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D E C I S I O N
of 11 March 1997

Case Number: T 0329/95 - 3.5.1

Application Number: 89105129.4

Publication Number: 0335245

IPC: H04N 9/29

Language of the proceedings: EN

Title of invention:
A method of degaussing color cathode ray tube

Applicant:
KABUSHIKI KAISHA TOSHIBA

Opponent:
-

Headword:
Degaussing a CRT/TOSHIBA

Relevant legal provisions:
EPC Art. 52(1) and 56

Keyword:
"Inventive step - yes"

Decisions cited:
-

Catchword:
-

Case Number: T 0329/95 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 11 March 1997

Appellant: KABUSHIKI KAISHA TOSHIBA
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 30 November 1994 refusing European patent application No. 89 105 129.4 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
G. Davies

Summary of Facts and Submissions

I. European patent application No. 89 105 129.4, filed on 22 March 1989 claiming a priority of 28 March 1988 and published under No. 0 335 245, was refused by a decision of the Examining Division dated 30 November 1994.

II. The reason given for the refusal was that the subject-matter of claim 1 of the main request as well as claim 1 of the auxiliary request lacked an inventive step having regard to the prior art documents

D1 = US-A-4 441 052 and

D2 = GB-A-1 499 663.

The decision also mentioned

D3 = EP-A-0 219 287.

III. On 27 January 1995 the applicants lodged an appeal against this decision and paid the prescribed fee. On 4 April 1995 a statement setting out the grounds of appeal was filed.

IV. In a communication of the Board pursuant to Article 11(2) of the RPBA, dated 14 January 1997, the rapporteur expressed the opinion that he had some sympathy for the argumentation of the appellants, but that much of it appeared to be somewhat unclear and not properly related to the original description. This also

applied to the advantages of the invention mentioned in the statement of grounds of appeal. In the communication an additional document, a handbook,

D4 = Basic Television and Video Systems, fifth ed., McGraw-Hill 1984, pp. 107 to 108, Chapter 5-2 "Degaussing Color Picture Tubes"

was cited. It was indicated that D4 appeared to contradict D2 and, therefore, could probably be used to support the patentability of the subject-matter of the present application.

V. In oral proceedings which were held on 11 March 1997 the appellants requested that a patent be granted on the basis of claim 1 of their auxiliary request, filed on 4 April 1995; all dependent claims of said request were deleted, and new description pages 1 to 9, 9a and 10 to 13 were filed; while the drawing sheets remained as originally filed. The only claim reads as follows:

"A method of degaussing a color cathode ray tube apparatus during manufacturing of the colour cathode ray tube apparatus which has an initial step of manufacturing the cathode ray tube apparatus including a vacuum envelope (36, 38, 40) and a deflection yoke (44) located on the vacuum envelope (36, 38, 40) to deflect electron beams and having vertical and horizontal deflecting coils, said method being characterized by comprising the steps of:

(a) turning on power to the CRT tube (31);

(b) initially maintaining a vertical deflecting current of said CRT tube (31) having a frequency in an off state after said turning on power;

(c) degaussing said CRT tube (31) using a current having a frequency which is the same as a frequency of a commercial power source and the frequency of the vertical deflecting current, while said vertical deflecting current is being maintained in the off -state;

(d) gradually decreasing a degaussing magnetic field by gradually separating a degaussing coil (66) to which the degaussing currents are applied, from the cathode ray tube (31) so that the degaussing magnetic field, generated by the degaussing coil (66)so as to surround the colour cathode ray tube (31), gradually weakens as the degaussing coil (66) gradually moves away from the colour cathode ray tube (31);

(e) subsequent to said decreasing in said step (d), completely turning off said degaussing magnetic field;

(f) turning on said vertical deflecting current to said vertical deflecting coils of the deflection yoke (44) only after said turning off step is completed; and

(g) testing a picture quality of said colour cathode ray tube apparatus while said vertical deflecting

coils are energized".

VI. The representative of the appellants pointed out that only the embodiment related to Figures 10A and 10B was considered to belong to the invention as identified in the only claim of the request. The other drawings of the application and the corresponding text were included in the application only to make it possible to understand the invention.

As to the rapporteur's objections in the communication referred to in IV, above, the appellants were of the opinion that from the beginning the description clearly expressed the fact that yoke 44, having the two deflection coils, had to be considered as part of the tube, although it was positioned outside the interior of the tube. Therefore, the first characterizing feature (a) of the claim would, at the priority date of the present application, on the basis of the general technical knowledge available at that time have implied that, when power was turned on to the CRT tube, also both deflection coils were energised. However, according to the present invention as claimed, the coil of the vertical deflection was then apparently not energized, as expressed in the characterizing feature (b).

