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File Number: T 668/92 - 3.5.1

Application No.: 88 400 137.1

Publication No.: 0 284 449

Title of invention: Apparatus for compensation for image rotation in a CRT display

Classification: H04N 3/22

D E C I S I O N  
of 27 April 1993

Applicant: DIGITAL EQUIPMENT CORPORATION

Headword:

EPC Article 56

Keyword: "Inventive step (yes)"



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Boards of Appeal

Chambres de recours

Case Number : T 668/92 - 3.5.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.1  
of 27 April 1993

**Appellant :** DIGITAL EQUIPMENT CORPORATION  
146 Main Street  
Maynard, MA 01754 (US)

**Representative :** Mongrédién, André  
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**Decision under appeal :** Decision of the Examining Division of the  
European Patent Office dated 3 April 1992  
refusing European patent application  
No. 88 400 137.1 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. Appellant's European patent application No. 88 400 137.1, filed on 22 January 1988, claiming priority from a previous application in the United States of America dated 25 March 1987, was refused by a decision of the Examining Division dated 3 April 1992. The decision was based on Claims 1 to 3 as filed on 18 January 1992.
  
- II. The reason given for the refusal was that the subject-matter of Claim 1 lacked an inventive step having regard to the prior art known from the following documents:  
  
D1: DE-A-2 809 725  
D2: US-A-4 296 359.
  
- III. On 27 May 1992 the Applicant (Appellant) filed a notice of appeal together with the appeal fee. The Statement of Grounds was filed on 13 July 1992.
  
- IV. The Board of Appeal provisionally informed the Appellant in a communication dated 20 November 1992 that the decision of the Examining Division appeared to be defensible, although the Board used a slightly different approach to show that the refused Claim 1 did not involve an inventive step.
  
- V. In response to that communication of the Board, on 3 March 1993 the Appellant filed an amended Claim 1, Claims 2 and 3 remaining unchanged, and argued in favour of his invention in the accompanying letter.

Claim 1 reads as follows:

"A video display unit for displaying an image on a screen, said unit being subject to an external magnetic field,

said external magnetic field causing a rotation of said image with respect to said screen, said unit comprising:

cathode ray tube means (14), said tube means including an electron gun (18) and a screen (28), said gun for emitting an electron beam along a path toward said screen;

deflection yoke means (16), said yoke means being disposed between said electron gun (18) and said screen (28), said yoke means operating to deflect said electron beam, thereby forming said image, said yoke means having a first end juxtaposed with said screen (28) and a second end juxtaposed with said electron gun (18), characterized in that

said yoke means further comprises a conductive winding (22) having first and second ends,

said winding being substantially disposed in a recess (30) of the first end of the yoke means, said winding forming part of a unitary structure with said yoke means, whereby said yoke means together with said winding is capable of unitary assembly and disassembly;

said winding being oriented substantially transverse to said path,

said first and second ends of said winding being coupled to control means (26),

said control means for producing a compensation current which is conducted through said winding,

said compensation current producing a compensating magnetic field for substantially cancelling said external magnetic field."

In the amended Claim 1 as filed the wording of the second characterising feature was:

"said winding being substantially disposed in a recess (30) of the first end of the yoke means, said recess forming part of a unitary structure with said yoke means, whereby ..."

which wording apparently does not make sense. Apparently the word recess in the expression "said recess forming part" has been inadvertently written for the word "winding". This intention of the Appellant can also clearly be seen from the Statement of Grounds of Appeal (page 2), wherein it is indicated several times that the compensating winding (22) forms a unitary structure with the yoke assembly. The Board therefore has amended the text of Claim 1 in that respect to bring it into line with the intention of the Appellant. Also at the end of Claim 1 the filed wording "for substantially cancel (sic) said external magnetic field" has been changed into "for substantially cancelling said external magnetic field".

VI. The Appellant, thus, requests that the decision under appeal be set aside and a patent granted on the basis of the following documents:

- Claim 1, filed on 3 March 1993, and Claims 2 and 3 filed on 18 January 1992,
- description pages 1 and 4 to 10 as originally filed and pages 2, 3 and 4a, filed on 18 January 1992,
- drawing sheets 1/4 to 4/4 as originally filed.

Reasons for the Decision

1. The appeal is admissible.
  
2. The Board, like the Examining Division, has come to the conclusion that Claim 1 as refused substantially corresponded to a combination of features taken from the original Claims 1 to 4, which features have been editorially amended, completed and clarified with the support of the original description and drawings. Valid Claim 1 is distinguished from refused Claim 1 in that the second feature of the characterising part of the claim

"said winding being substantially disposed in a recessed area (30) of the first end of the yoke means"

has been changed into

"said winding being substantially disposed in a recess (30) of the first end of the yoke means, said winding forming part of a unitary structure with said yoke means, whereby said yoke means together with said winding is capable of unitary assembly and disassembly".

