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D E C I S I O N
of 14 February 2006

Case Number: T 1376/04 - 3.2.05

Application Number: 96306672.5

Publication Number: 0763429

IPC: B41J 2/05

Language of the proceedings: EN

Title of invention:
Ink jet printhead heating

Patentee:
LEXMARK INTERNATIONAL, INC.

Opponent:
Canon Inc.

Headword:

-

Relevant legal provisions:

EPC Art. 123(2), 54, 56
EPC R. 27(1)(b)

Keyword:

"Added subject-matter (main request, yes; first and second auxiliary requests, no)"

"Late filed requests (admitted)"

"Novelty (first auxiliary request, no; second auxiliary request, yes)"

"Inventive step (second auxiliary request, yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1376/04 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 14 February 2006

Appellant: Canon Inc.
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
20 September 2004 concerning maintenance of
European patent No. 0763429 in amended form.

Composition of the Board:

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

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent No. 0 763 429 in amended form.

In the decision under appeal, it was held that the grounds of opposition submitted by the appellant did not prejudice the maintenance of the patent as amended.

II. Oral Proceedings were held before the Board of Appeal on 14 February 2006.

III. The appellant requested that the decision under appeal be set aside and that the European Patent No. 0 763 429 be revoked in its entirety.

The respondent (patentee) requested as a main request that the appeal be dismissed. As an auxiliary measure, the respondent requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following documents presented in the oral proceedings:

- (a) claims 1 to 3 as first auxiliary request; or
- (b) claims 1 to 3 as second auxiliary request.

IV. Claim 1 of the patent as maintained by the Opposition Division (main request of the respondent) reads as follows:

"A thermal ink jet printer having a printhead comprising a semiconductor chip having dot-creating

resistors for creating heat to vaporize liquid to create ink dots which are expelled through nozzles proximate to each said dot-creating-resistors, at least one additional, substrate-heating resistor in said chip to heat said printhead, a power supply connected to drive said dot-creating resistors and said substrate-heating resistor(s), electronic control means to recognize periods between the printing of lines of dots by said printer and to create a control condition in which said substrate-heating resistor(s) is/are powered from said power supply only during said periods between the printing of lines, wherein said dot-creating resistors are not powered from said power supply when said substrate-heating resistor(s) is/are powered from said power supply."

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the final feature of the claim according to which "said dot-creating resistors are not powered from said power supply when said substrate-heating resistor(s) is/are powered from said power supply" is replaced by "the dot creating resistors are not powered from said power supply during said periods between the printing of lines".

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that the following additional feature is added at the end:

"and wherein said power supply is a precision power supply of 2% or less variation in output voltage".

V. The following documents were *inter alia* referred to in the appeal proceedings:

D2: US-A-4,539,571

D3: US-A-5,168,284

D4: JP-A-4-85045, together with a translation thereof in English

D5: JP-A-5-116290, together with a translation thereof in English

D6: JP-A-2-253961, together with a translation of a portion thereof in English

VI. In written and oral proceedings, the appellant argued essentially as follows:

There is no disclosure in the application as originally filed of the dot-creating resistors not being powered when the substrate-heating resistors are powered. In the passage in the application as filed at column 2, lines 16 to 35, a distinction must be drawn between features relating to the prior art and features relating to the invention. The amendment to claim 1 of the main request of the respondent thus does not comply with the requirement of Article 123(2) EPC.

The first auxiliary request of the respondent was late filed and should not be admitted into the proceedings. The argument that claim 1 of the main request did not comply with the requirement of Article 123(2) EPC was first raised in January 2005, so that ample time was available for the filing of an amended claim responding to this argument.

The combination of features claimed in claim 1 of the first auxiliary request of the respondent was not disclosed in the application as filed. The sentence at column 2, lines 30 to 32 does not disclose that no power is supplied to the dot-creating resistors. The term "idle" does not mean that nothing is done by the power supply. The amendment to claim 1 of the first auxiliary request thus does not comply with the requirement of Article 123(2) EPC.

Claim 1 of the first auxiliary request of the respondent lacks novelty in view of the disclosure of document D4. As shown in Figure 4 of document D4, a common power supply 100 is present. As shown in Figure 5, the dot-creating resistors are only powered during line printing in step S418 and not during the periods between the printing of lines. Additionally, the sentence at page 6, lines 26 to 29, makes it clear that the dot-creating resistors are only powered during dot production.

The second auxiliary request of the respondent was late filed and should not be admitted into the proceedings. The feature of the precision power supply was only introduced into claim 1 from the description with the submission of 16 January 2006, that is, after the expiry of the period of one month before the oral proceedings set by the Board.

