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**D E C I S I O N**  
**of 15 November 2005**

**Case Number:** T 0622/04 - 3.4.02

**Application Number:** 98301174.3

**Publication Number:** 0860729

**IPC:** G02B 27/22

**Language of the proceedings:** EN

**Title of invention:**

Image display system, information processing apparatus, and  
method of controlling the same

**Applicant:**

Canon Kabushiki Kaisha

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (yes) "

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0622/04 - 3.4.02

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.02  
of 15 November 2005

**Appellant:**

Canon Kabushiki Kaisha  
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Ohta-ku  
Tokyo (JP)

**Representative:**

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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 23 December 2003  
refusing European application No. 98301174.3  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** A. G. Klein  
**Members:** F. J. Narganes-Quijano  
C. Rennie-Smith

## Summary of Facts and Submissions

I. The appellant (applicant) has lodged an appeal against the decision of the examining division to refuse European patent application No. 98301174.3 (publication No. 0860729).

In its decision the examining division held that the subject-matter of claim 1 amended according to the requests then on file did not involve an inventive step (Articles 52(1) and 56 EPC) with regard to the prior art represented by the following documents:

D1: DE-A-19500699,

D5: EP-A-0540137.

The examining division found in particular that the claimed information processing apparatus differed from the apparatus disclosed in document D5 in that the position of the window on the first display means is changed whereas in document D5 the position of the parallax barrier on the second display is shifted in order to enable a proper positional relationship. Since only the relative positional relationship of the striped image, the parallax barrier and the observer's head is relevant for a correct display of the stereoscopic image, the distinguishing feature was rendered obvious by document D1 which teaches shifting the striped image as an alternative to shifting the parallax barrier.

II. With the grounds of appeal the appellant requested setting aside of the decision under appeal and the grant of a patent on the basis of claims 1 to 25 and description pages 1, 7 to 9, 9a, 10, 12, 13, 26 to 29, 31 to 34 as submitted with the letter setting out the grounds of appeal, together with description pages 2 to 6, 11, 14 to 25 and 30 and drawing sheets 1/18 to 18/18 of the application as originally filed.

In response to a telephone consultation with the rapporteur, the appellant filed with its letter dated 15 September 2005 an amended page 16 of the description and amended pages 41 and 42 containing the text of claims 14 to 21 and partially that of claims 13 and 22, replacing the corresponding pages of its request.

III. Independent claims 1, 13 and 25 according to the appellant's request are worded as follows:

"1. An information processing apparatus capable of performing stereoscopic display, comprising:

stereoscopic image display means (10,21,22) for displaying a first stereoscopic image having first stripe parallax images arranged for right and left eyes, where the first stripe parallax images arranged for the right eye are displayed on first stripe areas of first display means (7, 101) and the first stripe parallax images arranged for the left eye are displayed on second stripe areas of said first display means (7,101); and

stereoscopic vision control means (10,21,23) for displaying a parallax barrier pattern on second display means (103) such that the first stripe parallax images displayed on the first and second stripe areas of said

first display means are respectively observed with the right and left eyes;

characterised in that the apparatus includes:

window setting means (S10,520,S41) for setting a window on a desired position of said first display means in which a second stereoscopic image constituted by second stripe parallax images arranged for the right and left eye is displayed;

determination means (S11,S212,S42) for determining whether or not the second stripe parallax image arranged for the right and left eyes are displayed on the first and second stripe areas respectively; and

changing means (S12,S22,S43) for, when the second strip parallax images arranged for the right and left eyes to be displayed in the window are displayed on the second and first stripe areas respectively, changing the position of the image within the window or interchanging odd and even stripe images constituting the image displayed in the window, so that the second stripe parallax images arranged for the right and left eyes to be displayed in the window are displayed on the first and second stripe areas respectively while the relationship between the first stripe parallax images and the first and second strip areas is maintained."

" 13.A method of performing stereoscopic display, comprising:

displaying a first stereoscopic image having first stripe parallax images arranged for right and left eyes, where the first stripe parallax images arranged for the right eye are displayed on first stripe areas of first display means (7, 101) and the first stripe parallax images arranged for the left eye are displayed on

second stripe areas of said first display means (7,101);  
and

displaying a parallax barrier pattern on second display means (103) such that the first stripe parallax images displayed on the first and second stripe areas of said first display means are respectively observed with the right and left eyes;

characterised in that the method includes:

setting a window on a desired position of said first display means in which a second stereoscopic image constituted by second stripe parallax images, arranged for the right and left eye is displayed;

determining whether or not the second stripe parallax image arranged for the right and left eyes are displayed on the first and second stripe areas respectively; and when it is determined that the second stripe parallax images arranged for the right and left eyes to be displayed in the window are displayed on the second and first stripe areas respectively, changing the position of the image within the window or interchanging odd and even stripe images constituting the image displayed in the window, so that the second stripe parallax images arranged for the right and left eyes to be displayed in the window are displayed on the first and second stripe areas respectively while maintaining the positional relationship between the first stripe parallax images and the first and second stripe areas."

