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Datasheet for the decision of 8 February 2011

Case Number: T 0258/07 - 3.5.04

Application Number: 99118032.4

Publication Number: 0971540

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Language of the proceedings: EN

Title of invention:
Omniview motionless camera orientation system

Patentee:
INTERACTIVE PICTURES CORPORATION

Former Opponent:
Rehse, H.

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 100(a)

Keyword:
"Inventive step (no for all requests)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0258/07 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 8 February 2011

Appellant: (Patent Proprietor)
INTERACTIVE PICTURES CORPORATION
Suite 100
1009 Commerce Park Drive
Oak Ridge
TN 37830 (US)

Representative:
Stephen, Robert John
Olswang LLP
90 High Holborn
London WC1V 6XX (GB)

Former Opponent:
Rehse, H.
Jettkorn 6
D-24146 Kiel (DE)

Representative:
Tönnies, Jan G.
Boehmert & Boehmert
Nordemann und Partner
Niemannsweg 13
D-24105 Kiel (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 7 December 2006 revoking European patent No. 0971540 pursuant to Article 102(1) EPC 1973.**

Composition of the Board:

Chairman: F. Edlinger
Members: M. Paci
B. Müller

Summary of Facts and Submissions

I. This is an appeal by the patent proprietor against the decision of the opposition division revoking European patent No. 0 971 540.

II. Opposition had been filed against the patent as a whole, based on Article 100(a) EPC 1973 (novelty and inventive step) and Article 100(c) EPC 1973.

III. Following the withdrawal of the opposition by the sole opponent, the opposition division continued the opposition proceedings of its own motion pursuant to Rule 60(2) EPC 1973 in conjunction with Article 101(1) EPC 1973.

IV. In the reasons for the decision under appeal the opposition division held that the subject-matter of claims 1 and 13 did not involve an inventive step in view of

D1: JP 02 127877 A & corresponding Patent Abstract of Japan

and the skilled person's common general knowledge.

V. With the statement of grounds of appeal the appellant (patent proprietor) filed sets of amended claims according to several auxiliary requests.

VI. In an official communication annexed to the summons to oral proceedings, the board expressed *inter alia* the provisional opinion that the subject-matter of claim 1 of the patent as granted (main request) and of each of

the auxiliary requests did not involve an inventive step in view of D1 and common general knowledge.

VII. With a letter dated 7 January 2011, the appellant filed sets of claims according to a first through sixth auxiliary requests, replacing all previous auxiliary requests.

VIII. Oral proceedings were held on 8 February 2011, at the end of which the board announced its decision.

IX. The appellant finally requested that the decision under appeal be set aside and the patent maintained as granted. If this main request was not deemed allowable, the appellant requested that the patent be maintained on the basis of the claims of one of the first through sixth auxiliary requests, in that order, all filed with the letter of 7 January 2011 except for the third auxiliary request which was filed in the oral proceedings to replace the previously filed third auxiliary request.

X. Claim 1 according to the appellant's **main request** (the patent as granted) reads as follows:

"A system for providing perspective corrected views of a selected portion of a received optical image captured using a wide angle lens (1), the received optical image being distorted, the system comprising:

image capture means (3) for receiving signals corresponding to said received optical image and for digitising said signal;

input image memory means (4) for receiving said digitised signal;

input means (12,13) for selecting a portion of said received image to view;

image transform processor means (5) for processing said digitised signals to produce an output signal corresponding to a perspective corrected image of said selected portion of said received image;

output image memory means (9) for receiving said output signal from said image transform processor means (5); and

output means (10,11) connected to said output image memory means (9) for recording or displaying said perspective corrected image of said selected portion; CHARACTERISED IN THAT

said image transform processor means (5) comprises transform parameter calculation means for calculating transform parameters for said selected portion of said image and processes said digitised signal based on said calculated transform parameters to generate said output signal."

Claim 1 according to the appellant's **first auxiliary request** differs from claim 1 according to the main request by the insertion of the phrase ", the system utilising no moving parts" after "captured using a wide angle lens (1)".

