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D E C I S I O N
of 12 June 1997

Case Number: T 0811/95 - 3.5.1

Application Number: 87309696.0

Publication Number: 0266996

IPC: H04N 3/233

Language of the proceedings: EN

Title of invention:
Raster correction circuit

Patentee:
RCA Thomson Licensing Corporation

Opponent:
Societa Italiana per lo Sviluppo dell'Elettronica S.I.SV.EL.
S.p.A.

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-



Case Number: T 0811/95 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 12 June 1997

Appellant: RCA Thomson Licensing Corporation
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Respondent: Societa Italiana per lo Sviluppo
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 10 August 1995
revoking European patent No. 0 266 996 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: A. S. Clelland
C. Holtz

Summary of Facts and Submissions

I. European patent No. 266 996 was granted on 19 January 1994. After opposition the patent was revoked on the ground that the subject-matter of the claims as granted lacked an inventive step (Articles 100(a), 52(1) and 56 EPC), having regard to the following document:

D1: GB-A-2 150 796

The written decision was dispatched on 10 August 1995.

II. On 4 October 1995 the proprietor (appellant) lodged an appeal against this decision and paid the prescribed fee. The written statement setting out the grounds of appeal was received on 13 December 1995.

III. Oral proceedings were held before the Board on 12 June 1997 at the request of both parties.

At the oral proceedings the appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of either the main request or the auxiliary request. The main request comprises claim 1 as filed on 9 December 1996 and headed "**main** request", together with dependent claims 2 to 20 as granted. The auxiliary request comprises claim 1 as filed on 12 May 1997 and headed "auxiliary request", together with claims 2 to 20 as granted. The respondent (opponent) requested that the appeal be dismissed.

IV. Claim 1 of the main request reads as follows:

"A deflection apparatus with raster distortion correction, comprising:

a source of input signal (Hs) at a frequency that

is integrally related to a first deflection frequency;
a deflection winding (LH);

switching means (Q₁) coupled to said deflection winding, said switching means operating, in accordance with said input signal at said first deflection frequency for generating scanning current (i₁) in said deflection winding during a trace interval of each deflection cycle;

a deflection retrace capacitance (C_{RD}) coupled to said deflection winding (L_H) to form a deflection retrace resonant circuit (27) that produces a first retrace pulse voltage at a retrace frequency during a retrace interval of each deflection cycle;

a source (90) of supply voltage;

a supply inductance (W1) connected to receive said supply voltage and coupled to said switching means (Q1) for generating a second retrace pulse voltage in said supply inductance (W1), said supply inductance being effective to supply, to said retrace resonant circuit (27) during said retrace interval, a supply current from said source (90) of supply voltage that replenishes energy losses in said retrace resonant circuit (27);

a load circuit (at U) energized by said second retrace pulse voltage in said supply inductance (W1);

a source (300) of a modulation signal; and

controllable means including semi-conductor means (Q2) responsive to said modulation signal for generating a modulation current (i₂) that is applied to said retrace resonant circuit (27) to modulate said scanning current (i₁) for providing raster distortion correction;

characterised in that said semi-conductor means (Q2) also forms an output impedance for said modulation current that, during said retrace interval, is sufficiently large to prevent a high frequency coupling between said supply inductance (W1) and said retrace resonant circuit (27) during said retrace interval."

- V. Claim 1 of the auxiliary request shares the preamble of claim 1 of the main request and has the following characterising part:

"said semiconductor means (Q2, Q3) is a switched current source which is saturated during a portion of horizontal trace and is biased for Class A operation during a portion of horizontal retrace so as to form an output impedance for said modulation current that, during said retrace interval, is sufficiently large to prevent a high frequency coupling between said supply inductance (W1) and said retrace resonant circuit (27) during said retrace interval."

- VI. The appellant argued that although it was true that at the priority date of the patent the skilled person would have avoided inductances wherever possible in order to facilitate the integration of circuitry, this was also true at the date of D1. The use of an inductance in D1 was nevertheless considered essential. Although D1 used many of the same components as were used in the preferred embodiment of the patent, the mere elimination of the existing inductance would not provide a correctly operating circuit and was not what was claimed. The modulating transistor of the east-west circuit in D1 was an on-off switch and did not provide a discrete output impedance. The skilled person would have no reason to modify this switch in the manner set forth in the claims.

- VII. The respondent argued that the skilled person would seek to integrate the entire circuit in order to reduce costs. It was clear from a consideration of D1 that the inductance L1 served to form a high impedance, and it was well known at the priority date of the patent that controllable semi conductor means would perform the same function. No invention was accordingly involved in replacing the existing inductor by semiconductor means.

Some form of high impedance would clearly be necessary if the inductor was to be avoided. Moreover, in the Figure 3 embodiment of D1 it was clear that the modulating transistor was not merely an on-off switch as suggested by the appellant.

Claim 1 of the auxiliary request was inadmissible since it failed to comply with Articles 84 and 123(2) EPC. It covered a technical solution which was not directly disclosed in the patent and generalised from features which were only disclosed in combination both in the claims and in the description.

Reasons for the Decision

1. The appeal is admissible.
2. *Amendments*
 - 2.1 Claim 1 of the main request has been amended with respect to claim 1 as granted; the amendment consists of moving the "controllable means" into the claim preamble. The wording of the claim is otherwise unchanged.
 - 2.2 The Board sees no reason to question the clarity of the claim, no substantive amendment having been made.
 - 2.3 Claim 1 of the auxiliary request does contain substantive amendments. In view of the finding below on the main request however it has not been necessary to consider this request further.