"25. A storage medium storing computer implementable instructions thereon for programming a computer to carry out the method in accordance with any one of claims 13-24."

Claims 2 to 12 and 14 to 24 all refer back to claims 1 and 13, respectively.

IV. The arguments of the appellant in support of its request are essentially the following:

The present claims specify explicitly that first and second stereoscopic images are displayed concurrently on the first display means, and that changes are made to the second image while maintaining a predetermined relationship between the first stripe parallax images and the first and second stripe areas of the first display means. The problem addressed in the application is that, when stereoscopic images are displayed in different windows, a reversed stereoscopic vision may be produced in one of the windows (page 6, lines 12 to 16 of the description).

Document D5 discloses means to determine the position of the image and the parallax windows and the observer's head position, but not means to determine the relationship between the stripe parallax images and the stripe areas of the first display means as claimed. Document D1 teaches the equivalence of moving the image relative to the parallax barrier. The application of this teaching to document D5 would then result in an adjustment affecting all stereoscopic images upon detection of a movement of the observer's head. Thus, if a window is set or the window is moved, the combination of documents D1 and D5 would not suggest any adjustment when no movement of the head is detected. Thus, the problem considered in, and solved by the present invention is neither disclosed nor suggested by the prior art.

## **Reasons for the Decision**

1. The appeal complies with the requirements mentioned in Rule 65(1) EPC and is therefore admissible.

2. *Amendments*

After due consideration of the amendments made to the claims and to the description of the application according to the present request of the appellant, the Board is satisfied that the amended application documents comply with the formal requirements of the EPC, and in particular with those set forth in Article 123(2) EPC. In particular, the information processing apparatus defined in claim 1 is based on independent claim 18 together with claims 1, 2, 11 and 27 of the application as filed; independent claim 13 directed to the corresponding method of performing stereoscopic display is based on claim 35 of the application as filed amended in line with the amendments made to present claim 1; and the storage medium of claim 25, which is defined with reference to claim 13, is based on the subject-matter of claim 36 of the application as filed. Furthermore, the description has been adapted to the invention as defined in the amended claims (Article 84 EPC, second sentence and Rule 27(1) EPC).



3. *Claim 1 - Patentability under Article 52(1) EPC*

3.1 Novelty of the information processing apparatus defined in claim 1 upon which the contested decision is based was not contested by the examining division, and in this respect also the Board is satisfied that claim 1 amended according to the present request of the appellant defines novel subject-matter over the available prior art (Articles 52(1) and 54 EPC).

3.2 The Board concurs with the examining division in considering the disclosure of document D5 as representing the closest prior art. This document discloses an information processing apparatus designed to perform stereoscopic image display to allow an observer to view a stereoscopic image by using the parallax between the right and left eyes. To this end, a striped image pattern obtained by alternately arranging strips of right and left parallax images representing different views of a scene is displayed so as to be observed through a parallax barrier (page 2, lines 17 to 30). The image display arrangement (Figures 1 and 2 and the corresponding description on pages 4 to 8, in particular page 7, lines 20 to 31) comprises, in particular, a first display means 46 with first (R1, R3, ...) and second (L2, L3, ...) stripe areas which, under the control of a stereoscopic image display means (image data processor 32), display stripe parallax images of a stereoscopic image for the right (OR) and the left (OL) eyes of an observer 400, respectively, and a second display means 28 which, under the control of a stereoscopic vision control means (controller 22), displays a parallax barrier pattern (A, B), such that the stripe parallax images

displayed on the first and the second stripe areas of the first display means are respectively observed by the observer with his right and left eyes (Figure 2).

3.2.1 The apparatus of document D5 further comprises means for setting a window on the second display means so that the parallax barrier pattern is only displayed in either the window or in the complementary part of the window. The stereoscopic image is then displayed either in the window or in the complementary part of the window while a non-stereoscopic image is displayed in the complementary part of the window or in the window, respectively (Figures 7B and 7C together with page 4, lines 18 to 32, page 5, lines 52 to 57, and page 8, lines 26 to 31). Thus, the means for setting a window on the second display means also sets the corresponding window on the first display means so that the image displayed by the first display means is stereoscopic only in the window or in the complementary part of the window depending on whether the parallax barrier pattern is being displayed by the second display means in the window or in the complementary part of the window, respectively.

