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**Datasheet for the decision  
of 8 March 2016**

**Case Number:** T 1911/12 - 3.2.05

**Application Number:** 05006961.6

**Publication Number:** 1582352

**IPC:** B41J2/14

**Language of the proceedings:** EN

**Title of invention:**

Inkjet head

**Applicant:**

Brother Kogyo Kabushiki Kaisha

**Relevant legal provisions:**

EPC 1973 Art. 84

EPC Art. 123(2)

EPC R. 43(6)

**Keyword:**

Inadmissible extension (no)

Clarity (yes)

Remittal to the department of first instance



**Beschwerdekammern**  
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Case Number: T 1911/12 - 3.2.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.05**  
**of 8 March 2016**

**Appellant:** Brother Kogyo Kabushiki Kaisha  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted on 18 April 2012  
refusing European patent application No.  
05006961.6 pursuant to Article 97(2) EPC.

**Composition of the Board:**

**Chairman** M. Poock  
**Members:** O. Randl  
J. Geschwind

## **Summary of Facts and Submissions**

- I. The appellant (applicant) has filed an appeal against the decision of the examining division to refuse application No. 05006961.6.

The examining division held that the application did not meet the requirements of Article 84 EPC 1973.

- II. The oral proceedings before the board took place on 8 March 2016.

- III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims 1 to 6 of the main request filed during the oral proceedings.

- IV. Claim 1 of the main request reads:

"An inkjet head wherein a plurality of nozzles (8) for ejecting ink are arranged on an ink ejection face of the inkjet head in  $4n$  rows (52) ( $n$ : a natural number) extending parallel to each other in one direction (A) such that projection points of the nozzles (8) obtained by projecting all the nozzles (8) constituting the  $4n$  rows (52) on an imaginary straight line extending in the one direction (A), in a direction (C) parallel to a plane including therein the  $4n$  rows (52), and perpendicular to each row (52), are arranged on the imaginary straight line at regular intervals, and the plurality of nozzles (8) are arranged in a cycle corresponding to a distance between the projection points at both ends of  $4n+1$  projection points arranged on the imaginary straight line, characterized in that

the total sum of products, each of which is obtained by multiplying a corresponding one of peak values of a modulation transfer function (MTF) as the standardized absolute value of the complex number obtained by the Fourier transformation of the cyclic nozzle arrangement with respect to spatial frequency in the one direction with a corresponding value of a visual transfer function (VTF) representing the sensitivity of human visual recognition to the spatial frequency of the corresponding one of the peak values, is not more than 0.10; wherein the visual transfer function (VTF) is defined by the following formula:

$$\text{VTF} = 5.05 \cdot \exp(-0.138 \cdot x \cdot f \cdot \pi / 180) \cdot \{1 - \exp(-0.1 \cdot x \cdot f \cdot \pi / 180)\},$$

where  $x$  represents an observation distance the value of which is determined from figures 12, 15 and 18, and  $f$  represents the spatial frequency of the nozzle arrangement in the one direction."

V. The appellant argued as follows:

The value of the observation distance which the examining division had found not to have been disclosed in the original application (i.e. 300 mm) can be determined from the visual transfer function 61 in figures 12, 15, and 18 of the application.

In view of the disclosure of the application (page 48, third line of Paragraph [0070], page 49, lines 1-3, page 66, last line: "... the total value of the MTF ..."; cf. page 66, paragraph [0092]), the skilled person would understand the expression "the total" in claim 1 as filed as referring to the total sum of all the products.

The clarity objections raised by the board in its communication are either unfounded or do not apply to the amended claims:

- the skilled person would understand the standardization to mean the scaling of the absolute value at the zero-frequency to 1;
- numerical factors such as  $1/\sqrt{2 \cdot \pi}$  were eliminated via the standardization involved in the calculation of the modulation transfer function;
- the meaning of the expression "the total" was clarified by amending claim 1.

