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D E C I S I O N
of 7 November 2002

Case Number: T 0910/99 - 3.2.5

Application Number: 93119800.6

Publication Number: 0622216

IPC: B41J 2/35

Language of the proceedings: EN

Title of invention:
Thermal printing apparatus with improved power supply

Patentee:
Gerber Scientific Products, Inc.

Opponent:
Maier Thomas

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (main request - no; auxiliary request - yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0910/99 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 7 November 2002

Appellant: (Proprietor of the patent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 19 July 1999 revoking European patent No. 0 622 216 pursuant to Article 102(1) EPC.**

Composition of the Board:

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

Summary of Facts and Submissions

I. The appellant (patentee) lodged an appeal against the decision of the Opposition Division revoking the European patent No. 0 622 216.

Opposition was filed against the patent as a whole based on Article 100(a) EPC (lack of novelty and inventive step) and Article 100(c) EPC (added subject-matter). The Opposition Division held that the subject-matter of the patent in suit lacked an inventive step.

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

E1: US-A-4 910 602

E2: JP-A-6 359 560 (English translation)

E6: JP-U-6 353 743 (English translation)

II. Oral Proceedings were held before the Board of Appeal on 7 November 2002.

At the end of the oral proceedings the requests of the parties were as follows:

(i) The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the following documents:

(a) main request: claim 1 filed on 25 November 1999 and claims 2 to 6 as granted; or

(b) auxiliary request: claim 1 submitted as auxiliary request during oral proceedings on 7 November 2002 and claims 2 to 6 as granted.

(ii) The respondent (opponent) requested that the appeal be dismissed.

III. Claim 1 according to the main request reads as follows:

"1. A thermal printing apparatus having a base for supporting sheet material (S) during the generation of printed images, a support frame (46) movably mounted on the base (24), a thermal printhead (30) mounted in the support frame (46) and having a plurality of resistive heating elements selectively energized and de-energized to impart thermal energy to a print medium for generating a printed image on the sheet material (S), an electrical power supply (70) mounted in the base (24) and having output terminals (72, 74) connected with each of the plurality of resistive heating elements in the printhead (30) for supplying electrical power at a given voltage for conversion into the thermal energy by the plurality of heating elements, characterized by a capacitor (76) mounted within the support frame (46) close to and separate from the printhead (30) and connected across the terminals (72, 74) of the power supply (70) and adapted to stabilize the given voltage and to prevent current surges by compensation of inductive impedance of the circuitry connecting the power supply (70) and the printhead (30) and of the surrounding structure when all or a significant number of the resistive heating elements in the printhead (30) are simultaneously energized or de-energized."

Claim 1 according to the auxiliary request differs from claim 1 according to the main request in that the expression "mounted in" is replaced by the expression "resiliently supported from".

IV. The appellant argued essentially as follows:

Although printers having a power supply with a capacitor connected across its terminals were known in the art, a distance relationship between the capacitor and the print head was either not recognised in the art, or, if such a relationship was recognised, the prior art taught that the capacitor had to be integrated in the print head, see documents E2 and E6. The main claim of both requests required that the print head and the capacitor be "close to and separate from the print head". This teaching was clear, and was neither known from, nor suggested by, the prior art. During printing the print head was pressed onto the sheet material, which caused mechanical stress on the print head. By mounting the capacitor and the print head close to each other, but at separate locations within the support frame, the advantage of an effective stabilization of the voltage was maintained, whereas additional mechanical stress by the capacitor on the print head was avoided. Claim 1 according to the auxiliary request expressed the idea that the capacitor and the print head were mechanically separated even more clearly.

V. The respondent argued essentially as follows:

The expression "close to" in claim 1 of both requests was vague and indefinite, and was thus not clear, contrary to Article 84 EPC. A thermal printing

apparatus with all the features according to the preamble of claim 1 of the main request was known from document E1. It was well-known in the art that the voltage of a thermal printing apparatus could be stabilized by mounting a capacitor across the terminals of the power supply, and that the capacitor was preferably mounted as close to the heating elements as possible, see e.g. documents E2 and E6. The additional feature in claim 1 of the auxiliary request, viz. that the print head was *resiliently* supported from the support frame, was already known from document E1 and could not support an inventive step.