The support of the first part of this amended feature can be found in the original Claim 4 (and Figures 2 and 3), wherein it is stated that "said forward end includes a recessed area for receiving said winding, whereby said winding is disposed substantially flush with said forward end".

It is, moreover, made clear in the original description that the said winding is disposed wholly in said recess (cf. Figure 2 and the two last lines on page 6 of the description) and "that the yoke assembly (16), along with

the winding (22), may be removed or replaced separately from the CRT". The Board therefore also takes the view that the identification of the yoke means and the winding as a unitary structure, as defined in the amended Claim 1, is supported by the original application documents.

Therefore, the Board is satisfied that the European patent application has not been amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Article 123(2) EPC).

3. Cited document D1 discloses:

- a video display unit (Figure 1), being subject to an external magnetic field which causes a rotation of the image,
- a cathode ray tube means (5) including an electron gun and a screen,
- a conductive winding (2) having first and second ends and being disposed around the screen edge (Figure 1 and page 5, lines 1 to 7),
- control means (8) coupled to said first and second ends of said winding, for causing the winding to conduct a current to compensate for the external magnetic field.

This document, however, does not disclose whether this arrangement has deflection yoke means. Instead the whole CRT (with the exemption of the screen edge) is surrounded by a shield.

D2 is considered to disclose - corresponding to Claim 1 - the following features:

- A video display unit for displaying an image on a screen (27), said image being erroneously rotated to said screen, said unit comprising:

- cathode ray tube means (21), said tube means including an electron gun (25,28 and 29 located in neck 26) and a screen, said gun for emitting an electron beam along a path toward said screen;
- deflection yoke means (22), said yoke means being disposed between said electron gun and said screen, said yoke operates to deflect said electron beam, thereby forming said image, said yoke means having a first end juxtaposed with said screen and a second end juxtaposed with said electron gun, whereby
- a conductive winding (31) having first and second ends is placed just in front of the first end of the said yoke means,
- said winding being oriented substantially transverse to said path,
- said first and second ends of said winding being coupled to control means (32),
- said control means for producing a compensation current which is conducted through said winding,
- said compensation current producing a compensating magnetic field for substantially correcting said erroneous image rotation.

This arrangement according to D2, however, is not directly designed to compensate external magnetic fields, but is designed to correct beam rotation due to gun-mount rotation error. Moreover, this document does not disclose that the compensating winding may be located on or secured to a deflection yoke as according to the present Claim 1.



Therefore, the subject-matter of Claim 1 is novel in the sense of Article 54 EPC.

4. As has been shown above, the arrangement of D1 does not show deflection yoke means. Therefore, it is not correct to use the teaching of this document as the imagined starting point of the present invention, which is mainly concerned with such yoke means and the design of such means in order to secure the compensating winding thereon.

Although D2 does not show a video display unit which is subject to an external magnetic field, the Board nevertheless considers this document to be the most pertinent document, in particular, as this document discloses most of the features of Claim 1.

Starting from the teaching of D2, therefore, it appears that the technical problem to be solved may be considered to be:

- (a) to adapt the arrangement according to D2 so that it also can be used for compensation of external magnetic fields and
- (b) to provide a convenient and mechanically secure location for the compensating winding.

5. It appears to the Board that it would be quite obvious to a skilled man having regard to the teaching of D1 to find a solution to the first part (a) of said technical problem. In fact, as has been indicated above, D2 discloses an apparatus for correcting beam rotation due to gun-mount rotation error principally in a deflection yoke test equipment (the deflection yoke is adjusted for best convergence on a deflection yoke coil adjustment machine - CAM). However, such gun-mount rotation error, it is said

in D2, can also occur in production kinescopes employed in the assembly of colour television receivers and therefore the described correction method may also be practised in a receiver.

It, therefore, appears that it would be self-evident to a skilled man to use said arrangement according to D2 to cancel also external magnetic fields (cancelling of external magnetic fields which influence video display units is in fact known as disclosed by D1). In fact, it appears that in the correction arrangement according to D2 also external magnetic fields, if present, contribute to the rotation of the image and therefore are taken into account automatically at the correction.

6. It thus remains to be investigated whether the solution according to the subject-matter of Claim 1 of the second part (b) of the problem would be obvious to a skilled man.

As has been indicated above, in the arrangement according to D2, the compensating winding (31) is placed just in front of the first end of said yoke means. In column 2, lines 54 to 57, it is said, that "a wire coil is mounted in front of the yoke (22) abutting the kinescope funnel (30), with the turns of coil (31) coaxially disposed with respect to neck (26)". In the document there is no further information giving details as to how this coil is mounted, nor is there a hint that it would be possible to mount it elsewhere.