### **Reasons for the Decision**

1. The application under consideration was filed on 30 March 2005. According to Article 7 of the Act revising the EPC of 29 November 2000 (Special edition No. 4 OJ EPO, 217) and the Decision of the Administrative Council of 28 June 2001 on the transitional provisions under Article 7 of the Act revising the EPC of 29 November 2000 (Special edition No. 4 OJ EPO, 219), Articles 84 EPC 1973 and 123(2) EPC apply in the present case.

2. Terminology

For the sake of concision the board adopts the abbreviations MTF and VTF for "modulation transfer function" and "visual transfer function", respectively.

3. Amendments (Art. 123(2) EPC)

3.1 Observation distance

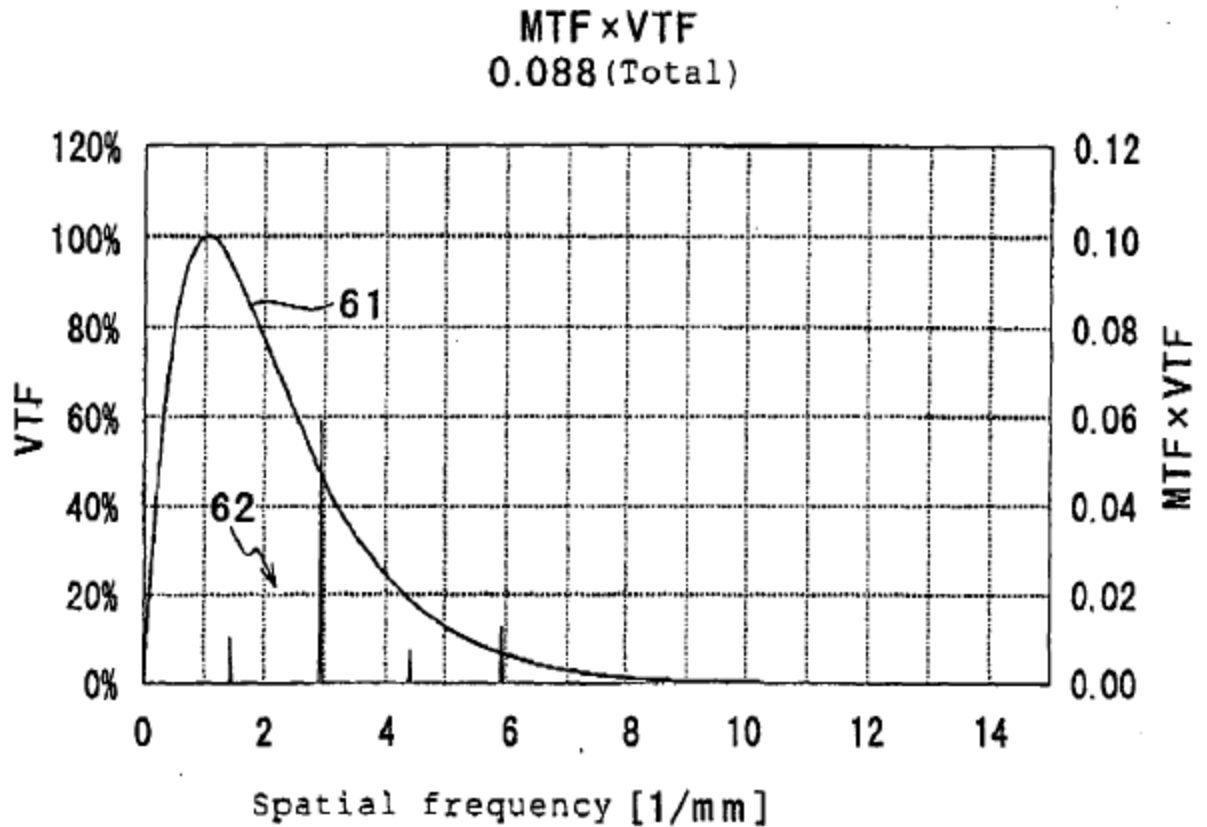
The board agrees with the examining division (see point 2.2 of the impugned decision) that the original application does not explicitly disclose an observation distance of 300 mm.