In the application as filed at column 2, lines 11 to 15, it is merely stated that the precision power supply must be "generally of 2% or less variation in output voltage". The amendment to claim 1 of the second auxiliary request, which omits the term "generally"

thus does not comply with the requirement of Article 123(2) EPC.

As stated in the patent in suit at column 2, lines 13 to 17, the power supply must be a precision power supply "generally of 2% or less variation in output voltage". This feature is thus implicit in both documents D4 and D5, so that claim 1 of the second auxiliary request lacks novelty.

Insofar as the subject-matter of claim 1 of the second auxiliary request is regarded as being novel, it nevertheless lacks an inventive step. The closest prior art is represented by document D4.

As stated in the patent in suit, it is essential to use a precision power supply. If the output voltage provided by the power supply disclosed in D4 or D5 is not sufficiently precise, it is an obvious measure to replace the shared power source 100 by a better power supply, such as that known from document D6.

In addition, document D2 discloses a precision power supply for both the substrate-heating resistors and the dot-creating resistors. It would be obvious to use such a power supply in the printer of document D4.

The subject-matter of claim 1 according to the second auxiliary request thus does not involve an inventive step.

The use of the term "generally" at column 2, line 15 of the patent in suit renders the description inconsistent with claim 1. In addition, there should be an

acknowledgement of the disclosure of document D4 in the description of the patent in suit.

VII. In written and oral proceedings, the respondent argued essentially as follows:

The amendment to claim 1 has the effect of specifying that the dot-creating resistors and the substrate-heating resistors are never activated simultaneously. The passage in the application as filed at column 2, lines 16 to 35, discloses that the dot-creating resistors are idle when the substrate-heaters are heated. The amendment to claim 1 of the main request thus complies with the requirement of Article 123(2) EPC.

The arguments of the appellant only became clear in January 2006. The amended request was filed as soon as possible. The first auxiliary request should accordingly be admitted into the proceedings.

The use of the term "idle" in the passage in the application as filed at column 2, lines 16 to 35, should be construed as meaning that the power supply does not provide any power to the dot-creating resistors. The amendment to claim 1 of the first auxiliary request thus complies with the requirement of Article 123(2) EPC.

Document D4 does not disclose the use of a common power supply for the dot-creating resistors and the substrate-heating resistors. Whilst there is a common power supply for the carriage motor, the paper feed motor and the substrate-heating resistors, there is no

disclosure relating to the power supply for the dot-creating resistors. Whilst the sentence at page 8, lines 8 to 10 refers to "the whole of the apparatus", this should be understood as referring to the carriage motor, the paper feed motor and the substrate-heating resistors, as set out at page 8, lines 2 to 5. It further cannot be assumed that the substrate-heating resistors are not activated during line printing. The prior art, for example, document D3, suggests that whenever the temperature is too low, the dot-creating resistors should be operated (see column 1, lines 25 to 61 and column 2, lines 8 to 20). Finally, in the absence of any disclosure concerning the supply of power to the dot-creating resistors, it cannot be assumed that there is no power supply to the dot-creating resistors during margin operations.

The subject-matter of claim 1 of the first auxiliary request is thus novel.

The Board is requested to exercise its discretion to allow the second auxiliary request to be admitted into the proceedings.

The amendment to claim 1 of the second auxiliary request is based on the sentence at column 2, lines 28 to 30, of the application as filed. The sentence at column 2, lines 11 to 15 is relied upon as defining what is meant by the reference at column 2, line 29 to a precision power supply. The amendments thus comply with the requirement of Article 123(2) EPC.

The power source 100 shown in Figure 4 of document D4 is not a precision power source. It is merely the power

source, for example the mains or a battery for the entire printer, including the motors. The same applies to the power source 130 shown in Figure 5 of document D5. The subject-matter of claim 1 of the second auxiliary request is thus novel.

The closest prior art is represented by document D4.

Document D6 merely confirms that a precision power supply is required for the dot-creating resistors (final paragraph of the discussion of the prior art). The combined teaching of documents D4 and D6 would be to use the power supply of document D6 to power the dot-creating resistors, and a separate power supply for the substrate-heating resistors. A mains plug would be provided as the power source 100 of document D4.

Document D2 shows a different system from that of document D4, in which the substrate-heating resistors and the dot-creating resistors are powered simultaneously (Figure 4 and column 4, lines 13 to 31).

The subject-matter of claim 1 of the second auxiliary request thus involves an inventive step.

The term "generally" as used at column 2, line 15 of the patent in suit refers to the fact that power supplies for thermal ink jet printers in general have 2% or less variation in output voltage. The description is thus consistent with the claim 1 according to the second auxiliary request.