Claim 1 according to the appellant's **second auxiliary request** differs from claim 1 according to the main request by the addition at the end of the claim of the phrase ", and wherein the system apparatus can provide an image of any portion of the viewing space within a hemispherical field-of-view without moving the system apparatus".

Claim 1 according to the appellant's **third auxiliary request** differs from claim 1 according to the main request by the addition at the end of the claim of the phrase ", and wherein the portion may be any portion of the received optical image".

Claim 1 according to the appellant's **fourth auxiliary request** differs from claim 1 according to the main request by the addition at the end of the claim of the phrase ", and wherein the system is commensurate with a zoom function that allows a change in the field of view of the output image".

Claim 1 according to the appellant's **fifth auxiliary request** differs from claim 1 according to the main request by the addition at the end of the claim of the phrase ", and wherein system is commensurate with a zoom function that allows a change in the field of view of the output image, the magnitude of the zoom provided being a function of the resolution of the input camera, the resolution of the output display, the clarity of the output display and the amount of picture element (pixel) averaging that is used in a given display".

Claim 1 according to the appellant's **sixth auxiliary request** differs from claim 1 according to the main request by the addition at the end of the claim of the phrase ", and wherein the transformations are performed at real time video rates".

XI. In the decision under appeal the opposition division's finding of lack of inventive step regarding claim 1 of the patent as granted was essentially based on the following considerations:

D1, the closest prior art, discloses a system according to the preamble of claim 1. More specifically, the system of D1 uses a fisheye (wide-angle) lens to take a picture of a scene and stores the digitised picture data in a memory. The user can then use input means for selecting one of nine predetermined portions of the stored picture. Distortion factors corresponding to the nine predetermined overlapping portions are pre-stored at respective addresses in a fisheye lens distortion factor storage section. The pre-stored distortion factors associated with the selected portion of the picture are used by the system for correcting the distortion of the selected portion and displaying the resulting corrected image.

The system of claim 1 thus differs from D1 only by the features in the characterising portion i.e. in that "said image transform processor means (5) comprises transform parameter calculation means for calculating transform parameters for said selected portion of said image and processes said digitised signal based on said calculated transform parameters to generate said output signal".

The wording of claim 1 covers the case where there are a limited number of selectable portions, as in D1. Similarly, the input means for selecting a portion of the image in claim 1 need not be different from those in D1.

Essentially, the sole distinguishing feature of claim 1 with respect to D1 is therefore that the pre-stored tables of D1 are replaced by real-time calculations.

It is common general knowledge that calculation processors suitable for such real-time calculations were already available years before the priority date of the patent, as illustrated by, for example, the IBM-AT personal computer and the 8088 Intel processor. The fact that, as alleged in the sworn statement of Mrs Wallis filed with the patent proprietor's letter dated 12 August 2005, in the summer of 1991 there were still optical laboratories which did not use computers does not alter the fact that personal computers and microprocessors were already widespread.

Whether replacing pre-stored tables, as in D1, by real-time calculations, as in the system of claim 1, leads to faster or slower processing cannot be determined.

Hence the only objective technical problem solved by the subject-matter of claim 1 with respect to D1 is that of finding an equivalent way of performing the distortion correction.

Solving this problem by replacing the pre-stored tables of D1 by real-time calculations is considered obvious in view of the fact that calculation processors were available years before the priority date of the patent.

Accordingly, the system of claim 1 lacks an inventive step in view of D1 in combination with common general knowledge.

XII. The appellant essentially argued as follows:

Main request

It is common ground that D1 represents the closest prior art and discloses the features in the preamble of claim 1 of the patent.

D1 discloses an electronic still camera employing a fisheye lens to enable the distortion correction of a part of the image. The whole image is divided up into nine predefined subsections. Lens distortion data for each of the nine predefined subsections is stored in a static memory. When one of the nine predefined subsections of the distorted image is selected for viewing by the user, the corresponding distortion data is read from the static memory and used by an image correction circuit to correct the selected subsection of the distorted image to be viewed. In D1 the user may then view the whole image or one of nine fixed subsections.