The appellant has argued that the value could be extracted from the VTF 61 in figures 12, 15, and 18 of the application, because the values of this function corresponded to an observation distance of 300 mm.

In view of the definition of the VTF in claim 1:

$$VTF = 5.05 \cdot \exp(-0.138 \cdot x \cdot f \cdot \pi / 180) \cdot \{1 - \exp(-0.1 \cdot x \cdot f \cdot \pi / 180)\},$$

and based on the VTF values as a function of the spatial frequency in figures 12, 15, and 18:



the skilled person can perform a fit and obtain a value for the observation distance used. The board is satisfied that the value obtained would be close to 300 mm. Considering the limited resolution and other imperfections of the plots, however, the value obtained would be affected by some error. Consequently, the value of 300 mm cannot be said to be directly and unambiguously disclosed in figures 12, 15, and 18.

Claim 1 takes account of this observation by expressly referring to the "observation distance the value of which is determined from figures 12, 15, and 18".

The board is satisfied that this formulation complies with the requirements of Article 123(2) EPC.

### 3.2 "total sum"

This amendment is intended to clarify claim 1. Although the expression "total sum" is not explicitly found in the application as filed, the board has reached the conclusion that the amendment has a sufficient basis therein.

As a matter of fact, the application refers to the "total value of the MTF multiplied by VTF" several times (page 48, lines 19-20; page 49, lines 1-3; page 66, last line). When viewed together with the disclosure according to which "[t]he total of products each obtained by a peak value of a modulation transfer function defined by the arrangement of the plurality of nozzles, multiplied by a value of a visual transfer function at a spatial frequency corresponding to the peak value of the modulation transfer function, is not more than 0.10" (page 4, line 21 to page 5, line 2), it

is clear to the skilled person that a sum of all the products or, in other words, the total sum of products is to be calculated.

### 3.3 Conclusion

The board has reached the conclusion that claim 1 complies with the requirements of Article 123(2) EPC.

### 4. Compliance with Rule 43(6) EPC

Rule 43(6) EPC states that "[e]xcept where absolutely necessary, claims shall not rely on references to the description or drawings in specifying the technical features of the invention. ..."

In the present case the only way to define the observation distance that is implicitly disclosed in figures 12, 15, and 18 of the application without infringing either Article 84 EPC 1973 or Article 123(2) EPC was to refer to those figures. If this amendment had been refused, the application would have had to be refused, too. Therefore, the board has reached the conclusion that in the present case the reference to the figures was indeed "absolutely necessary" within the meaning of Rule 43(6) EPC.

### 5. Clarity

In the course of the grant and appeal proceedings, the examining division and the board have raised a series of clarity objections against claim 1:

#### 5.1 Definition of the MTF function



- 5.1.1 The examining division pointed out that a mathematical formula for the MTF was missing.

The MTF is defined in claim 1 as "the standardized absolute value of the complex number obtained by the Fourier transformation of the cyclic nozzle arrangement at the spatial frequency in the one direction".

This definition, which was not part of the original claims, is based on the only passage of the original application mentioning Fourier transforms, i.e. paragraph [0008] (page 5, last line to page 6, line 5):

"On the other hand, the modulation transfer function (hereinafter may be simply referred to as MTF) is a standardization of the absolute value of a complex number obtained as a result of Fourier transformation of a nozzle arrangement with respect to spatial frequency."

The skilled person knows what a Fourier transformation is. There is no unique definition of a Fourier transformation and several conventions differ by numerical factors (such as, for instance,  $1/\sqrt{2 \cdot \pi}$ ). However, as the MTF is the result of a standardization, the precise value of the numerical value is not relevant for the computation defined in claim 1.

- 5.1.2 In its communication the board had found the expression "Fourier transformation of the cyclic nozzle arrangement at the spatial frequency in the one direction" to be unclear. In response to this objection, the appellant has amended this feature of claim 1 - in line with page 6, lines 4-5 of the original application - to read "Fourier transformation of the cyclic nozzle arrangement with respect to spatial frequency in the one direction" (emphasis by the board). The board is

satisfied that this amendment overcomes the clarity objection.

