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Case Number: T 1531/05 - 3.5.04

Application Number: 01308656.6

Publication Number: 1255402

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Language of the proceedings: EN

Title of invention:
Power-supplying device for an electron gun

Applicant:
SAMSUNG ELECTRONICS CO., LTD.

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 83

Keyword:
"Disclosure - sufficiency - (no)"

Decisions cited:
G 0002/93, T 0171/84

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1531/05 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 30 October 2009

Appellant: SAMSUNG ELECTRONICS CO., LTD.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 26 July 2005 refusing European application No. 01308656.6 pursuant to Article 97(1) EPC 1973.**

Composition of the Board:

Chairman: F. Edlinger
Members: A. Dumont
C. Vallet

Summary of Facts and Submissions

I. The appeal is directed against the decision by the examining division to refuse European patent application No. 01 308 656.6, published as EP 1 255 402 A1, on the ground of insufficient disclosure of the invention (Article 83 EPC 1973).

II. In its statement of grounds of appeal the appellant explained how inconsistencies in the description and drawings of the application which caused difficulties in interpretation could be remedied so as to make the invention solve the technical problem. The appellant filed claims according to a main, a first and a second auxiliary request, as well as an amended page 6 of the description.

III. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request, the first auxiliary request or the second auxiliary request, in that order, all filed with the statement of grounds of appeal.

IV. In an annex to the summons to oral proceedings the board observed that it was not clear which information in the application would lead the skilled person, using common general knowledge, to read the application as suggested by the appellant in the statement of grounds of appeal, and that there was no clear disclosure of an embodiment solving the technical problem identifiable from the application as filed.

V. In a letter dated 17 September 2009 the appellant informed the board that it would not be attending the scheduled oral proceedings.

VI. The board held oral proceedings on 30 October 2009 in the absence of the appellant.

VII. Claim 1 according to the main request reads as follows.

"A power supply apparatus for an electron gun in a colour display tube CDT, the apparatus comprising:
a flyback transformer FBT having a focus voltage output terminal and an acceleration voltage output terminal;
a power supplying part supplying a predetermined reference voltage;
a focus voltage detection part detecting a focus voltage of the focus voltage output terminal; and
a focus voltage boost part boosting the focus voltage of the focus voltage output terminal when the focus voltage detected by the focus voltage detection part is lower than the reference voltage of the power supplying part."

VIII. Claim 1 according to the first auxiliary request reads as follows.

"A power supply circuit for an electron gun, the circuit comprising:
a flyback transformer (10);
means (16, 28) for providing a focus voltage at a focus voltage output (EC3-0) from the voltage across a secondary winding (12) of the flyback transformer (10);
wherein said means (16, 28) for providing a focus voltage comprises a potential divider (16, 28) for

dividing the voltage across said secondary winding, including a resistor (28) connected to ground; and means (23, 25, 27) for boosting the focus voltage in the event of a transient period of increased focus current due to a discharge, wherein said means for boosting the focus voltage includes a diode (25) for providing a unidirectional current path from a voltage source (23) through the ground connected resistor (28), wherein the diode (25) is conductive only when the focus voltage drops below the voltage of the voltage source (23)."

IX. Claim 1 according to the second auxiliary request reads as follows.

"A power supply circuit for an electron gun, the circuit comprising:
a flyback transformer (10) having first and second secondary windings (12, 13);
focus voltage means (16, 28) for providing a focus voltage at a focus voltage output (EC3-D) from the voltage across the first secondary winding (12) of the flyback transformer (10), the focus voltage means comprising a potential divider (16, 28) for dividing the voltage across said secondary winding, including a resistor (28) connected to ground; and
means (20, 25, 27) for maintaining a predetermined voltage across the ground connected resistor, comprising a diode (25) for providing a unidirectional current path from a voltage source (20) through the ground connected resistor (28), the diode (25) being connected in series with a further resistor (26), a capacitor (27) is connected between the junction between the diode and the further resistor and ground

and the further resistor (26) is connected to the ground connected resistor (28), wherein the diode (25) is conductive only when the voltage across the ground connected resistor (28) drops as a result of a drop in the focus voltage."

X. The reasoning in the decision under appeal may be summarised as follows.

The application relates to the generation of high voltages, in particular a high focus voltage, for an electron gun. The problem to be solved, as indicated in the description, consists in designing a power supply in which the focus voltage can easily recover to a normal value after a discharge event in the electron gun. This problem has already been recognised and solved in the prior art. The present application attempts to provide the further solution according to figure 3.

In normal operation the voltage across the focus voltage detecting resistor of figure 3 is slightly above a reference voltage (210V) but well below the focus voltage (several kV). The current injected through the "boost" arrangement during a transient discharge event prevents the voltage across the detecting resistor from dropping considerably below the reference voltage. This only marginally influences the focus voltage, essentially due to the substantial difference in magnitude. Thus the circuit of figure 3 does not disclose means for boosting the focus voltage so as to solve the technical problem presented in the description. There is also no indication of other means for boosting in the application. Furthermore no other

meaningful technical problem is addressed by the circuit of figure 3.

