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D E C I S I O N
of 16 July 2004

Case Number: T 0560/01 - 3.2.5
Application Number: 91904346.3
Publication Number: 0478781
IPC: B41J 2/05
Language of the proceedings: EN

Title of invention:

Ink-jet recording head, substrate for said head, ink-jet recording device, and method for controlling the temperature of the board

Applicant:

CANON KABUSHIKI KAISHA

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC R. 86(3)

Keyword:

"Consent to amendments under Rule 86(3) EPC - yes"

Decisions cited:

-

Catchword:

-



Case Number: T 0560/01 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 16 July 2004

Appellant:
(Applicant)

CANON KABUSHIKI KAISHA
30-2, 3-CHOME, Shimomaruko,
Ohta-ku
Tokyo (JP)

Representative:

Beresford, Keith Denis Lewis
BERESFORD & Co.
2-5 Warwick Court,
High Holborn
London WC1R 5DH (GB)

Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 28 December 2000
refusing European application No. 91904346.3
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: W. Moser
Members: H. M. Schram
P. E. Michel

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division posted 28 December 2000 refusing European patent application 91 904 346.3 (publication number EP-A-0 478 781) on the ground that there was no version approved by the appellant (applicant) in which a patent could be granted (cf. Article 113(2) EPC). The text submitted by the appellant, on the basis of which the grant of a European patent was requested, was not admitted, because the Examining Division did not give its consent to amendments (cf. Rule 86(3) EPC) filed by the appellant on 11 January 2000.

II. The factual and legal situation that led to the absence of a text agreed by the appellant can be briefly summarized as follows. The examination of the application was resumed following amendments filed by the appellant in response to a communication under Rule 51(4) EPC dated 5 August 1997, wherein the appellant had been informed that the Examining Division intended to grant a European patent on the basis of the documents recited in said communication. Claim 1 of the set of claims to be granted was directed to "*A method for controlling the temperature of a board of an ink-jet recording head ...*", a wording proposed by the primary examiner in a communication dated 9 July 1996.

With the amendments filed on 11 January 2000, the appellant sought to change the wording of claim 1 from "*1. A method for controlling the temperature of a board ...*" to "*1. A method for locating a temperature sensor on a board ...*", and to include a device claim directed to "*6. A board for an ink-jet recording head on which a*

temperature sensor is located by using a method as claimed in any one of claims 1 to 5", a dependent device claim 7 and two use claims 8 and 9.

In a communication accompanying the summons to attend oral proceedings, the Examining Division stated: *The revision of claim 1 could be consented to. [...] No consent can be given to the introduction of claims 6 - 9 [...].*

According to the minutes of the oral proceedings, after discussing claim 1 only, the Examining Division did not give its consent to the amendments to the claims filed by the appellant on 11 January 2000, and refused the application.

- III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims that were filed with the statement of grounds and identical to the claims refused by the Examining Division. Oral proceedings were requested on an auxiliary basis.

- IV. In support of his request, the appellant argued that the wording of the claim, which had been held allowable by the Examining Division in its communication pursuant to Rule 51(4) EPC, could give rise to an interpretation that the step of locating the temperature sensor was a subsequent activity in controlling the temperature of the board, rather than a step that is carried out before the temperature of the board is controlled in operation. The invention did not concern a controlling method, the gist of the invention was to locate the temperature sensor in the manner defined in the claim

so as to allow the temperature of the board to be controlled in an optimum manner.

V. In response to a communication of the Board, the appellant filed a complete set of amended documents on 29 March 2004.

VI. Independent claim 1 reads as follows:

"1. A method for locating a temperature sensor on a board of an ink-jet recording head, the board comprising on the same substrate: a plurality of heat generating elements (5) for generating thermal energy to discharge ink from discharge orifices (26); the temperature sensor (2a) for detecting the temperature of the substrate; and a heating element (8a) for heating the substrate, the method being characterised by the steps of:

a) selecting a predetermined heat generating element from the plurality of heat generating elements so that the temperature of said predetermined heat generating element represents the average temperature, the highest temperature portion, or the intermediate temperature portion in the heat generating elements during their operation; and

b) locating the temperature sensor (2a) at a position where the time required for a temperature change caused by said predetermined heat generating element (5c) being energised to influence the temperature sensor is substantially the same as the time required for a temperature change caused by the heating element being energised to influence the sensor."

Reasons for the Decision

1. *Allowability of the amendments (Articles 84 and 123(2) EPC)*

- 1.1 Claim 1 of the application as filed was directed to an ink-jet recording head defining the location of the temperature sensor, in a very similar wording as present claim 1, cf. feature (b). The change of category from a device claim to a method claim cannot be objected to in this case, since the device feature ("said temperature sensor element is disposed at a position ...") and the method feature (b) ("locating the temperature sensor (2a) at a position ...") are equivalent.

The three possibilities for selecting a predetermined heat generating element from the plurality of heat generating elements (cf. feature a)) of claim 1 now on file are based on claims 3 to 5 of the application as filed (published version), see also column 5, lines 35 to 40, column 11, line 9, to column 14, line 43, and Figures 6 and 7 of this application.

A basis for the additional features of dependent claims 2 to 5 is found at column 11, lines 17 to 22, column 11, lines 23 to 28, column 5, lines 41 to 45 (cf. claim 14) and column 7, line 43, to column 8, line 16 (cf. Figure 2), respectively, of the application as filed (published version).

Consequently, claims 1 to 5 now on file meet the requirements of Article 123(2) EPC. The Board is

satisfied that the claims are also clear and supported by the description, cf. Article 84 EPC.

