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D E C I S I O N
of 12 December 1995

Case Number: T 0577/95 - 3.5.1

Application Number: 91106404.6

Publication Number: 0454008

IPC: H04N 3/233

Language of the proceedings: EN

Title of invention:
Parabola generators with auxiliary reset function

Applicant:
THOMSON CONSUMER ELECTRONICS, INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-



Case Number: T 0577/95 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 12 December 1995

Appellant: THOMSON CONSUMER ELECTRONICS, INC.
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Representative: Einsel, Robert, Dipl.-Ing.
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Decision under appeal: Decision of the Examining Division of the European
Patent Office posted 10 April 1995 refusing
European patent application No. 91 106 404.6
pursuant to Article 97(1) EPC.

Composition of the Board:

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

Summary of Facts and Submissions

- I. The Appellant contests the decision of the Examining Division dated 10 April 1995, refusing European patent application No. 91 106 404.6.
- II. The reason for the refusal was that the subject-matter of Claims 1 to 12 filed on 4 January 1995 lacked an inventive step having regard to the prior art document
D1: US-A-3 842 310.
- III. On 12 June 1995 the Applicant filed a notice of appeal against this decision together with a statement setting out the grounds, and paid the prescribed appeal fee. Grant of a patent was requested on the basis of a new Claim 1.
- IV. In the annex to a summons to oral proceedings dated 10 November 1995, the Rapporteur expressed the preliminary view that having regard to the disclosure of D1 the subject-matter of Claim 1 lacked novelty.
- V. Oral proceedings were held on 12 December 1995. The Appellant requested grant of a patent on the basis of Claim 1 filed on the same day and claims 2 to 12 filed on 4 January 1995.
- VI. Claim 1 reads:

"A parabola waveform generator for correction of a television raster, comprising:
a resettable circuit (84) for generating a repetitive ramp signal (62);
first resettable means (86) for initializing said ramp circuit (84) at a frequency related to a scanning frequency;

a resettable integrator (70) for generating a repetitive parabola signal (60) from said repetitive ramp signal (62);

second resettable means (80) for initializing said integrator (70) at said scanning frequency, to an input condition independent of each preceding repetitive parabola, prior to integrating each said repetitive parabola,

the output of said ramp circuit (84) is directly AC coupled (76) to the input of said integrator (70), and that the integrator comprises further means, which causes the output signal of said integrator symmetrically to a reference voltage".

VII. At the oral proceedings the Appellant's representative argued that the parabola waveform generator claimed in Claim 1 was different from the parabola generator described in D1 in that the ramp circuit was ac-coupled to the integrator. Due to the ac-coupling there was no need for the impedance converter used in D1. Furthermore, the invention provided means for ensuring a high degree of symmetry in the TV raster. These means were implemented either as a voltage divider coupled to the non-inverting input of the operational amplifier serving as integrator, as shown in Figure 4 of the patent application, or as symmetrical op-amp supply voltages, as shown in Figure 5. D1 did not render the invention obvious, in particular because it did not address the same technical problem. The invention proposed to reset the integrator periodically in order to avoid the accumulation of error signals generated during the horizontal and vertical scans. In D1, however, the resetting of the integrator was inherent to the circuit since any ramp generator has to be reset cyclically.

Reasons for the Decision

1. The appeal is admissible.
2. *Clarity of Claim 1*
 - 2.1 At the start of the oral proceedings the Appellant filed a new Claim 1 which includes the newly introduced feature that the integrator comprises means "which causes the output signal of said integrator symmetrically to a reference voltage". In the course of the oral proceedings the meaning to be attached to this feature was discussed; it appeared from the Appellant's comments that what was intended was not that a waveform is produced which is symmetrical in shape but that the waveform has maximum positive and negative excursions which are symmetrical about zero. It was argued that the skilled person would appreciate that the capacitive coupling between the ramp generator and integrator together with the ± 12 volt power supplies to the integrator amplifier shown in the Figure 5 embodiment would lead the skilled person to conclude that the amplitude of the output voltage was symmetrical, implicitly about zero. The effect of the means was said to be an improved symmetry of the generated signal and, in consequence, of the TV raster.
 - 2.2 It is not however clear to the Board that the skilled person, reading the originally filed application, would conclude that the output parabolic voltage is indeed symmetrical about zero as asserted by the Appellant. The description and drawings nowhere suggest such a symmetry. The Board has derived little assistance in interpreting the feature from the description; although as noted above the Appellant drew attention to the presence in Figure 5 of symmetrical supply voltages to the operational amplifier U1, this is a standard feature

of such amplifiers and would not be understood by the skilled person as meaning that the output must necessarily also be symmetrical. Moreover, the Figure 6 embodiment does not show such supply voltages but it is apparent that claim 1 is intended to cover this embodiment. The voltage divider shown in Figure 4 and in Figure 6 (resistors R27, R28 at U3) suggests that the output signal has a predetermined DC level and points away from the Appellant's interpretation.