Reasons for the Decision

Main request

1. *Allowability of the amendments*

The subject-matter of claim 1 is a combination of claims 1 and 2 as filed, with the additional features that capacitor (76) is mounted "close to and separate from the printhead (30) and connected across the terminals (72, 74) of the power supply (70) and adapted to stabilize the given voltage and to prevent current surges by compensation of inductive impedance of the circuitry connecting the power supply (70) and the printhead (30) and of the surrounding structure when all or a significant number of the resistive heating elements in the printhead (30) are simultaneously energized or de-energized".

A basis for these additional features is column 5, lines 29 to 31 and column 6, line 48, to column 7,

line 11, of the application as filed (published version). Hence the Board is satisfied that the subject-matter of claim 1 is disclosed in the application as filed, cf. Article 123(2) EPC.

Since features have been added with respect to claim 1 as granted, and none deleted, the scope of protection conferred by claim 1 is restricted with respect to claim 1 of the patent in suit as granted. Claim 1 thus meets the requirements of Article 123(3) EPC as well.

Claim 1 requires that the thermal print head is mounted in a support frame. The feature that the capacitor is "mounted within the support frame close to and separate from the print head" must be interpreted in the light of the *purpose* of mounting the capacitor defined in the claim: "... to stabilize the given voltage and to prevent current surges by compensation of inductive impedance of the circuitry ..., when ... the resistive heating elements in the print head are simultaneously energized or de-energized". It is thus clear that the capacitor must be mounted so close to the print head as to stabilize the voltage and to minimize the inductive impedance of the circuitry connecting the power supply and the print head and of the surrounding structure, cf. column 6, lines 10 to 13, and lines 47 to 50, of the patent in suit.

In the judgement of the Board, the subject-matter of claim 1 of the main request is thus clear. It is also concise, and supported by the description, so that the requirements of Article 84 EPC are met.

2. *Novelty*

None of the cited documents discloses a thermal printing apparatus with all the features of claim 1. Since this was not disputed, there is no need for further substantiation of this matter.

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

3. *Inventive step*

The Board agrees with the parties that document E1 represents the closest prior art. This document discloses a thermal printing apparatus according to the preamble of claim 1.

A known problem of thermal printers is that voltage transients in the power supplied to the print head of a thermal printing apparatus, and current surges, may occur, when heating elements in the print head are powered on, or off. A thermal print head generally comprises, besides the heating elements ("resistors"), also the electrical circuitry for switching these elements.

From document E6 (cf. paragraph bridging pages 3 and 4) it is known that such voltage transients and current surges can be *suppressed* by mounting a large capacity capacitor across the terminals of the power supply. Document E6 states (see page 3, line 13) that if the capacitor is not *contained in* the print head, voltage drops in the print head cannot be neglected. This document therefore proposes that the capacitor must be *contained in* the print head.

The appellant has argued that, by mounting the (heavy)

capacitor separate from the print head, the print head would not suffer from mechanical stresses *caused by the capacitor* during printing. However, claim 1 merely requires that the capacitor and the print head must be "close to" and "separated". In combination with the expression "close to", the term separated can only be interpreted as meaning *spatially* separated. This does not imply that the capacitor and the print head are also *mechanically* separated. If, for example, the capacitor and the print head are both fixedly mounted within the support frame at different locations, the capacitor and the print head are mechanically coupled through the (rigid) support frame.

The arrangement depicted in Figure 6 of document E2 shows (see page 10, lines 8 to 9) an example of "conventional thermal print heads", whereby capacitors (20), driving circuits (14) and heating devices (6) are all mounted on a support board. This example shows two aspects. Firstly, the capacitors, the driving circuits and the heating devices are mechanically "connected". Secondly, whether the capacitor can be said to be "mounted separate from", or "contained in" the print head, depends on what constitutes the print head: the driving circuits and the heating devices, or the driving circuits, the heating devices *and* the support board.

In the opinion of the Board, the expression "capacitor mounted close to and separate from the print head" in claim 1 is not suitable to distinguish the capacitor/print head arrangement according to the invention as claimed from the capacitor/print head arrangement shown in Figure 6 of document E2. To put it differently, claim 1 does not exclude a thermal

printing apparatus with a print head as shown in Figure 6 of document E2.