- 1.2 The Examining Division exercised its discretion under Rule 86(3) EPC not to give its consent to change the wording of claim 1 from "*1. A method for controlling the temperature of a board ...*" to "*1. A method for locating a temperature sensor on a board*".

The former wording was proposed by the primary examiner. However, nowhere in the application as filed is the expression "method for controlling the temperature of a board" or similar wording disclosed. Insofar as reference to "controlling the temperature" is made, it is made in connection with disposing the temperature sensor in a particular way, cf. for example column 12, lines 50 to 55, of the application as filed (published version). In this passage, the second part of the phrase "*a temperature sensor is disposed in such a way ..., thereby controlling the temperature within the heater board*" means "*thereby allowing to control the temperature within the heater board*".

That the invention is aimed at providing a *method for locating a temperature sensor on a board* follows from the following.

The problem the invention seeks to overcome with respect to the prior art is *where* to locate the temperature sensor in an ink-jet recording head in an optimum manner, cf. column 3, line 20, to column 4, line 14, of the application as filed (published version). This is also clear from the object of the invention, which is stated in the description to be "to

carry out the temperature control at a high degree of accuracy, response and stability by suitably determining the positions of temperature sensors", cf. column 4, lines 18 to 22, of the application as filed (published version).

How the temperature is controlled is not the subject of the invention. An example of a temperature control system which operates in response to the outputs from the temperature sensors and controls the heaters is explained in an illustrative manner in the description, see column 17, line 33, to column 19, line 23, of the application as filed (published version).

*In the judgement of the Board, it thus is appropriate that claim 1 is directed to a *method for locating a temperature sensor on a board.**

*It may be noted that the Board does not share the opinion of the Examining Division (see the communication dated 22 February 1999, point 2, last paragraph) that feature (a) must be amended to read (proposed amendments in bold): [...] **either** the average temperature, **or** the highest temperature portion, or the intermediate temperature portion [...], since "or" is a conjunction used to join alternatives.*

2. *Novelty (Article 54 EPC) and inventive step (Article 56 EPC)*

Claim 1 of the sole request of the appellant is, apart from the change in the first line of the claim, substantially identical to the claim on the basis of which the Examining Division intended to grant a

patent. The Board concurs with these findings of the Examining Division for the following reasons:

Document EP-A 0 353 925 (D1), which is discussed at column 3, line 36 to column 4, line 14, of the application as filed (published version) can be considered to represent the closest state of the art. This document, the sole document referred to during the examination proceedings, discloses an ink-jet recording head comprising on the same substrate an array of heat generating elements (ejecting heating portion or region 3), heaters 8 for warming the substrate and temperature sensors 2, see column 7, lines 18 to 50, column 11, lines 13 to 20, Figures 1A, 1B (an embodiment without warming heaters) and Figures 9A and 9B (an embodiment with warming heaters). The temperature sensors are said to be disposed such that at least parts thereof are adjacent to longitudinal ends of the region 3 ("discharge" heaters), cf. column 7, lines 36 to 39.

Nothing is said in document D1 about selecting a reference discharge heater (cf. feature (a) of claim 1) or about locating the temperature sensor such that the heat transmission time from the reference discharge heater to the temperature sensor is equal to the heat transmission time from the heating element to the temperature sensor (cf. feature (b) of claim 1).

No disclosure of the features (a) or (b) of claim 1 was found in documents GB-A 2 208 829 and GB-A 2 169 855, family members of corresponding Japanese patent applications cited "A" (i.e. documents defining the general state of the art which is not considered of

particular relevance) in the International Search Report drawn up by the Japanese Patent Office. It may be noted that for two other Japanese patent applications cited "A" in said International Search Report no family members were reported.

Document US-A 4 719 472, which is cited "A" in the supplementary Search Report (cf. Article 157(2)(a) EPC), discloses (see column 2, line 6, to column 3, line 2, and claim 1) an ink-jet recording head, wherein the temperature of the ink reservoir 23 is detected by a temperature sensor 28 for controlling the heat to said ink reservoir. The temperature sensor 28 is located in close proximity of a heating resistor 27 for heating the ink in the ink reservoir 23, see Figure 2. A heating resistor 29 for ink discharge is provided at a position on the base plate which corresponds to the ink discharge flow path. This document does hence neither disclose feature (a) nor feature (b).

The subject-matter of claim 1 is thus novel within the meaning of Article 54 EPC.

The subject-matter of claim 1 also involves an inventive step, since the prior art does not suggest to the person skilled in the art to locate a temperature sensor on a board of an ink-jet recording head such that the heat transmission time from a pre-selected reference discharge heater to said temperature sensor and from a heating element to said temperature sensor are substantially the same.

The subject-matter of claims 2 to 5, which are appendant to claim 1, similarly involves an inventive step.

Therefore, the request of the appellant that a patent be granted on the basis of the documents filed as sole request is allowable.

3. The European patent application was published with the title "*Ink-jet recording head, substrate for said head, and ink-jet recording device*", see EP-A-0 478 781. In the communication under Rule 51(4) EPC dated 5 August 1997, which set out the title of the invention for the intended grant of a European patent in the three official languages of the European Patent Office, the English version read as follows: "*Ink-jet recording head, substrate for said head, ink-jet recording device and method for controlling the temperature of the board*". This title is reproduced on the cover page of this decision. None of these titles seem any longer to be appropriate (cf. Rule 26(2)(b) EPC), since the sole independent claim is now directed to "*A method for locating a temperature sensor on a board of an ink-jet recording head*".

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 grant a patent on the basis of the following documents filed on 29 March 2004:

Claims: 1 to 5

Description, pages: 1 to 8, 11 to 36 (9, 10 deleted)

Drawings, sheets: 1/13 - 13/13

The Registrar:

The Chairman:

M. Dainese

W. Moser