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**D E C I S I O N**  
**of 10 November 1999**

**Case Number:** T 0733/96 - 3.4.1

**Application Number:** 92903104.5

**Publication Number:** 0600885

**IPC:** G09G 3/34

**Language of the proceedings:** EN

**Title of invention:**

Electrophoretic display panel with selective line erasure

**Applicant:**

Copytele Inc.

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 52(1), 54, 56

**Keyword:**

"Novelty (no)"

"Inventive step (no)"

**Decisions cited:**

-

**Catchword:**

-



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Boards of Appeal

Chambres de recours

**Case Number:** T 0733/96 - 3.4.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.4.1**  
**of 10 November 1999**

**Appellant:** Copytele Inc.  
900 Walt Whitman Boulevard  
Huntington Station  
New York 11746 (US)

**Representative:** Lucking, David John  
Forrester & Boehmert  
Franz-Joseph-Strasse 38  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 28 March 1996  
refusing European patent application  
No. 92 903 104.5 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** G. Davies  
**Members:** U. G. O. Himmler  
H. K. Wolfrum

## Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal, received on 28 May 1996, against the decision of the examining division, dispatched on 28 March 1996, refusing European patent application No. 92 903 104.5. The fee for appeal was paid on 28 May 1996. The statement setting out the grounds of appeal was received on 25 July 1996.

The examining division held that the application did not meet the requirements of Articles 52(1) and 54 EPC with respect to claim 1 having regard to document

D1: EP-A-0 186 519.

With respect to claim 2 and the remaining claims the examining division held that the application did not meet the requirements of Articles 52(1) and 56 EPC having regard to document

D2: US-A-4 522 472

combined with D1.

II. The appellant requested that the decision under appeal be set aside and a patent granted on the basis of the following documents:

**Main request:**

**Claims:** 1 to 14 filed on 2 February 1996.

**Description:** pages 1 and 4 to 14 as originally filed;  
pages 2 and 3 as filed on 2 February 1996.

**Drawings:** Sheets 1/6 to 6/6 as originally filed.

**First auxiliary request:**

**Claims:** 1 to 13 called "first amended claims" and  
filed with the grounds of appeal.

**Second auxiliary request:**

**Claims:** 1 to 12 called "second amended claims" and  
filed with the grounds of appeal.

Moreover, the appellant requested that the application  
be returned to the examining division for amendment of  
the description should either the first auxiliary  
request or the second auxiliary request be allowed by  
the Board.

Auxiliarily, the appellant requested oral proceedings.

III. In an annex to the summons to oral proceedings setting  
out the preliminary opinion of the Board on the case,  
the appellant's attention was drawn to the following  
further documents:

D3: EP-A-0 396 247,

D4: EP-A-0 187 374, and

D5: US-A-4 379 621.

IV. By letter dated 11 October 1999, the appellant informed the Board that it did not intend to attend the oral proceedings and requested a decision on the appeal on the basis of the documents currently on file.

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

"1. An electrophoretic display apparatus comprising a display panel having a display surface, the display apparatus containing an electrophoretic dispersion of particles in a suspension medium, the display apparatus having writing means for forming an image on the display surface in a write mode by attracting charged particles from the dispersion onto the display surface in a plurality of image lines and the display apparatus being characterised by line erasing means for selectively erasing an image line in a line erase mode by repelling charged particles from only a portion of the display surface corresponding to the image line to be erased without disturbing the other image lines which remain the same from one frame to the next."

Claim 1 of the first auxiliary request reads as follows:

"1. An electrophoretic display apparatus comprising a display panel having a display surface, the display apparatus containing an electrophoretic dispersion of particles in a suspension medium, the display apparatus having writing means for forming an image on the display surface in a write mode by attracting charged particles from the dispersion onto the display surface in a plurality of image lines and the display apparatus and line erasing means for selectively erasing an image

line in a line erase mode by repelling charged particles from only a portion of the display surface corresponding to the image line to be erased, the line erasing means comprising a multiplicity of parallel anode line segments, each anode line segment being electrically insulated from adjacent anode line segments, the display apparatus being characterised in that the line erasing means further comprises line control means for individually controlling each anode line segment by applying a first potential thereto for writing a corresponding image line, and a second potential thereto for erasing the image line without disturbing the other image lines which remain the same from one frame to the next."

Claim 1 of the second auxiliary request reads as follows:

"1. An electrophoretic display apparatus comprising a display panel having a display surface, the display apparatus containing an electrophoretic dispersion of particles in a suspension medium, the display apparatus having writing means for forming an image on the display surface in a write mode by attracting charged particles from the dispersion onto the display surface in a plurality of image lines and the display apparatus and line erasing means for selectively erasing an image line in a line erase mode by repelling charged particles from only a portion of the display surface corresponding to the image line to be erased, the line erasing means comprising a multiplicity of parallel anode line segments, each anode line segment being electrically insulated from adjacent anode line segments, and line control means for individually

controlling each anode line segment by applying a first potential thereto for writing a corresponding image line, and a second potential thereto for erasing the image line, without disturbing the other image lines which remain the same from one frame to the next, the display apparatus being characterised in that the line control means comprises a first multiplicity of switch elements each operable to couple a corresponding one of the anode line segments to a source of the first potential, and a second multiplicity of switch elements each operable to couple a corresponding one of the anode line segments to a source of the second potential, and control signal input means for inputting control signals for individually controlling the opened or closed states of the first and second multiplicities of switch elements."

