an input for receiving one or more characteristics of the substrate and one or more characteristics of the ink, the controller including a computer for determining a desired dwell time for the ink based on the characteristics of the substrate and the ink; and

a control device connected to the controller for varying the dwell time in accordance with the desired dwell time determined by the computer."

"17. A method of inkjet printing comprising:
selecting a radiation curable ink;
selecting a substrate;
entering at least one characteristic of the ink and at least one characteristic of the substrate into a computer;
determining a preferred ink dot gain when the selected ink is printed onto the selected substrate;
calculating with the computer a dwell time for achieving the preferred ink dot gain for the ink based on the characteristics of the substrate and the ink; and
varying the dwell time in accordance with the calculated dwell time by means of a control device."

IV. The following documents are referred to in the present decision:

D1: US-A-6,145,979
D2: "The Inkjet Triumvirate: Printhead, Ink, and Media", S. F. Pond, Torrey Pines Research, 2000, pages 65 to 77

V. The arguments of the appellant in the written and oral proceedings can be summarised as follows:

The refusal of the opposition division to admit the objection of the appellant to claim 17 under Article 100(b) EPC constituted a substantial procedural violation. The amended claim 17 differs from claim 1 as

granted in the use of the term "calculating" as opposed to "determining". The wording of the amended claim 17 thus does not correspond to the wording of claim 1 as granted, so that this ground of opposition could not have been introduced into the proceedings at an earlier stage.

The ground of opposition under Article 100(b) EPC should accordingly be admitted into the proceedings.

There is no disclosure in the patent in suit of a method of inkjet printing comprising the step of calculating a dwell time for achieving the preferred ink dot gain for the ink based on the characteristics of the substrate and the ink. As shown in the Examples of the patent in suit, the computer merely reads from a table and does not carry out any calculation based on the characteristics of the substrate and the ink.

The requirements of Article 83 EPC are therefore not satisfied.

The subject-matter of claims 1 and 17 differs from the disclosure of document D1 merely by the automation of the method of determining the desired dwell time. In the absence of automation, an experienced operator would know the necessary dwell time without needing to experiment. No unexpected result arises from the replacement of an experienced human operator with a computer and control device. In effect, the experience of the operator is expressed in Tables I and II of the Examples of the patent in suit.

It is not necessary to rely on paragraphs [0012] and [0013] of the patent in suit as evidence of the knowledge of the skilled person. Document D2 discusses the relevance of the characteristics of the substrate and the characteristics of the ink, in particular at page 65, right hand column, line 17 to page 67, left hand column, line 19, and in Figures 3.1 and 3.4. Document D1 itself refers to the role of the characteristics of the ink and substrate at column 1, lines 33 to 37.

Paragraph [0037] of the patent in suit does not disclose varying the dwell time during a printing operation.

The subject-matter of claims 1 and 17 thus does not involve an inventive step.

VI. The arguments of the respondent in the written and oral proceedings can be summarised as follows:

The opposition division was correct to refuse to admit the objection of the appellant to claim 17 under Article 100(b) EPC during the oral proceedings. The amendment to claim 17 does not give rise to a new objection in view of the presence of the same feature in claim 1 as granted, which specifies that the dwell time is determined by a computer. The objection should therefore have been introduced into the proceedings at an earlier stage. Fresh grounds of opposition may only be introduced under exceptional circumstances. In particular, the respondent does not agree to the introduction of this ground.

The ground of opposition under Article 100(b) EPC should accordingly not be admitted into the proceedings.

There is no difference between the terms "calculating" and "determining" as used in the claims. Paragraph [0033] discloses that the characteristics of selected inks and substrates may be identified from, for example, brand names. The Examples of the patent in suit also disclose how the method of claim 17 is to be performed. In particular, Tables I and II show characteristics of inks and substrates.

The requirements of Article 83 EPC are therefore satisfied.

As set out at column 1, lines 20 to 45 of document D1, the object of document D1 is to provide a process in which the curing time is substantially the same for all portions of the substrate.

