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**Datasheet for the decision  
of 2 June 2014**

**Case Number:** T 2122/12 - 3.2.05

**Application Number:** 06116943.9

**Publication Number:** 1747890

**IPC:** B41J2/175

**Language of the proceedings:** EN

**Title of invention:**

Method of determining the droplet size of ink droplets released by an ink jet printer

**Applicant:**

Océ-Technologies B.V.

**Relevant legal provisions:**

EPC 1973 Art. 56  
EPC R. 103(1)(a)

**Keyword:**

Inventive step - main request and first auxiliary request (no)  
Inventive step - second auxiliary request (yes)  
Reimbursement of appeal fee - (no)



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Case Number: T 2122/12 - 3.2.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.05**  
**of 2 June 2014**

**Appellant:** Océ-Technologies B.V.  
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**Representative:** Paulus J. P. Janssen  
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**Decision under appeal:** **Decision of the Examining Division of the European Patent Office posted on 4 May 2012 refusing European patent application No. 06116943.9 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** M. Poock  
**Members:** S. Bridge  
M. J. Vogel

## **Summary of Facts and Submissions**

- I. The appellant (applicant) lodged an appeal against the decision of the examining division refusing European patent application No. 06 116 943.9.
- II. The following documents were referred to in the decision under appeal:
- D1: US-A1-2003/146945,  
D7: US-B1-6,334,658.
- III. The examining division held that claim 1 (main request) lacks novelty with respect to document D1 (Article 54 EPC 1973) and claim 10 (main request) lacks an inventive step with respect to the combination of documents D1 and D7 (Article 56 EPC 1973), that claims 1 and 10 according to the first auxiliary request and respective claims 1 and 8 according to the second and third auxiliary requests lack an inventive step with respect to the combination of documents D1 and D7 (Article 56 EPC 1973).
- IV. Oral proceedings were held before the board of appeal on 2 June 2014.
- V. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:
- (a) claims 1 to 10 as main request; or
  - (b) claims 1 and 2 as first auxiliary request; or
  - (c) claims 1 and 2 as second auxiliary request,
- all requests filed with letter of 1 May 2014 and description pages 1 and 1a filed during the oral proceedings, pages 2 to 6 and drawings of the application as filed.

In addition the appellant requested that the appeal fee be reimbursed because of alleged substantial procedural violations.

In addition a variety of procedural requests had been filed in writing including several sets of questions for the Enlarged Board of Appeal. However, these requests were not maintained at the oral proceedings.

VI. Claim 9 of the main request reads as follows:

"Ink jet printer (1) comprising:

- a print head (4) comprising:
  - a plurality of nozzles (8), and
  - ink channels arranged side by side, each nozzle being connected to an ink reservoir via its associated ink channel, and
- a device (9) for dispensing ink pellets of substantially predetermined and identical volume to the ink reservoir,

wherein the ink jet printer further comprises first counting means (15) for counting the number of ink pellets dispensed to the reservoir, second counting means (12) for counting the number of ink droplets released by the nozzles, detecting means (14) for detecting the ink level within each ink reservoir, and controlling means (16) for determining the average droplet size of ink droplets released by the nozzles based upon measured values gathered by the first counting means, the second counting means, and the detecting means."

VII. Claim 2 according to the the first auxiliary request is identical to claim 9 of the main request.

VIII. Claims 1 and 2 of the second auxiliary request read as follows:

"1. Method of determining the average droplet size of ink droplets released by an ink jet printer (1), the inkjet printer comprising

- a control unit (16),
- an ink reservoir, the ink reservoir having a substantially predetermined volume
- a print head (4) comprising a plurality of nozzles and ink channels arranged side by side, each nozzle being connected to the ink reservoir via its associated ink channel
- a dispensing device (9) for dispensing ink pellets of substantially predetermined and identical volume to the ink reservoir;
- a carriage (5) carrying the print head, the carriage being moveable for disposing the print head beneath the dispensing device,
- first counting means (15) for counting a number of ink pellets dispensed to the reservoir,
- second counting means (12) for counting the number of ink droplets released by the nozzles,
- detecting means (14) for detecting the ink level within each ink reservoir;

the method comprising the steps of:

- A) measuring an amount of ink dosed to the ink reservoir by the first counting means by counting the number of ink pellets dispensed to the ink reservoir of the print head of the ink jet printer;
- B) measuring the ink level within said ink reservoir by the detecting means (14),
- C) measuring the number of ink droplets released by at least one nozzle (8) operatively connected to the ink reservoir by the second counting means by

counting the number of ink droplets released by the nozzles, and

- D) determining the average ink droplet size by the control unit based upon the measured values gathered in steps A) - C); and
- F) controlling the dispensing device and the carriage by the control unit to timely supply the ink reservoir with sufficient ink dependent on the printing tasks to be performed within a certain timeframe and to optimize the print quality of the inkjet printer permanently on the actual average droplet size determined by the control unit."