VI. The appellant argued as follows:

Although document D1 could be considered as recognising the problem addressed in the application, it did not disclose or point to the solution defining the control circuits achieving selective line erasure.

Furthermore, document D2 only disclosed the provision of anode voltages for enabling or preventing writing but did not teach the circuitry for selective erasure. Thus, this document did not show that at the priority date of the application under appeal the skilled person would have had the technical means to carry out selective erasure.

## **Reasons for the Decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
  
2. *Main request*
  - 2.1 Document D1 (cf. in particular Figure 1 and the corresponding description) is the closest prior art which discloses an electrophoretic display apparatus with an array of cathode electrodes  $C_1 - C_n$ ; an array of grid electrodes  $G_1 - G_p$ , the cathode and grid electrodes together defining pixels P at their crossings; and an array of segmented anodes  $A_1 - A_m$ . According to D1, page 5, last paragraph, the m strips of anodes correspond to m lines for displaying m lines of characters of text or other images through the front panel.
  
  - 2.2 D1 addresses the same problem as in the application, that in electrophoretic displays the writing time is comparatively long compared to other display devices (for instance, CRT devices, see page 3, second paragraph of D1). In order to speed up the writing time in D1 the individual pixels or lines of characters are addressed in a time less than the saturation time and - if desired - the same line can be overwritten a second time in order to reach the brightness saturation value. Furthermore D1 teaches on page 10, second paragraph, that for achieving movement of windows or graphic animation faster and smoother image changes can be accomplished by only erasing and rewriting those character lines on which the changes occur. Contrary to the appellant's submission, the Board considers this teaching to be synonymous with the expression

"selectively erasing an image line" in the characterising portion of claim 1. Consequently, in order to carry out this selective erasure, it is implicit in the teaching of page 10 of D1 that the electrophoretic device shown in Figure 1 of D1 comprises line erasing means which are suitable for selectively erasing an image line in a line erasing mode.

Therefore, the subject-matter of claim 1 of the main request is not novel (Articles 52(1) and 54 EPC) with respect to the teaching of D1.

Consequently, the main request is not allowable.

3. *First auxiliary request*

Claim 1 of the first auxiliary request defines in addition to claim 1 of the main request "line control means" for individually controlling each anode line segment by applying respective potentials for selective writing and erasure.

This feature would have been immediately apparent to the skilled person working with the device known from D1, in particular in view of the fact that the application of first and second potentials for selective erasure and writing was explicitly known for a similar electrophoretic device from D3 (cf. claim 5; Figures 1 to 3; column 5, lines 8 to 11; and column 6, lines 11 to 54).

Hence, the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step

(Articles 52(1) and 56 EPC) with respect to the combined teachings of D1 and D3.

Therefore, the first auxiliary request is also not allowable.

4. *Second auxiliary request*

Claim 1 of the second auxiliary request combines the features of claims 1, 2 and 5 as originally filed.

The subject-matter of claim 1 of this request differs from the prior art device of D1 in that the line control means comprise first and second multiplicities of switch elements operable for coupling the anode lines to the first and second potentials and by particular control signal input means. By these combined means a selective writing and erasure is obtainable.

The provision of switch elements for individually switching the potentials applied to electrodes or electrode segments of flat panel displays is generally applied practice in the art. It is, for instance, not conceivable that the display according to D3 could operate without switches when changing from the mode of writing (or displaying) to erasing, i.e. when applying new potentials to the electrodes.

Moreover, the use of two switches connected to an individual electrode for switching between different potentials (for the purpose of selective display and erasing) was known in the art before the filing of the present application from each of documents D4 and D5.

D4 shows in particular in Figures 3 and 4 a pair of switches 35 used for applying one of opposite potentials to an electrode segment 14 for selectively displaying or erasing information. Although D4 primarily relates to electrolytic displays, it is evident from page 21, lines 19 to 22 that its teaching can be applied to electrophoretic displays as well. D5 (cf. Figure 12; column 6, line 50 to column 7, line 2; and column 7, lines 31 to 35) provides another example (albeit for a display in which the active material is a ferroelectric ceramic). An individual electrode 41a, 41b is connected by two switches 44, 54 either to a write potential (on row electrode 41) or to an erase potential (on erase electrode 51).

Consequently, the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step either (Articles 52(1) and 56 EPC).

Thus, the second auxiliary request is also not allowable.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

M. Beer

G. Davies