Reasons for the Decision

1. *Main Request*

1.1 Amendments

In the application as filed (published version), the operation of the substrate heaters is described at column 2, lines 18 to 35. In particular, it is disclosed that the separate (i.e. substrate) "heaters are driven just during margin operations of the printer" (column 2, lines 18 and 19). During this period, "the power supply for the drop-creating heaters is idle. In accordance with the invention the substrate heaters are heated from that power supply" (column 2, lines 24 to 27). Further, at column 2, lines 30 to 32, it is disclosed that instead of the power supply "being idle, in accordance with this invention, it is used to drive the substrate heaters".

It is further noted at column 3, lines 43 and 44, that the resistors 3a and 3b (that is, the substrate heaters) "do not require power during all of each period of margin activity".

It is thus disclosed that the substrate heaters are only operated during margin operations, that is, during a period in which the drop-creating heaters are not operated.

However, claim 1 of the main request specifies that "said dot-creating resistors are not powered from said power supply when said substrate-heating resistor(s) is/are powered from said power supply." This

formulation leaves open the possibility that the drop-creating heaters are operated, for example, for the purpose of heating the ink ejecting nozzles without drop formation, during periods of the margin operations when the substrate heaters are not operated, a possibility which is not disclosed in the application as filed.

The application as filed thus does not disclose the feature of claim 1 according to which "said dot-creating resistors are not powered from said power supply when said substrate-heating resistor(s) is/are powered from said power supply."

The amendment to claim 1 thus does not comply with the requirement of Article 123(2) EPC.

2. *First Auxiliary Request*

2.1 Late submission

Whilst it is correct that the argument that claim 1 of the main request did not comply with the requirement of Article 123(2) EPC was first raised by the appellant in January 2005, it is accepted by the Board that it was only with the filing of more extensive arguments by the appellant with the submission of 13 January 2006 that the argument was fully understood by the respondent. The Board is accordingly of the opinion that it is appropriate to exercise its discretion and admit the first auxiliary request, in which claim 1 is amended so as to overcome this objection, into the proceedings.

2.2 Amendments

In the application as filed, it is disclosed at column 2, lines 24 and 25, that during "margin operations the power supply for the drop-creating heaters is idle". In addition, at column 2, lines 30 to 32, it is disclosed that, instead of the precision power supply "being idle, in accordance with this invention it is used to drive the substrate heaters".

The application as filed thus discloses the feature of claim 1 according to which "the dot-creating resistors are not powered from said power supply during said periods between the printing of lines". It is not accepted that references to the power supply being "idle" should be construed as including the power supply operating so as to supply power to the drop-creating resistors at any level, as asserted by the appellant.

The amendment to claim 1 thus complies with the requirement of Article 123(2) EPC.

2.3 Novelty

Document D4 is essentially concerned with an ink jet printer in which the substrate heating resistors, the carriage motor and the transport motor are not simultaneously driven (page 5, lines 19 to 24). In the illustrated embodiment of the invention as shown in Figure 5, the heat-retention heater (that is, the substrate heater) is driven during steps S406 to S408 and during steps S412 to S416. Printing of a line occurs at step S418.

Thus, the result of following the teaching of the flowchart constituting Figure 5 in conjunction with the associated description at page 8, line 11 to page 10, line 18 of document D4, is that power supply to the substrate-heating resistors only occurs during periods of time when line printing is not being carried out, that is, when the dot-creating resistors are not powered.

In addition, document D4 discloses a printhead in which the dot-creating resistors and the substrate-heating resistor are powered from a common power supply. This is shown in Figure 4 as power source 100. This is described at page 8, lines 8 to 10, where it is stated that reference "numeral 100 is a power source for the whole of the apparatus including the control section 10".

There is nothing in the wording of claim 1 which would restrict the construction of the term "power source" so as to exclude the power source, such as the mains or a battery, from which the entire printer is powered.

The subject-matter of claim 1 thus lacks novelty in view of the disclosure of document D4.

3. *Second Auxiliary Request*

3.1 Late submission

An amended set of claims containing for the first time the feature that the "power supply is a precision power supply of 2% or less variation in output voltage" was

filed on 16 January 2006, that is, within one month of the date of the oral proceedings, which took place on 14 February 2006.

The Board is, however, of the opinion that the amendment is sufficiently clear and simple as to enable it to be dealt with in the period which remained before the oral proceedings. The amendment involves a limitation of claim 1 by the introduction of a single feature which is readily understood.

The Board is accordingly of the opinion that it is appropriate to exercise their discretion and admit the second auxiliary request.

3.2 Amendments

The feature introduced into claim 1 as an addition to the features of claim 1 according to the first auxiliary request is disclosed in the application as filed at column 2, line 29, where it is stated that the "power supply ... is a precision power supply". The term "precision power supply" is defined in the application as filed at column 2, lines 11 to 14, as being "generally of 2% or less variation in output voltage". The term "generally" is understood as meaning that precision power supplies are generally of 2% or less variation in output voltage, and not that precision power supplies are of generally 2% or less variation in output voltage.