"2. Ink jet printer comprising

- a print head (4) comprising: a plurality of nozzles (8), and ink channels arranged side by side, each nozzle being connected to an ink reservoir via its associated ink channel, and
- a dispensing device (9) for dispensing ink pellets of substantially predetermined and identical volume to the ink reservoir,
- a carriage (5) carrying the print head, the carriage being moveable for disposing the print head beneath the dispensing device,

wherein the ink jet printer further comprises first counting means (15) for counting the number of ink pellets dispensed to the reservoir, second counting means (12) for counting the number of ink droplets released by the nozzles, detecting means (14) for detecting the ink level within each ink reservoir, and a control unit (16) for determining the average droplet size of ink droplets released by the nozzles based upon measured values gathered by the first counting means, the second counting means, and the detecting means; and

wherein the control unit is adapted for controlling the dispensing device and the carriage to timely supply the ink reservoir with sufficient ink dependent on the printing tasks to be performed within a certain timeframe and to optimize the print quality of the inkjet printer permanently [sic] on the actual average droplet size determined by the control unit."

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

*Main request*

The solution set out in document D1 is incompatible with the device disclosed in document D7, because the latter requires assuming a fixed droplet size in the process of determining whether an ink jet ejection failure has occurred. Replacing this assumed fixed droplet size by one which is calculated is incompatible with the rest of the process set out in document D7. Thus, the subject-matter of claim 9 involves an inventive step.

*Reimbursement of the appeal fee*

The appellant considers that the reasoning provided in the communications of the examining division and in the decision under appeal was insufficient in that it did not indicate in detail which feature of the independent claims were disclosed in which passages of the prior art documents. This constitutes a substantial procedural violation in that it prevented the appellant from responding appropriately. Therefore, reimbursement of the appeal fee is equitable.

## Reasons for the Decision

### 1. *Main request - claim 9 - inventive step*

Document D7 constitutes the closest prior art and discloses an ink jet printer (column 3, lines 62 to 65, figure 1) comprising:

a print head (1) comprising: a plurality of nozzles (31, 32), and ink channels (38) arranged side by side (column 5, lines 53 to 57, figure 5), each nozzle (32) being connected to an ink reservoir (11, 13) via its associated ink channel (35, 37) (column 5, lines 25 to 31), and a device (200) for dispensing ink pellets (220) of substantially predetermined and identical volume to the ink reservoir (column 6, lines 1 to 13, figures 6 and 7),

wherein the ink jet printer further comprises second counting means (74a) for counting the number of ink droplets released by the nozzles (column 9, lines 40 to 42), detecting means (300) for detecting the ink level within each ink reservoir (column 9, lines 10 to 23), and controlling means (71-75) (column 8, lines 59 to 63) which comprises a CPU 71, RAM 72, ROM 73 and ASIC 74 connected via a bus 75.

This computer-like structure of the controlling means with a CPU 71, RAM 72, ROM 73 and ASIC 74 connected via a bus 75 merely lacks suitable programming for it to be suitable:

- for use as first counting means for counting the number of ink pellets dispensed to the reservoir, and
- for determining the average droplet size of ink droplets released by the nozzles based upon



measured values gathered by the first counting means, the second counting means, and the detecting means.

The effect achieved by these differences is to obtain the "*average droplet size of ink droplets released by the nozzles*". The inevitable technical consequences of using a computer-like structure to perform such a calculation are that the result is contained in the computer. Claim 9 does not require any additional effect resulting from this calculation.

In consequence, the subject-matter of claim 9 does not extend beyond the inevitable technical consequences of using a computer-like structure to perform such a calculation.

It was argued on behalf of the appellant that the result may potentially be used for optimising the operation of the printer and thus achieve a technical effect. However, claim 9 in its wording according to the main request does not specify that the obtained "*average droplet size of ink droplets released by the nozzles*" necessarily be put to any further use at all, not to mention a use which results in a technical effect. Thus, the board cannot derive from the claimed subject-matter a technical effect beyond the one resulting from the use of a computer for carrying out such a calculation.

Nevertheless, document D1 discloses the problem that actual ink droplet ejection volumes from an ink jet printer progressively change as the printer accumulates operating hours and that this adversely affects the quality of the printed output (paragraph [0011]). The solution to this problem involves calculating an

average ink droplet volume (and using this to adapt the operation of the printer accordingly - paragraph [0013]).

It was argued on behalf of the appellant that the solution set out in document D1 was incompatible with the device disclosed in document D7, because the latter involved assuming a fixed droplet size in the process of determining whether an ejection failure had occurred. However, the board cannot see any reason why the skilled person would not use the solution according to document D1, not as a replacement, but as an additional measure in order to adjust the assumed droplet size, as set out in document D1, to overcome the problem that actual ejection volumes progressively change as the printer accumulates operating hours. In so doing, the skilled person arrives immediately at the subject-matter of claim 9 without having to perform an inventive step.

Therefore, the subject-matter of claim 9 according to the main request does not involve an inventive step (Article 56 EPC 1973).

2. *First auxiliary request - claim 2 - inventive step*

Claim 2 according to the first auxiliary request is identical to claim 9 of the main request. The reasons for the lack of an inventive step of the subject-matter of claim 9 according to the main request thus apply identically to claim 2 according to the second auxiliary request. The subject-matter of claim 2 according to the second auxiliary request therefore does not involve an inventive step (Article 56 EPC 1973).