Moreover, the appellants pointed out that according to the invention a technical effect or an advantage could be achieved. To wit, when, as according to the invention, the vertical deflection circuit was in the off state and the horizontal deflection circuit was maintained in the on-state, a horizontal line could be

seen on the screen. When degaussing was performed according to the characterizing features (c) to (e), the line would, to start with, be heavily disturbed, the disturbances having a significant amplitude. However, in the course of decreasing the degaussing field the disturbances would weaken and when the line would be substantially re-established in an undisturbed form the degaussing process could be considered to have been finished.

Reasons for the Decision

1. The appeal is admissible.

2. The Board interprets the characterizing feature (a) as proposed by the appellants, i.e. that "turning on power to the CRT tube", in principle, means that both the vertically deflecting coil as well as the horizontally deflecting coil are supplied with currents. From this, however, follows that when reading the characterizing features (a) and (b) together, it is apparent that only the horizontally deflecting coil is supplied with current. Thus, according to the opinion of the Board the claim does not cover the case that also the horizontally deflecting coil may be held in the off state during the degaussing operation.

In the opinion of the Board, this interpretation of the claim is supported by the original documents of the application. Although original claim 1 discloses that "at least deflecting current is not supplied to one of

the vertically and horizontally deflecting coils", according to the teaching of the original document it is clear that it is the vertically deflecting current that disturbs the degaussing. Therefore, the vertically deflecting current should be suppressed during degaussing. Thus the most normal way of performing the degaussing, with regard to both the original description and the original claim 1, would be to switch off the vertically deflecting current, while the horizontally deflecting current is either in the on state or in the off state. However, having regard to the present final claim it appears that the appellants have restricted their invention to the case where the horizontally deflecting current is in the on state.

The Board thus considers the subject-matter of claim 1 to be clear with regard to Article 84 EPC and to meet the requirements of Article 123(2) EPC.

3. D1 teaches that current from the ac mains supply is used as the degaussing current, but apparently both deflection currents are switched on at approximately the same time as the degaussing current.

D2 mentions in a short passage that "none of the scanning components are energised before degaussing is completed otherwise the degaussing operation is unsatisfactory". Thus, this document reveals that a degaussing field may be disturbed by the "scanning components". However, only the circuit for delaying switching-on of the deflection performed by the "scanning circuit" is described. No information is given how the degaussing is performed, in particular,

no indication of the frequency of the degaussing current is given.

D3 uses a 2 kHz resonant degaussing signal "so that degaussing is completed in less than 5 ms". This time is short compared to the deflection interval. Thus, this document relates to a much higher degaussing frequency than that of the present invention and the disturbance caused by the deflection current is of a different character than the one avoided by the invention. D3 in fact mentions the prior art as disclosed in D1, in its introductory part of the description, but is itself concerned with a high frequency resonant method for degaussing. The present application seeks to avoid that method and refers in the introductory part of the description to the teaching of the US document corresponding to D3 and discusses the disadvantages of the use of high frequency at degaussing.

D4 teaches degaussing of a CRT like the present invention in that a hand-held coil (60 Hz) is slowly removed from the screen. However, D4 contradicts D2 in saying that "the receiver can be either off or on during the degaussing".

In the oral proceedings the Board asked the representative of the appellants whether the device according to Figure 7 of the application should be considered as prior art. The representative expressed the opinion that this probably was "in-house prior art". In any case there were no documents disclosing such prior art. The Board at this stage takes the view

that said device, comprising a circuit for a degaussing coil using the power source frequency and also comprising a delay circuit for the deflection currents, has in principle to be considered as "in-house prior art". It is observed that in the short description of the figures it is stated that said circuits in the diagram of Figure 7 are "for the conventional colour cathode ray tube". This is interpreted in the way that said circuits could be used for a conventional CRT; the circuits themselves are not conventional. It is noted that said circuits do not distinguish between horizontal and vertical deflection currents but seem to provide equal delay for both the horizontal and vertical currents after switch-on.

4. According to the case law of the Boards of Appeal, in order to assess inventive step the problem-solution approach is frequently applied. According to this method, an objective problem to be solved by the invention must be formulated. This is carried out by comparing the invention with the closest prior art.