3. *Inventive Step*

3.1 The patent is concerned with line output circuitry, in US parlance sweep circuitry, for cathode ray tubes. The geometry of the tube causes distortions which require correction; in the case of so-called pincushion distortion this is achieved by superimposing a signal at the vertical deflection rate on the horizontal or sweep signal by means of an "east-west" circuit. The line output circuit itself makes use of a well-known principle in which a storage capacitor, known in the art as a trace capacitor, is at the start of a scan cycle in a reverse charged state and is discharged through the horizontal scan coil and a free-wheel or efficiency diode to provide the first half of the line sweep; the capacitor forms a resonant circuit with the scan coil such that in discharging it is recharged in the opposite sense. This occurs at a position half way along the line. A sweep transistor is at this time rendered conducting and discharges the capacitor, in consequence of which current again flows through the scan coil - in the opposite sense - and the line sweep is completed. The transistor also completes a circuit from a power supply through a winding of the line output or flyback transformer to earth. At the end of the line, the transistor is rendered non-conducting and the energy stored in the transformer and scan coil used to generate the final anode voltage in well-known manner.

3.2 In order to recharge the trace capacitor during the flyback period a further resonant circuit is provided, including the scan coil, the flyback transformer winding and a so-called retrace or tuning capacitor.

- 3.3 Figure 1 of the patent and Figure 1 of D1 are both based on this known circuit; indeed the patent relates to a development of the circuit known from D1. In both, the box 90 is the power supply, Q1 is the switching transistor, C_s is the storage or trace capacitor, L_H is the deflection coil, C_{RD} is the tuning or retrace capacitor and diode D_1 is the efficiency diode. There is a second tuned circuit to replenish the retrace capacitor, formed by flyback winding W1, capacitors C1 and C_{RT} , diodes D2 and D3 and inductance L1. The remaining components in both the patent and D1 are to compensate for pincushion distortion.
- 3.4 In such circuits some of the scan energy derives from the flyback transformer, which is primarily used to derive the CRT beam current. If the beam current is high for a particular line, for example because an all-white horizontal line is being displayed, the energy available for flyback and hence for the next scan is reduced. The net result is a small current from the trace to the retrace capacitor through the scan winding, which produces a scan offset, resulting in so-called "mouseteeth distortion" This can be seen in Figure 2a of D1 and Figure 7 of the patent. In D1 the choke L1 serves to suppress the coupling of energy from the tuned circuit formed by L_H and C_{RD} to that including flyback winding W1, through diode D3. L1 is said in D1 to have a substantially higher inductance than deflection coil L_H . In effect, L1 stops there being a closed circuit from one plate of capacitor C_{RD} by way of diode D3 and winding W1 to the other plate during retrace, its inductance being sufficiently high to block any current pulse.
- 3.5 It was common ground between the parties that claim 1 of the main request is correctly delimited with respect to the disclosure of D1. The claim is characterised by the feature of the (existing) semiconductor means also

forming an output impedance for the modulation current that, during the retrace interval, is sufficiently large to prevent high frequency coupling between the supply inductance, i.e. the flyback transformer main winding, and the retrace resonant circuit.

3.6 Although claim 1 of the main request does not exclude the presence of an inductor as used in D1, it is apparent from the characterising feature that the function of this inductor is taken over by the existing semiconductor means. Comparing the Figure 1 embodiments of D1 and the patent, it can be seen that the inductor L1 in D1 is not equivalent to the tapped inductor L1 in the patent. The former has in Figure 1 an inductance of 20mH and the latter in Figure 1 of the patent an inductance of ca. 2.2mH for the path including the line output transformer. It is noted that in D1 the inductor L1 is in the path both of the retrace current and the east-west modulating current, whereas the inductor L1 in the patent is only in the former path.

3.7 In essence, the respondent's argument on inventive step is that the skilled person would at the claimed priority date have been aware of the disadvantages posed by inductors in the tighter integration of circuitry and would have sought wherever possible to replace them with semiconductor components; in the particular case of D1, the skilled person would have understood the advantages of replacing the comparatively large inductor L1 with a semiconductor switch and in doing so would have arrived at the claimed arrangement.

3.8 The Board accepts the general proposition that at the priority date - and indeed, as argued by the appellant, at the date of D1 - the skilled person would have sought to avoid inductors whenever possible. The fact that this was not in fact done in D1 shows that

replacement was not a simple matter of substituting a semiconductor switch for an inductor. The characterising feature of claim 1 of the main request does not specify the use of **additional** semiconductor means but rather that **existing** semiconductor means serving to modulate the scanning current in order to provide raster distortion correction are also used to prevent high frequency coupling, ie to emulate an inductor. This goes further than a mere substitution. The respondent was unable to provide any convincing reason as to why the skilled person should take exactly this path. The Board considers that the use of the existing device for an additional purpose is not derivable from the disclosure of D1 without the exercise of invention.

- 3.9 The Board has also considered the relevance of the Figure 3 circuit of D1 to the claims of the patent. This circuit differs from that of Figure 1 in that there is no current path from inductor L1 comparable to that by way of diode D3 to the line output transformer winding W1; all current flows through a capacitor Cc which by-passes the east-west circuit transistor Q6, and the transistor itself, which is described as operating in "class A mode". The Board takes this to mean that the transistor is operating in the centre of its linear region. This circuit was discussed for the first time in the oral proceedings. The Board notes however that the inductor L1 is still present and has the same inductance as in Figure 1. It is therefore apparent that although this is a step in the direction of the solution adopted in the patent there was no appreciation that by control of transistor Q6 the function of the inductor could be emulated. It does not appear that the skilled person would have arrived at this appreciation without the exercise of invention.

3.10 Claim 1 of the main request is accordingly allowable. It is not therefore necessary to consider the dependent claims of the main request, no separate objections having been raised to them, or the claims of the auxiliary request.

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 according to the main request of the appellant.

The Registrar:

The Chairman

M.Kiehl

P. K. J. van den Berg