3. *Second auxiliary request*

3.1 Claim 2

3.1.1 Claim 2 according to the second auxiliary request corresponds in substance to claim 9 according to the main request with the following two additional features:

*"a carriage (5) carrying the print head, the carriage being moveable for disposing the print head beneath the dispensing device" and*

*"wherein the control unit is adapted for controlling the dispensing device and the carriage to timely supply the ink reservoir with sufficient ink dependent on the printing tasks to be performed within a certain timeframe and to optimize the print quality of the inkjet printer permanently [depending] on the actual average droplet size determined by the control unit".*

Although the word *"depending"* is not explicitly stated in this last feature, the skilled person will nevertheless understand it to be present implicitly, because otherwise the wording would not make technical sense.

These additional features are disclosed on page 6 of the description as filed, respectively in lines 6 to 8 and lines 23 to 27, so that the requirements of Article 123(2) EPC are met.

3.1.2 Document D7 further discloses a carriage (3) carrying the print head, the carriage being moveable for disposing the print head beneath the dispensing device (column 3, lines 62 to 65, column 6, lines 9 to 10,

figure 6) and that the control unit (71 to 75, figure 8) is adapted for controlling the dispensing device and the carriage to timely supply the ink reservoir with sufficient ink dependent on the printing tasks to be performed within a certain timeframe (column 8, line 59 to column 9, line 22; column 10, lines 32 to 34; figures 8 and 9).

3.1.3 Thus, the subject-matter of claim 2 according to the second auxiliary request only differs from the apparatus disclosed in document D7 in that the controlling unit is suitable for:

- use as first counting means for counting the number of ink pellets dispensed to the reservoir;
- determining the average droplet size of ink droplets released by the nozzles based upon measured values gathered by the first counting means, the second counting means, and the detecting means, and
- optimizing the print quality of the inkjet printer permanently depending on the actual average droplet size determined by the control unit.

The overall technical effect achieved by these features is that the print quality of the inkjet printer can be maintained even though the actual ejection volumes progressively change as the printer accumulates operating hours.

As already noted above, document D1 discloses both the problem that the print quality is affected by the actual ink droplet ejection volumes which progressively change as the printer accumulates operating hours (paragraph [0011]) and the solution which involves calculating an average ink droplet volume and using

this to adapt the operation of the printer accordingly (paragraph [0013]).

Nevertheless, the provision of the counter for counting the number of dispensed ink pellets gives rise to an additional technical effect. Although the provision of a counter for counting the number of dispensed ink pellets in itself falls within the usual practice of the skilled person needing to keep track of this number, this counter leads to the additional technical effect that the control unit can optimize the print quality of the inkjet printer permanently depending on the actual average droplet size when more than one pellet is added to the ink reservoirs thus decoupling the print quality optimisation process from the dispensing of an individual ink pellet.

Such a solution is not suggested by the combination of documents D7 or D1, as document D7 is primarily concerned with the detection of ink jetting failure (column 1, lines 44 to 49) and document D1 does not discuss the use of ink pellets. Similarly, none of the other cited documents disclose or suggest the possibility or means for achieving this effect.

In consequence, the subject-matter of claim 2 according to the second auxiliary request is based on an inventive step (Article 56 EPC 1973).

### 3.2 Claim 1

Claim 1 according to the second auxiliary request is a method claim corresponding to the use of the apparatus of claim 2 of this request.

Again, although the word "*depending*" is not explicitly stated the last feature of claim 2, the skilled person will nevertheless understand it to be present implicitly, because otherwise the wording would not make technical sense.

Thus, the novelty and inventive step of the subject-matter claim 2 carries over to the subject-matter of claim 1.

4. Reimbursement of the appeal fee

According to Rule 103(1)(a) EPC, the appeal fee is to be reimbursed if the board deems the appeal to be allowable and if the reimbursement is equitable due to a substantial procedural violation. The Board cannot agree that a substantial procedural violation, as alleged by the appellant, occurred during the proceedings before the examining division.

Although the examining division did not indicate in detail which feature of the independent claims were disclosed in which passages of the prior art documents, or that certain arguments advanced on behalf of the applicant did not relate to the claimed subject-matter this does not necessarily amount to a procedural violation in that in the present case the subject-matter of the claims is not particularly complex since the invention only involves measuring three parameters and calculating an average and the cited passages of the prior art documents are not extensive. From the course of the proceedings, it would appear that a certain amount of misunderstanding concerning the breadth of the claimed subject-matter between the examining division's broad view and the applicant's narrower view contributed not unsubstantially to the

course of the examination ending in the refusal of the application by the examining division.

The Board has therefore come to the conclusion that the examining division did not commit a substantial procedural violation.

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following documents:  
Claims 1 and 2 filed as second auxiliary request with letter of 1 May 2014;  
Description, pages:
  - 1 and 1a filed during oral proceedings;
  - 2 to 6 as originally filed;Drawings, figure 1 as originally filed.
3. The reimbursement of the appeal fee is refused.

The Registrar:

The Chairman:



D. Meyfarth

M. Poock

Decision electronically authenticated