There is no indication as to how the position of the curing device is to be selected. The remaining prior art does not disclose any criteria for selection of the curing time. The discussion at paragraphs [0013] and [0014] of the patent in suit does not constitute prior art and cannot be relied upon as indicating the common general knowledge of the person skilled in the art. Prior to the present invention, simple trial and error would have been used to determine the dwell time.

As indicated in paragraph [0037] of the patent in suit, the present invention enables dwell time to be quickly changed during a printing operation, for example to

achieve a different print quality (resolution) in different parts of the image.

The subject-matter of claims 1 and 17 thus involves an inventive step.

Reasons for the Decision

1. *Admissibility of fresh ground of opposition*

During oral proceedings before the opposition division, an auxiliary request was filed by the respondent which included an amended claim 17. In response to the new request, the appellant raised a fresh ground of opposition to claim 17 under Article 100(b) EPC. The opposition division regarded the objection as being prima facie not relevant and stated that the objection could have been made at an earlier stage of the proceedings. The objection was therefore not taken into account (see paragraphs 10 and 11 of the minutes and paragraph 3.2 of the decision of the opposition division).

Claim 17 as granted specified the step of "calculating with the computer a dwell time for achieving the preferred ink dot gain". The starting point for this calculation was not specified. The amended claim specified that the dwell time to be calculated with the computer is "for the ink based on the characteristics of the substrate and the ink". It may be noted that this amendment, whilst intended to bring the claim into line with the apparatus claim, claim 1, differs from that claim in that claim 1 refers to "*determining* a

desired dwell time for the ink based on the characteristics of the substrate and the ink" (italics added).

The patent in suit does not contain any disclosure of a method of calculating a dwell time, which uses as input data physical characteristics of the ink and substrate.

The Board is thus of the opinion that there is reasonable doubt as to whether or not there is sufficient disclosure in the patent in suit to enable the person skilled in the art to carry out a method of inkjet printing comprising the step of "calculating with the computer a dwell time for achieving the preferred ink dot gain for the ink based on the characteristics of the substrate and the ink".

The ground of insufficiency of disclosure relates to the amendment made during oral proceedings before the opposition division and should be admitted into the proceedings. Whilst the Board is therefore of the opinion that the opposition division accordingly erred in refusing to admit the ground of opposition under Article 100(b) EPC, this is not regarded as constituting a substantial procedural violation, since the opposition division was of the opinion that the objection was prima facie not relevant.

2. *Sufficiency of Disclosure (Article 83 EPC)*

Claim 17 specifies that the dwell time for achieving the preferred ink dot gain for the ink is calculated based on the characteristics of the substrate and the ink.

It is disclosed in paragraph [0031] of the description of the patent in suit that the controller has an input for receiving one or more characteristics of the substrate and the ink. In paragraph [0032], it is disclosed that different inks and substrates may be identified in drop-down menus. The characteristics in question are set out in the patent in suit in paragraph [0033]. Characteristics of the substrate may include, for example, the composition of the substrate and/or physical characteristics of the substrate such as surface roughness, temperature, surface energy, porosity, color, and diffusion rate through the substrate of various solvents and monomers. Characteristics of the ink may include, for example, the composition of the ink and/or physical characteristics of the ink such as viscosity, elasticity, surface tension, temperature, and its diffusion coefficient in various substrates. Paragraph [0033] goes on to state that the computer software may identify selected inks and substrates "by brand name, trade name, catalog number, inventory number or the like".

In addition, the patent in suit discloses a method for calculation of the dwell time in the Examples. Examples 1 and 2 show the development of ink dot diameter in time after impact for pairs of inks and substrates. Example 3 shows the required dot gain for printing at three different resolutions. Examples 4 and 5 show optimal dwell times for the combinations of ink and substrate of Examples 1 and 2 based on the required dot gain. The optimum dwell time is calculated on the

basis of the results of the measurements of Examples 1 and 2.