Article 83, read in combination with Rule 27(1)(c) EPC 1973, requires that the application provide sufficient information to teach the skilled person, using common general knowledge, what to do for which purpose. This requirement is not fulfilled in the present case.

XI. The appellant's arguments may be summarised as follows.

The skilled person would gather from the operation of the circuit as described that the reference voltage at terminal 20 must be comparable to the focus voltage in order to solve the technical problem. It is thus in the order of at least several kV, and significantly greater than the 210V erroneously indicated in the figures (only). The resistances of the distribution network 16 are set so that the focus voltage (EC3-D) is about 6kV. In this network this can be achieved with a resistance R5 around 100 MΩ. The relevant wording of page 6 of the description has been amended back to make clear, as in the originally filed version, that the voltage across resistor R5 is about 6kV. The capacitor C2 has a smoothing function to adjust the waveform of the static focus voltage which has a peak-to-peak voltage in the order of 300V to 400V. The second and third paragraphs on page 6 describe in detail that the circuitry can boost the focus voltage when it collapses. This can only apply if the voltage at terminal 20 in figures 2 and 3 is significantly greater than 210V. Although the description and drawings contain some inconsistencies, the skilled person looking at the

total information content of the document would be able to perform the invention.

Reasons for the Decision

1. The appeal is admissible.

2. Main request

2.1 In order to meet the requirements of Article 83 EPC 1973, a European patent application must contain sufficient information to allow a person skilled in the art, using common general knowledge, to perceive the technical teaching inherent in the claimed invention and to put it into effect accordingly (see G 0002/93, OJ 1995, 275, point 4 of the reasons), if necessary after having recognised and rectified evident errors in the application documents (see T 0171/84, OJ 1986, 095).

2.2 The present application refers to the technical problem that a discharge current in the electron gun of a colour display tube may cause an accidental voltage drop at the (dynamic) focus voltage output terminal (17 or EC3-D), which has a high electric potential and a fairly high output impedance. The present invention is presented as providing a power supply device which can recover from such a voltage drop by boosting the focus voltage to return to the normal voltage (see, for instance, paragraphs [0010], [0011], [0018] and [0030] in the application as published).

2.3 The solution according to the single embodiment disclosed in the application consists in an arrangement

(25, 26, 27 in figure 3) supplying additional current from an output terminal (20 in figures 2 and 3) when the voltage across a sensing resistor (28 or R5) drops below a reference voltage.

2.4 This reference voltage is derived from the voltage at terminal 20, which is shown in both figures 2 and 3 as being equal to 210V. Thus the voltage across the sensing resistor, taking account of the voltage drops across a diode (D4) and a further resistor (R4), should be below 210V, which is an order of magnitude smaller than the normal focus voltage (typically several kV). As can be seen from figures 2 and 3, the focus voltage between terminal EC3-D (or 17) and ground represents the sum of the voltage across capacitor (C2) and the voltage across resistor R5 (or 28). In normal operation, when capacitor C2 is fully charged and essentially neither supplies nor draws current, the voltage across resistor R5 is determined by resistance values of a purely resistive voltage dividing network (16). The resistance value of the sensing resistor (28; R5) accordingly has to be small compared to the resistance value of the resistors in the voltage dividing network (16). The board thus agrees with the examining division that the arrangement (25, 26, 27) shown in the figures provides a voltage across resistor R5 which is well below the (normal) focus voltage.

2.5 The appellant contends that the circuit arrangement can boost the focus voltage only if the voltage produced is significantly greater than 210V and that the value "210V" at terminal 20 in figures 2 and 3 is erroneous. It argues that there are some inconsistencies in the description and drawings and that the skilled person

looking at the total disclosure of the application would recognise that the value in the drawings should actually be significantly greater than 210V and of an order comparable to the focus voltage, ***i.e.*** of the order of at least several kV up to a few tens of kV. It also argues that the sensing resistor should accordingly have a value of about 100 MΩ to obtain such a value.

2.6 As correctly acknowledged by the appellant, the description as originally filed sets out that "a high voltage is also generated across the second secondary winding 13" and, in contrast to the figures, discloses no explicit numerical value for the voltage at terminal 20. A value of 540V is mentioned however for the high voltage at another terminal 19 of the second secondary winding 13 (see page 5, lines 13 to 17, corresponding to paragraph [0026] in the application as published). The description and drawings also do not disclose numerical values for the resistance of the sensing resistor (28 or R5) and the normal output voltage at terminal 14, which would have allowed the skilled person to compute the value for the normal voltage across the sensing resistor and to indirectly derive a value (or a range) for the voltage at terminal 20.

2.7 In the board's view values different from 210V were also not derivable by the skilled person from the paragraphs describing the operation of the "voltage boost part", for the following reasons.