2.3 Be that as it may, the Board notes that the claim does not require that this mean or reference voltage be zero. It is however noted that no meaningful limitation results if the wording of the feature is interpreted as merely requiring that the output signal of the integrator be symmetrical with respect to an unspecified reference voltage: any periodic waveform will be "symmetrical" with respect to a reference voltage inasmuch as there will exist a mean between the maximum positive and negative excursions. The Board accordingly concludes that the only interpretation consistent with the originally filed description and which gives meaning to the form of words used is that the **shape** of the parabola must be symmetrical with respect to a reference level, so that when superimposed on the scanning of a TV image, the resultant (vertical or horizontal) deflection is symmetric around the centre of the raster. This interpretation is adopted below.

3. *Novelty*

The Board accepts that the subject-matter of Claim 1 as amended is new.

4. *Inventive step*

4.1 A problem which arises in the display of images on a cathode ray tube is so-called pincushion distortion, a geometric aberration arising from the shape of the screen, which is not spherical but approximately flat. A correction may be made for such distortion by means of a parabola signal, which can be applied to both the horizontal and vertical scanning circuits, as is well known in the art. Such a signal may be obtained by integrating twice a constant voltage. The technical problem identified by the present inventors concerns various noise components which accumulate in the integrator generating the parabolas. The noise may result from vertical rate disturbances coupled from the vertical deflection system or from loss of vertical sync following a channel change. The timing disturbances are AC coupled to the integrator, with a distortion of the generated parabolas as a consequence. The proposed solution to this problem consists in resetting the integrator periodically at the scanning frequency, in dependence on whether the circuit is for correcting so-called north-south distortion, in which case a component at the horizontal scanning frequency is superimposed on the vertical scan, or east-west distortion, in which case a component at the vertical scanning frequency is superimposed on the horizontal scan.

4.2 It was common ground at the oral proceedings that the single most relevant document is D1. This document discloses in connection with Figure 1 as modified by Figure 3 a parabola waveform generator for correction of a television raster, comprising a resettable circuit 7 for generating a repetitive ramp signal, see Figure 2A; first resettable means, 28 in Figure 1, for initialising said ramp circuit at a frequency related to a scanning frequency; a resettable integrator 56 for generating a

repetitive parabola signal, Figure 2D, from said repetitive ramp signal; and second resettable means 64, see column 5, lines 53 to 58 and column 6, lines 2 to 8, for initialising said integrator at said scanning frequency, to an input condition independent of each preceding repetitive parabola, prior to integrating each said repetitive parabola, the output of the ramp circuit being coupled to the input of the integrator by way of an offset circuit 10 (referred to by the Appellant as an "impedance converter") which shifts the DC level such that the mid point of the ramps corresponds to ground, see Figure 2c. From a consideration of Figure 2 and the description at column 4, lines 47 to 51 it appears to the Board that D1 discloses the provision of means which cause the output signal of the integrator to be symmetrical in shape.

- 4.3 The only clear distinction in the claimed subject-matter with respect to the disclosure of D1 is that Claim 1 requires the output of the ramp circuit to be "directly AC coupled" to the input of the integrator, whereas in D1 the output is DC coupled by way of offset circuit 10. As pointed out by the Board in the course of the oral proceedings, the skilled person would appreciate the importance of ensuring that the ramp signal has the correct DC level in order to avoid introducing asymmetry in the parabolic signal used to modulate the television raster. As noted in D1, in the case of east-west pincushion distortion the voltage provided to the beam must have "positive and negative values proportional to the respective deflections of the beam from the horizontal mid way line" (column 4, lines 48 to 51). It therefore appears that the considerations advanced by the Appellant were well-known at the time of publication of D1. The use of an offset circuit as in D1 permits a shift component to be introduced to the ramp signal and hence control of the shape of the parabolic signal, but

the Board considers that the skilled person would be well aware that if no need for a shift arose a simple blocking capacitor would perform the same function. The use of blocking capacitors to eliminate the DC component of a signal has been common general knowledge since the earliest days of the electronics art.

4.4 The Appellant has submitted that if the DC coupling in D1 were replaced by AC coupling there would be no reason for resetting periodically the (second) integrator. An integrator receiving a DC-free input signal need in principle not be reset at all; only when the problems identified by the present inventors are considered might the advantages of resetting be appreciated.

4.5 The Board accepts that although the parabola generator described in D1 contains a switch for resetting the integrator, it must be considered whether this switch would be omitted by the skilled man as a consequence of the circuit modifications indicated above. Contrary to the Appellant's submissions, however, this appears unlikely. Even when a DC-free signal is integrated it is common to reset the integrator periodically to avoid drift in the output due to the op-amp offset and bias current. It was therefore obvious to retain this feature in view of the well known problem of avoiding the accumulation of noise effects in the integrator. The particular noise referred to in the present application is cancelled at the same time.

4.6 It follows that the subject-matter of Claim 1 of the single request does not involve an inventive step. It is observed that the Board would have reached the same conclusion even if the feature of Claim 1 discussed at point 2 above were interpreted as requiring that the waveform be symmetrical with respect to zero.

4.7 Nor does the Board consider that any inventive step can be found in the subject-matter of any of the other appendant claims. The representative in particular drew attention to the disclosure of Claim 4, according to which the first resetting means is responsive to horizontal retrace pulses and the auxiliary resetting means is responsive to differentiated horizontal retrace pulses. The Board does not however consider that any significance can be attached to this distinction; in practice, devices are not triggered by pulses but by the leading or falling edges of such pulses, i.e. by the differentiated pulse. The feature is accordingly known per se.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

P. K. J. van den Berg