5.1.3 Summing up, the board finds the definition of the MTF to be clear.

5.2 Definition of the VTF

The examining division also found the definition of the VTF to be unclear (Reasons for the decision, sheet 4, point 2.2).

The appellant has amended the claim in order to clarify the definition, by defining the observation distance.

Claim 1 defines the VTF as follows:

" $VTF = 5.05 \cdot \exp(-0.138 \cdot x \cdot f \cdot \pi/180) \cdot \{1 - \exp(-0.1 \cdot x \cdot f \cdot \pi/180)\}$ ,

where x represents an observation distance the value of which is determined from figures 12, 15 and 18, and f represents the spatial frequency of the nozzle arrangement in the one direction."

Contrary to the assertion of the examining division (Reasons for the decision, point 3.5), the skilled person would understand what is meant by "spatial frequency", i.e. a measure of how often the periodic nozzle pattern is repeated per unit of distance. Having determined the particular value for the observation distance x from figures 12, 15 and 18, the skilled person would be able to calculate the value of VTF for any particular frequency using the above formula.

Consequently, this clarity objection does not apply to claim 1 any more.

### 5.3 Sum of products

- 5.3.1 The examining division pointed out that the feature "sum of the products" in the then main request was not clear (Grounds for the decision, sheet 4, point 3.1).

In claim 1 the feature "sum of the products" has been replaced by "total sum of products". Regardless of this semantic difference, the board finds the objection of the examining division to be unfounded because the skilled person would understand that there will be more than one peak value per MTF. The examining division appears to have misunderstood the concept of nozzle arrangement. There is only one nozzle arrangement, but the MTF has several "peaks", and it is possible to relate different (sub)groups of nozzles to the various peaks of the MTF.

For the same reason, the objection expressed in point 3.2 of the Reasons for the decision of the examining division is unfounded.

- 5.3.2 The examining division has also found that it was not clear how the peak value of the MTF was to be calculated for each "product" (Reasons for the decision, sheet 3, point 2.1, second paragraph). The objection was based on the absence of a definition for the spatial frequency as well as the absence of the function  $P(x)$  and its shape.

In response to this objection, the appellant provided a specific example for the calculation based on Fig. 10 of the original application.

Claim 1 requires the calculation of a total of products. Each product corresponds to a multiplication of a peak value of a MTF with the corresponding value of a VTF. As already explained under point 5.1.1, the MTF is defined as "the standardized absolute value of the complex number obtained by the Fourier transformation of the cyclic nozzle arrangement at the spatial frequency in the one direction".

As mentioned before (point 5.2) the skilled person would understand that "spatial frequency" refers to a measure of how often the periodic nozzle pattern is repeated per unit of distance. The skilled person would also understand from the overall disclosure of the original application that what is relevant here is the spatial frequency in the main scanning direction. Finally, the skilled person would understand that the MTF yields a series of peak values, each of which has a certain frequency, and that he would have to multiply peak values with the value of the VTF at the same frequency and compute the sum of these products.

Thus the board cannot endorse the clarity objection related to this computation.

### 5.3.3 Number of products/peak values to be considered

The examining division has pointed out that it was not clear how many products should be considered (Reasons for the decision, point 3.3).

The appellant has emphasised that the sum had to run over all the peak values.

Claim 1 has been clarified accordingly: the expression "the total" was replaced by "the total sum".

Therefore, this clarity objection has been overcome.

#### 5.4 Conclusion

In the light of the above, the board has reached the conclusion that claim 1 of the main request is clear.

#### 6. Patentability

Since the examining division has not examined the novelty and inventive step of the subject-matter of claim 1, the board considers it appropriate to make use of its discretionary powers under Article 111(1) EPC and remit the case to the department of first instance for further prosecution on the basis of the claims filed during the oral proceedings before the board.

### **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 for further prosecution.

The Registrar:

The Chairman:



D. Meyfarth

M. Poock

Decision electronically authenticated