2.7.1 The paragraph from page 5, line 29, to page 6, line 3, of the description as originally filed (paragraph [0028]

as published) states that "[t]he voltage applied to the dynamic focus grid (G4) is detected by measuring the voltage across the focus voltage detection resistance 28" and that "the voltage detected across the focus voltage detection resistance is about 6kV" in normal operation. The appellant regards this numerical value of 6kV as both the detected value of the focus voltage ("the focus voltage (EC3-D) is about 6kV" in the statement of grounds of appeal, page 2, third paragraph) and the value measured across the sensing resistor ("the voltage across R5 is about 6kV" in the statement of grounds of appeal, page 2, fourth paragraph). These statements by the appellant would imply that the voltage across capacitor C2, connected in series between the focus voltage terminal (17 or EC3-D) and resistor R5, is close to zero, which is however contrary to the alleged purpose of smoothing the waveform ascribed to capacitor C2 in the statement of grounds of appeal.

A further look at the various statements made in the examination proceedings reveals that the then applicant assumed the value of the voltage across the sensing resistor to be 6kV in a first letter (dated 9 September 2003) and then about 210V in subsequent letters (dated 14 April 2004 and 15 November 2004). Page 6 of the description filed with the statement of grounds of appeal corrects an amendment previously made in the examination proceedings, by returning to the version of paragraph [0028] as originally filed. Therefore this amendment does not affect the above considerations.

In the board's view these inconsistent statements reflect the very ambiguity of paragraph [0028] of the

description, which therefore does not clearly disclose an implementation with a voltage of 6kV across the sensing resistor, let alone a voltage of 6kV at terminal 20.

2.7.2 The paragraph on page 6, lines 5 to 14, of the description as originally filed (paragraph [0029] as published) states that "the line to which the focus voltage detection resistance 28 is connected, is connected to the power-supplying terminal 20 supplying vertical and dynamic waveform power to a parabola waveform output terminal 23 of the FBT 10". This sentence has no correspondence in the drawing of figure 3 and is inconsistent with figure 2, in which terminal 20 is not suitable to be connected to terminal 23 (or PARABOLA). It does not therefore contribute to resolving the inconsistencies as proposed by the appellant.

2.7.3 Thus the arguments by the appellant based on the paragraphs ([0028] and [0029]) describing the operation of the "voltage boost part" are not convincing.

2.8 In conclusion, the arguments and explanations provided by the appellant have not demonstrated that the skilled person, using common general knowledge, would have interpreted and modified the disclosure of the invention so as to provide a voltage of 6kV, or of several kV, at terminal 20.

2.9 The appellant has not provided any other facts and arguments as to why the decision under appeal was wrong in concluding that "the means for boosting the focus voltage" could not fulfil their purpose. The board

could also not find any other passages in the description supporting the appellant's case.

2.10 Consequently the requirement of Article 83 EPC 1973 is not met and the main request is not allowable.

3. First auxiliary request

3.1 Claim 1 according to the first auxiliary request corresponds to claim 1 according to the main request rejected by the examining division. In addition to means "for boosting the focus voltage" it incorporates details of the arrangement of the components, as depicted in figure 3, that allegedly lead to a focus voltage boost.

3.2 Since no specific arguments were presented in conjunction with this first auxiliary request, the conclusion arrived at for the main request also applies to the first auxiliary request. The requirement of Article 83 EPC 1973 is thus also not met, and the first auxiliary request is not allowable.

4. Second auxiliary request

4.1 Claim 1 according to the second auxiliary request corresponds to claim 1 according to the first auxiliary request rejected by the examining division. It is directed at the details of the structure shown in figure 3.

4.2 The arrangement is set out "for maintaining a predetermined voltage across the ground connected

resistor" (*i.e.* the sensing resistor mentioned in the foregoing) rather than "for boosting the focus voltage".

4.3 Original claim 12, which contained a similar feature ("for maintaining the voltage across the ground-connected resistor above a predetermined minimum value") was dependent on claim 10, which set out "means for maintaining the focus voltage during transient periods of increased focus current". Maintaining the voltage across the sensing resistor (28 or R5) does not constitute an object in itself which may be understood from the disclosure of the application, but has to be understood in the context of boosting the focus voltage by boosting the voltage across the sensing resistor (see page 6, lines 11 to 24). The invention for which protection is sought by this different wording is thus essentially the same as the invention according to the main request, as far as the underlying problem and its solution are concerned.

4.4 Since no specific arguments were presented in conjunction with this second auxiliary request as to the disclosure in the application of how maintaining the relatively small voltage across the sensing resistor effectively maintains the much higher focus voltage during transient periods, the conclusion arrived at for the main request also applies to the second auxiliary request. The requirement of Article 83 EPC 1973 is thus also not met, and the second auxiliary request is not allowable.

5. None of the appellant's requests being allowable, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar | The Chairman

L. Fernández Gómez | F. Edlinger