Such an apparatus would however be obvious to the person skilled in the art, since in order to solve the problem of voltage transients and current surges, the skilled person, starting from the thermal printing apparatus known from document E1, merely has to apply the known teaching that voltage transients and current surges can be suppressed by mounting a capacitor with a large capacity close to the print head (as shown for example in Figure 6 of document E2) with a view to minimize the inductive impedance of the system.

The subject-matter of claim 1 thus lacks an inventive step within the meaning of Article 56 EPC.

Consequently, the main request of the appellant is not allowable.

Auxiliary request

4. *Allowability of the amendments*

The additional feature in claim 1 of the auxiliary request, viz. that the print head is "resiliently supported from the support frame" is disclosed in column 4, lines 50 to 51, of the application as filed (published version). The Board is satisfied that the combination of features is disclosed as a whole in the application as filed. Claim 1 thus meets the requirements of Article 123(2) EPC.

The subject-matter of claim 1 is also clear and supported by the description of the patent in suit, cf.

Article 84 EPC. Since the scope of protection conferred by claim 1 is restricted with respect to claim 1 of the patent as granted, claim 1 meets the requirements of Article 123(3) EPC as well.

5. *Novelty*

None of the cited documents discloses a thermal printing apparatus with all the features of claim 1.

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

6. *Inventive step*

Claim 1 of the *auxiliary request* requires that the print head is resiliently supported from the support frame.

In a thermal transfer printing apparatus, the print head is gently pressed onto the sheet material to be printed, whereby mechanical shocks due to relative movements of the print head and the sheet material must be absorbed with a view to protecting the print head and to avoiding damage to the sheet material. Since the sheet material typically passes over a rigid support, it was known in the art to mount the print head within the support frame in a resilient manner. For example, document E1 discloses (see column 6, lines 6 to 11, and Figure 3) a thermal transfer printing apparatus, whereby springs (15) extending between the press arm (14) and the support frame impart a resilient pressure force to the print head.

The respondent has argued that the introduction of a feature that is known from the prior art taken as a starting point to assess inventive step could not make an "obvious" teaching inventive.

The introduction of a new feature does not merely restrict the scope of the claim (this narrow view would indeed give rise to the paradoxical situation as described by the respondent), it may also change the interpretation of the claim *as a whole*. The direct result of this amendment is that a correct interpretation of claim 1 is that the capacitor and the print head are *both spatially and mechanically* uncoupled. In the judgement of the Board, the phrase (cf. claim 1) "a capacitor that is mounted within the support frame close to and separate from the printhead resiliently supported from the support frame" excludes the case in which the capacitor is fixedly mounted on the print head, or in which the capacitor and the print head are fixedly mounted on a further component.

The teaching of the documents E2 (see page 6, lines 7 to 10) and E6 (see the sole claim and the sole Figure) is that the capacitor must be *integrated* within the print head. These documents thus teach away from the invention. In the example of a prior art thermal printing head shown in Figure 6 of document E2, the capacitor and the print head are both mounted on a support board, and are thus mechanically coupled. This example also teaches away from the invention.

The feature that the capacitor is mounted close to and (mechanically) separate from the print head is not known from, or suggested by, any of the other documents cited by the respondent. By mounting a capacitor in a

thermal printing apparatus in the manner as claimed, transients in the power supply are minimized by reducing the effects of inductive impedance, whereas at the same time mechanical stresses to the print head are avoided.

It follows from the above, that the person skilled in the art, starting from the thermal printing apparatus known from document E1, or from any other document cited by the respondent, would not arrive at the subject-matter of claim 1 in an obvious manner.

Consequently, the subject-matter of claim 1 involves an inventive step.

The subject-matter of claims 2 to 6, which are appendant to claim 1 similarly involve an inventive step.

Therefore, the patent in suit may be maintained on the basis of the documents filed by the appellant.

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) claim 1 submitted as auxiliary request during oral proceedings on 7 November 2002, and claims 2 to 6

as granted; and

(b) description: page 3 submitted during oral proceedings on 7 November 2002, and pages 2, 4 and 5, column 7, lines 1 to 27, as granted; and

(c) drawings: Figures 1 to 5 as granted.

The Registrar: The Chairman:

M. Dainese W. Moser