Having regard to the present claim, it appears that the teaching of D4 clearly must be considered to represent the closest prior art. D4 discloses, in principle, the prior art portion of claim 1, although it is not stated in D4 that the method is used "during manufacturing". Moreover, this document discloses that the current used has the commercial power source frequency according to the characterizing feature (c) of claim 1 and also that the characterizing steps, features (d) and (e), are known in combination.

It is noted that the problem to be solved according to the description of the present application ("object of the present invention" - column 6 of the published application, lines 42 to 45) was said to be "to provide a method of degaussing color cathode ray tube, high in color purity and suitable for mass production".

The Board considers that said problem to be solved, in principle, could be also applied in respect of the teaching of D4, i.e. the method according to D4 should be made suitable for mass production and made more effective in that the remanent magnetism of the different parts of the CRT is minimized at degaussing.

5. It appears to the Board that it would be obvious for the skilled man that the degaussing method of D4 could be adapted for **mass production**. Thus the aim of performing that method **during manufacture,** can not be considered to involve inventive matter. Therefore, it appears to be decisive to examine, whether the features of claim 1 relating to suppression of remanent magnetism, could contribute to an inventive step.

The Board notes that D4 states that the receiver can be either off or on during the degaussing. Thus, according to the teaching of D4 it is, apparently, totally unimportant, whether the deflection currents are switched on or off. The application, however, discloses very convincingly how and why the vertical deflection current disturbs the degaussing operation when the degaussing current has the mains frequency. In this respect, the Board does not share the opinion of the examining division (cf. the decision of the examining

division, page 6, last paragraph), i.e. having regard to the relationship between the frequencies of the vertical and horizontal scanning and the frequency of the degaussing current, "**it is clear that....only the vertical deflection current can substantially affect the degaussing field**". This teaching, in fact, in the Board's view was only disclosed by the present application and the documents cited do not reveal such a teaching.

It is, moreover, noted that according to the invention the mains current is used for degaussing and deliberately not a high frequency current, since the available degaussing energy decreases with increasing frequency (column 2 of the published application). Thus, although D3 discloses that the deflection currents could be switched off during degaussing (performed with a very high frequency), the Board is of the opinion that this document is not relevant for assessing the inventive step of the present invention.

D1 does not disclose more than D4. Although it teaches degaussing with a mains power current, it does not teach that the deflection currents should be switched off.

D2 is, in fact, the only document that expressly teaches that none of the deflection currents should be energized before degaussing is completed. Thus, the question arises whether this hint would lead the skilled man in the direction of the invention as claimed. As has been observed above, this document, however contrary to the present patent application,

does not deal with problems relating to the frequency of the degaussing current; it does not even mention which frequency is used. Thus, no explanation is given as to the way in which the residual magnetism is influenced. It is only stated that "otherwise the degaussing is unsatisfactory". Moreover, having regard to the said statement in D4 (published 1984), which document was published much later than D2 (published 1978), it appears that the skilled man would rely rather on the newest information in D4 and would not consider D2.

It is once more noted that the teaching of the description of the application as to the impact of the vertical deflection current on degaussing with a current of the same frequency as the vertical deflection current has been clearly reflected in the only claim, which now makes clear that only the vertical deflection current is inhibited, while apparently the horizontal deflection current is in the on state. In this respect, it is noted that the possibility to maintain only one of the deflection currents in the off state during the degaussing has nowhere been hinted at in the prior art. Thus, neither D2 nor D4 make a difference between the two deflection currents in that sense, both currents are either on or off.

Thus, instead of maintaining both the vertical and the horizontal deflection in the off state during degaussing, a possibility that also was proposed in the original application, the only claim is now restricted to the suppression of only the vertical deflection. This implies that the horizontal deflecting current during degaussing could be used for providing said advantageous effect referred to under VI above. Although this effect is not mentioned in the application as filed and in the application as now amended, it is obvious for the skilled man when reading the only claim in the light of the description.

The Board, however, in this decision does not need to consider said effect suggested by the appellants, since the subject-matter of the only claim is clearly non obvious even without taking said effect into account.

6. Thus, the subject-matter of claim 1 being the sole claim according to the appellants' request involves an inventive step over the prior art and the claimed invention meets the requirements of Articles 52(1) and 56 EPC.

Order

For these reasons it is decided that:

1. The decisions under appeal is set aside.

2. The case is remitted to the first instance with the

order to grant the patent on the basis of the appellants' request (cf. under V above).

The Registrar: The Chairman:

M. Kiehl P. K. J. van den Berg