Document D5 also mentions means for monitoring the head position of the observer and for inverting the phase of the parallax barrier pattern, or alternatively for shifting by one pixel the parallax barrier pattern, when the observer moves to the right or to the left by the interval between the pupils (page 3, lines 19 to 22 together with page 9, lines 1 to 13, and page 6, lines 4 to 8). Nonetheless, although these means allow for the determination of the positional relationship between the observer's eyes, the parallax barrier

pattern and the stripe areas of the display, contrary to the view expressed by the examining division in the decision under appeal, these means alone do not allow for the determination of whether or not the stripe images for the right and left eyes displayed on the window are respectively displayed on the first and second stripe areas as claimed.

It follows that the information processing apparatus defined in claim 1 differs from the apparatus disclosed in document D5 essentially in that

- (a) while in document D5 the stereoscopic image and the parallax barrier pattern are respectively displayed in the second and in the first display means only in the window or in the complementary part of the window, in claim 1 they are displayed in both the window and the complementary part of the window, thus displaying a first stereoscopic image in the complementary part of the window and a second stereoscopic image in the window (first and last paragraphs of the characterizing part of claim 1), and
- (b) the apparatus of claim 1 further includes means for determining whether or not the stripe parallax images for the right and the left eyes of the stereoscopic image displayed in the window are displayed on the corresponding first and second stripe areas of the first display means, respectively, and means for, in the negative alternative, changing the position of the image within the window or interchanging the stripe images of the image displayed in the window so

that the stripe parallax images for the right and the left eyes displayed in the window are displayed on the corresponding first and second stripe areas of the first display means (second and third paragraphs of the characterizing part of claim 1).

Thus, - unlike claim 1 of the requests upon which the decision was based - claim 1 as presently amended makes clear that the window section and the complementary section of the display each displays an image of the stereoscopic type, and that the changing means - which essentially adjust the image displayed in the window to bring the stripe images in registration with the corresponding stripe areas to ensure a proper stereoscopic vision - operates on the image displayed within the window without however affecting the image displayed in the complementary section of the window in the first display means.

3.2.2 According to the disclosure of the application and the appellant's submissions, once the whole stereoscopic display arrangement has been adjusted for proper stereoscopic vision of a stereoscopic image by an observer, when a second stereoscopic image is displayed in a window set at a desired position of the display, the strip images of the second stereoscopic image and the constituents of the arrangement may not be set at the appropriate relative positions for a proper stereoscopic vision of the second stereoscopic image by the observer (Figures 22 and 23 together with page 5, line 3 to page 6, line 16, Figures 6 and 7 together with page 19, lines 1 to 5, and page 17, lines 22 to page 18, line 9). In particular, depending on the

selected position of the window, the second stereoscopic image may be displayed to the observer as a reversed stereoscopic image (page 6, line 3 to page 7, line 6, and page 18, line 10 to page 19, line 5). According to the disclosure of the invention, this adverse effect is corrected as claimed, i.e. by adjusting features of the image displayed in the window to render it suited for a proper stereoscopic vision of the same (claims and page 7, lines 9 to 24, and page 34, lines 15 to 20).

It follows that the technical contribution of the distinguishing features of claim 1 identified in point 3.2.1 above over the disclosure of document D5 is the display of a second stereoscopic image in a window at a desired position within the display of a first stereoscopic image, whereby, if needed, the image display arrangement is adjusted so that the observer also views the second stereoscopic image displayed in the window as a proper stereoscopic image.

Accordingly, the problem solved by the apparatus of claim 1 over the disclosure of document D5 can be seen in improving the stereoscopic image display capability of the apparatus without compromising a proper stereoscopic vision of the stereoscopic image content displayed by the apparatus.

3.2.3 The disclosure of document D5 only contemplates the possibility of displaying a stereoscopic image either in a window section of the display arrangement or in the complementary section, while a non-stereoscopic image is displayed in the other one of the sections (Figures 7A and 7B together with page 4, lines 18 to 32,

and page 8, lines 29 to 31), and the document contains no hint whatever towards the simultaneous display of stereoscopic images within both the window section and the complementary section of the first display means (page 2, lines 31 to 47).

Document D1 considered by the examining division in its decision discloses a stereoscopic image display arrangement of the same parallax barrier type as that of document D5, i.e. based on stripped stereoscopic images 7 displayed in registration with a parallax barrier display 4 arranged to direct the right and left stripped stereoscopic images to the corresponding eyes of the observer (Figure 1 together with the abstract and claim 1). The disclosure of the document is, however, confined to the display of one single stereoscopic image on the whole display means.