As stated under point 1 above, the patent in suit does not contain any disclosure of a method of calculating a dwell time which uses as input data physical characteristics of the ink and substrate. However, the Board is of the opinion that claim 17 should not be construed as requiring such a step. Rather, the claim should be construed, in line with claim 1, and in the light of the description, as relating to a method involving the step of determining a desired dwell time for the ink based on the characteristics of the substrate and the ink. Such a step does not require that the calculation should be carried out directly from physical characteristics of the ink and substrate, but merely requires that the physical characteristics are taken into account, at least indirectly, in the calculation.

The disclosure of the patent in suit is thus sufficient to enable the person skilled in the art to calculate with a computer, into which at least one characteristic of the ink and at least one characteristic of the substrate is entered, a dwell time for achieving the preferred ink dot gain for the ink based on the characteristics of the substrate and the ink. The requirements of Article 83 EPC are therefore satisfied.

3. *Inventive step*

Document D1 is regarded as constituting the closest prior art. As shown in Figure 4, and described in column 3, lines 51 to 60, of the description of

document D1, an inkjet printing apparatus for radiation curable ink comprises a support for receiving a substrate (1), a print head (5) for directing radiation curable ink (33) towards a substrate received on the support, and a curing device (19) for directing radiation toward ink received on the substrate. The curing device (19) is mounted on a runner (31) so that it can be located in a predetermined desired position downstream of the printhead (5) (see column 3, lines 55 to 60). A similar apparatus having three printheads is shown in Figure 5 and discussed at column 3, line 61 to column 4, line 29.

There is, however, no indication in document D1 as to the basis on which the position of the curing device and thus the dwell time for the ink should be determined. The subject-matter of claim 1 is thus distinguished over the disclosure of document D1 by the provision of a controller and a control device as defined in the last two sub-paragraphs of the claim.

The person skilled in the art is aware that, in an inkjet printing system, it is desirable to obtain, as far as possible, a solid area optical density. This is determined by the size of the dot formed on the substrate by a drop of ink (see document D2, figure 3.4). As further discussed in document D2, in particular at page 65, right hand column, line 17 to page 67, left hand column, line 19, and illustrated in Figure 3.1, dot size is dependant on the printhead, the characteristics of the substrate and the characteristics of the ink. Thus, for a given printhead, the person skilled in the art is aware that the optimum

dwell time is dependant upon the characteristics of the substrate and the ink.

The skilled person faced with an unknown ink and substrate would proceed to choose a suitable dwell time on the basis of trial and error, printing one or more test sheets before embarking on a print run once a satisfactory dwell time had been arrived at. Further, with experience, a skilled operator would, at least as a first approximation, re-apply a dwell time which had been established for a particular combination of ink and substrate. In this connection, it was pointed out on behalf of the respondent that the disclosure of paragraphs [0012] and [0013] of the patent in suit cannot be relied on as indicating the state of the art. It is, however, necessary to consider the manner in which the skilled operator would use the printer of document D1 in the absence of any explicit instructions as to where the curing device should be positioned on the runner.

Thus, the provision of a controller having an input for receiving one or more characteristics of the substrate and one or more characteristics of the ink, the controller including a computer for determining a desired dwell time for the ink based on the characteristics of the substrate and the ink, and a control device connected to the controller for varying the dwell time in accordance with the desired dwell time determined by the computer, merely represent automation of a procedure which the skilled operator would apply when using the printer of document D1.

The use of a controller and a control device in place of a human operator does not give rise to any unexpected results. It was suggested on behalf of the respondent that the use of a controller and a control device would enable the adjustment of the dwell time during a print run. It is not, however, accepted that this would not be possible with a human operator, who would intervene in a printing operation if the print quality was not satisfactory.

The subject-matter of claim 1 thus does not involve an inventive step.

As discussed under point 2 above, claim 17 relates to a method of inkjet printing corresponding to the apparatus of claim 1. The subject-matter of claim 17 thus does not involve an inventive step for the same reasons as set out above in respect of claim 1.

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:

N. Maslin W. Zellhuber