As has been mentioned above, according to D2 the correction method disclosed can also be employed in colour television receivers. However, in the text of D2 it is said that there may be undesired inconvenience and expense associated with the provision of an adjustable DC source

for said coil. According to one embodiment of the arrangement, therefore, the coil is replaced by a permanent magnet ring (reference numeral 36 in Figure 6) that "is positioned about the kinescope funnel in a position similar to that occupied by coil (31) in Figure 1". The magnetic ring effects raster rotation in the same manner as coil 31.

Said magnetic ring is large enough to fit over the deflection yoke (22) to aid installation (column 5, lines 4 to 5). However, in order to accurately align the raster lines with the kine major axis, it is necessary that rings of different magnetic strengths are available to correct different amounts of mount rotation error. Therefore, the adjusting is done by the yoke adjusting operator apparently before delivery of the receivers. It is furthermore said that the operator has to select a ring of appropriate strength and place it on the kine, "securing it in place with tape or other mounting means". Thus apparently the magnetic ring (36), like the coil (31) is positioned about the kinescope funnel in front of the deflection yoke.

7. It, therefore, appears to the Board that there is nothing in D2 to indicate that a compensating winding could be secured to the deflection coil as defined by Claim 1.

It has been made clear in D2 that the normal way of securing the coil is in front of the deflection yoke. In fact, it appears, as has been hinted by the Appellant, that the prior art teaches that a compensating winding must be so positioned that the normal deflection functions performed by the yoke are not unallowably affected, i.e. the compensating winding must be positioned away from the deflection yoke.

In the impugned decision, the Examining Division observed, as did the Rapporteur in the communication referred to under IV above, that according to the second embodiment of D2 the magnet ring is large enough to fit over the deflection yoke. From this observation the conclusion was drawn that it was obvious to the skilled man that the yoke might be modified to receive the conductive winding. However, the Board has reconsidered this matter and can see no hint whatsoever in D2 that would prompt the skilled man to arrive at the solution claimed. As can be seen from the citation of D2 above, the said magnet ring is secured to the kinescope funnel with tape or other mounting means. Moreover, the magnet ring apparently has a larger diameter than the deflection coil in order to be pushed over the yoke at the installation and, therefore, can probably also be easily removed. It is hard to see, therefore, how from this design the skilled man would get the idea of placing the winding in a recess in the yoke so as to form a unitary structure with the yoke.

Moreover, the said magnet rings apparently are not suitable for compensation of external magnetic fields as they are introduced into the receivers when manufactured and, therefore, cannot contribute to a compensation of e.g. the earth's magnetic field at the place where the receivers are used.

8. Thus, nothing in the prior art (neither D1, nor D2) gives a hint that a compensating winding could be secured to a deflection yoke, not to mention in a recess in said yoke.

In relation to the prior art, in particular, the following advantages of the invention can be observed:

- (a) a convenient and mechanically secure location has been created for the winding and it is not subject to

damage or displacement during handling or assembly of the CRT,

- (b) the winding is smaller and saves space, yet the overall dimensions of the deflection yoke are unaffected,
- (c) the smaller perimetral size of the winding is desirable from the point of view of economy (to produce a desired magnetic field compensation),
- (d) the yoke and the winding together (forming a unitary structure) can be assembled with or disassembled from the CRT.

9. In the result, the Board takes the view that the subject-matter of Claim 1 involves an inventive step over the cited prior art (Article 56 EPC). The subject-matters of dependent Claims 2 and 3 are also acceptable.

10. Having regard to the teaching of the prior art documents D1 and D2, it appears that Claim 1 is not correctly delimited against these documents. However, the Board considers it questionable, whether in this case it is appropriate to have the two-part form of Claim 1, as D1 does not mention deflection yoke means and D2 is silent on cancelling external magnetic fields.

The Board also notes that the description is not adapted to amended Claim 1.

In particular, the introductory part of the description should be adapted to this claim. If, finally, the one-part form of claim is used, then the arrangement of D1 and, in particular, that of D2 which represents the closest prior art should be clearly described in this introductory part.

Also, it is obvious that the last three paragraphs of the description must be partly deleted and/or revised in order to correspond to the invention according to the new set of amended claims.

The Board remits the case to the first instance (Article 111(1) EPC) to complete the examination and to put right the above-mentioned deficiencies.

**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 for further prosecution with the order to grant a patent on the basis of the main request (see paragraph VI above) but with particular attention being paid to correction of the deficiencies mentioned in paragraph 10 above.

The Registrar:

The Chairman:

M. Kiehl

P.K.J. van den Berg