The feature introduced into claim 1 is thus disclosed in the application as filed, and the amendment to

claim 1 thus complies with the requirement of Article 123(2) EPC.

In addition, the amendments to claim 1 as compared with claim 1 as granted have the effect of limiting the protection conferred, so that the amendment also complies with the requirement of Article 123(3) EPC.

3.3 Novelty

The power source 100 shown in Figure 4 of document D4 is not described as being a precision power source. It is only referred to in the description at page 8, lines 8 to 10, where it is stated that reference "numeral 100 is a power source for supplying power to the whole of the apparatus including the control section 10". The person skilled in the art would thus understand that the power source 100 is simply the power source for the entire printer. Such a power source would not be understood as being a precision power supply of 2% or less variation in output voltage.

The same applies to the power source 130 shown in Figure 5 of document D5 (see page 41, line 8 and page 25, lines 11 to 17, of the English translation).

The subject-matter of claim 1 of the second auxiliary request is thus novel.

3.4 Inventive step

By virtue of the fact that claim 1 specifies that the power supply is a precision power supply of 2% or less variation in output voltage, the reference in the claim

to "a power supply connected to drive said dot-creating resistors and said substrate-heating resistor(s)" is not to be construed as referring to the power supply common to the entire printer, which is no more than the available mains supply or a battery, neither of which is sufficiently precise. Rather, what is meant is a power supply derived from the common power supply which has a consistent output voltage which, when applied to the dot-creating resistors, enables the ejection of ink droplets of sufficiently consistent mass.

The Board concurs with the parties that document D4 represents the closest prior art.

The disclosure of document D4 is essentially concerned with overcoming the problems associated with the management of the power supply in ink jet printers having a heat-retention heater, that is, a substrate-heating resistor. More particularly, document D4 recognizes that, in the prior art, problems arise owing to three loads occurring simultaneously, that is, driving of the carriage motor, driving of the paper feed motor and heating the ink by the substrate-heating resistor (Figure 6 and page 4, lines 4 to 24). The solution to this problem as taught by document D4 is to ensure that only two, but never all three, of these three loads occur simultaneously (page 5, lines 19 to 24 and page 13, lines 1 to 14).

It is noted that document D4 makes no reference to a load resulting from operation of the dot-creating resistors and that there is no disclosure relating to the power supply to the dot-creating resistors.

Document D6 relates to a control apparatus for supplying a stable voltage, having up to 1% variation, at large currents to an ink jet head. The result of applying the teaching of this document to the printer of document D4 is that the control apparatus of document D6 would be used to provide a stable voltage to the recording head, whilst a second power supply is used to supply voltage to the substrate-heating resistor, the carriage motor and the transport motor, in accordance with the disclosure of document D4.

Document D2 relates to a thermal printer in which a common power source is provided for heating elements 1a, 1b, 1c, ... and an auxiliary heating element 4 (Figure 4). A temperature compensation circuit 11 varies the amount of current supplied to the auxiliary heating element 4 in response to changes in the ambient temperature (see column 4, lines 31 to 65). Power is, however, always provided to the heating element. The teaching of this document is thus not compatible with that of document D4, which requires a common power source for driving the carriage motor, driving the paper feed motor and supplying power to the substrate-heating resistor, and requires that a maximum of two of these loads are applied at any one time.

The combination of document D4 and either of documents D2 or D6 thus does not lead to the adoption of a precision power supply of 2% or less variation in output voltage being used to drive the dot-creating resistors and the substrate-heating resistor(s), which is made possible by ensuring that the dot-creating resistors and the substrate-heating resistor(s) are never simultaneously activated.

The teaching of the prior art as discussed above thus does not lead the person skilled in the art to the subject-matter of claim 1.

3.5 Claims 2 and 3 are appendant to claim 1. They relate to preferred embodiments of the thermal ink jet printer of claim 1 and thus similarly involve an inventive step.

3.6 Description

The presence of the term "generally" at column 2, line 15 of the description is not incompatible with claim 1 (cf. point 3.2 above).

An acknowledgement of the disclosure of document D4 in the description is not seen as being necessary. The requirements of Rule 27(1)(b) EPC are seen as being met by the existing description at column 1, line 27 to column 2, line 17, which discusses two alternative approaches known in the art for maintaining a desired substrate temperature. The disclosure of document D4 is no more relevant to an understanding of the invention than the existing discussion.

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 on the basis of the following documents:
 - (a) claims 1 to 3 presented as second auxiliary request in the oral proceedings;

 - (b) description, pages 2 and 3, as granted;

 - (c) drawings, Figures 1 and 2, as granted.

The Registrar:

The Chairman:

M. Dainese

W. Moser