Thus, none of the documents considered by the examining division discloses or suggests solving the problem of improving the stereoscopic image display capability formulated above by simultaneously displaying two stereoscopic images on a display means, let alone by displaying one of the stereoscopic images within a window set at a desired position of the other one of the stereoscopic images.

In addition, even assuming that the skilled person would have considered the possibility of displaying in the stereoscopic imaging arrangement of document D5 not just one but both images as stereoscopic images, so that he would then have been confronted with the subsequent problem of the positional registration of two different stereoscopic images with the parallax

barrier pattern and the eyes of the observer, none of the available documents would have prompted the skilled person towards the claimed combination of features. In particular, each of documents D1 and D5 teaches to track the position of the observer's head so as to adjust the position of the parallax barrier to bring the left and right images displayed through the parallax barrier in registration with the observer's eyes (document D1, abstract and column 2, lines 39 to 57, column 3, lines 16 to 65, and column 4, line 21 *ff.*, and document D5, page 9, lines 1 to 13), document D1 teaching, in addition, adjusting the features of the image itself as an alternative to adjusting the position of the parallax barrier (column 3, lines 16 to 19). The application of these teachings to the problem of the positional registration of the displayed stereoscopic images with the stereoscopic arrangement would then have at the most suggested adjusting the whole displayed image and/or the whole parallax barrier display with respect to one another so as to maintain the whole stereoscopic arrangement in registration with the observer's eyes, not however to adjust only the image section of the stereoscopic image that is displayed within the window with respect to the parallax barrier without affecting the complementary image section of the image as claimed in order to compensate - not for movements of the observer's head as is the case in documents D1 (column 3, lines 16 to 19) and D5 (page 3, lines 19 to 22) - but for the lack of registration between the stripe images of only the stereoscopic image displayed in the window and the stripe areas of the display means that arises depending on the relative position of the window in the first

stereoscopic image even when the observer does not change position.

Thus, even though documents D1 and D5 disclose the adjustment of the stereoscopic display arrangement, neither document D1 nor document D5 gives a hint towards the simultaneous display of first and second stereoscopic images and towards the adjustment of the features of the second stereoscopic image displayed on a window of the first stereoscopic image as claimed.

3.3 In view of the foregoing, the Board concludes that the subject-matter of claim 1 does not result in an obvious way from the prior art considered by the examining division in the contested decision. In addition, after consideration of the remaining documents cited in the search report, the Board is satisfied that the subject-matter of claim 1 involves an inventive step over the available prior art (Article 56 EPC).

4. *Claims 2 to 25 - Patentability under Article 52(1) EPC*

Independent claim 13 is directed to a method of performing stereoscopic display, the steps of which are essentially in one-to-one correspondence with the functional features of the different means of the information processing apparatus defined in claim 1.

Claim 25 defines a storage medium storing computed implementable instructions for programming a computer to carry out the method in accordance with claim 13, and consequently the storage medium contains features which - beyond the normal physical interaction with the computer - specifically direct the computer to carry



out the functional technical features of the method of claim 13.

Dependent claims 2 to 12 and 14 to 24 concern particular embodiments of the subject-matter of claims 1 and 13, respectively.

It follows that claims 2 to 25 also define patentable subject-matter under Articles 52(1), 54 and 56 EPC for reasons analogous to those put forward in point 3 above with regard to the subject-matter of claim 1.

5. In view of the above, the decision under appeal is to be set aside. In addition, being satisfied that the patent application as amended according to the present request of the appellant and the invention to which it relates meet the requirements of the EPC (Article 97(2) EPC), the Board, in accordance with Article 111(1) EPC, considers it appropriate to exercise favourably the power within the competence of the examining division to order grant of a patent.

**Order**

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

1. The decision under appeal is set aside.
  
2. The case is remitted to the department of first instance with the order to grant a patent on the basis of the following application documents:
  - claims 1 to 12, the text of claim 13 on pages 39 and 40, the text of claim 22 on page 43, and claims 23 to 25 as filed with the letter dated 22 April 2004, and the text of claim 13 on page 41, claims 14 to 21, and the text of claim 22 on page 42 as filed with the letter dated 15 September 2005,
  
  - description pages 1, 7 to 9, 9a, 10, 12, 13, 26 to 29 and 31 to 34 as filed with the letter dated 22 April 2004, description pages 2 to 6, 11, 14, 15, 17 to 25 and 30 as originally filed, and description page 16 as filed with the letter dated 15 September 2005, and
  
  - drawing sheets 1/18 to 18/18 as originally filed.

The Registrar:

The Chairman:

P. Martorana

A. G. Klein