Using the problem-and-solution approach, the system of claim 1 differs from that of D1 in that claim 1 requires the presence of transform parameter calculation means for calculating transform parameters for the selected portion of the image. An image transform processor means then processes said digitised signal based on the calculated transform parameters to generate an output signal. Instead, the system of D1 relies upon predefined distortion factors. This difference was accepted by the opposition division.

The image transform processor means has the technical effect of allowing calculation of parameters for any part of an image, not just for predefined portions as in D1.

The objective technical problem to be solved is therefore the provision of a system for providing a corrected view of any selected portion of a received optical image which is distorted. The appellant disagrees with the statement of the opposition division that the only objective technical problem solved by the subject-matter of claim 1 with respect to D1 is that of finding an equivalent way of performing the distortion correction. It maintains that the system of claim 1 provides a vastly more flexible approach to viewing the image than the pre-stored tables provided in D1.

The appellant disputes the opposition division's conclusion that common general knowledge about the availability of calculation processors would be combined with D1 to arrive at the present invention. The appellant's reasons can be summarised as follows:

- There is no mention of any problem in D1.
- Even if there is a problem, there is no indication to use a computer-based solution.
- Even if there is a problem, an alternative solution appears more straightforward.
- The skilled person would not arrive at the claimed invention, which the opposition division has stated would be perceived as potentially disadvantageous over the prior art.
- Even if computers were considered, there is no suggestion that they would be used to provide transform parameter calculation means.

Regarding the common general knowledge, the opposition division has made assertions based simply on the general use of computers at the priority date. However, the skilled person would have been in the field of optical components, and the use of computerised real-time transformation (for example, within the system of D1) would not have been contemplated in that field at the priority date. As evidence, the appellant filed, with letter dated 12 August 2005, a sworn declaration by Mrs Wallis attesting to the fact that computers were not generally used in optical laboratories at the priority date of the patent, other than for word processing. This sworn declaration made by a person who worked in the technical field concerned should be given more weight than mere assertions made by the opposition division.

Moreover, even assuming, as the opposition division did, that computer means were commonly used in optical labs at the priority date and that the skilled person was aware of the problem of the system of D1, the skilled person would have arrived at a different solution. Indeed, in order to provide more flexibility in the selection of a portion of the image, the straightforward solution would have been to increase the number of predefined portions by increasing the number of pre-stored tables, rather than by making the system more complex by the introduction of a new element (a transform parameter calculation means).

For the above reasons, the subject-matter of claim 1 of the patent involves an inventive step.

First auxiliary request

The additional feature ("the system utilising no moving parts") inserted into claim 1 only serves to overcome an objection under Article 100(c) EPC 1973. The appellant does not dispute that this feature is known from D1.

Second and third auxiliary requests

The additional features further clarify that, in complete contrast to the prior art, the user can view any part of the field of view. In the prior art the user is restricted to only nine possible predefined views.

Fourth auxiliary request

The additional feature specifies that the system is commensurate with a zoom function that allows a change in the field of view of the output image. There is no indication in D1 that the image is magnified, only that a selected part of the image is corrected for distortion. Use in the present invention of transform parameter calculation means allows the image to be magnified as well as corrected for distortion.

Fifth auxiliary request

The additional features further clarify that the zoom is not a fixed zoom but rather that its magnitude can be varied, as impacted by the different specified features.

Sixth auxiliary request

The additional features further specify that the step of transforming the image is performed at real-time video rates. D1, which relates to an electronic still camera, provides no indication that such rates of transformation are contemplated or achieved.

Reasons for the Decision

1. The appeal is admissible.

Inventive step (Article 100(a) EPC 1973 and Article 56 EPC 1973)

Main request

2. The closest prior art

It is undisputed that D1 represents the **closest prior art** for the system of claim 1 of the granted patent. D1 discloses an electronic still camera providing a perspective-corrected view of a selected portion of an image captured by a fisheye lens. The captured image is digitised, stored in a memory (picture data memory 13) and divided into nine predefined overlapping portions (shown in fig. 3(A) to 3(I)). Lens distortion data for each of the nine predefined portions is pre-stored in a memory (fisheye lens distortion factor storage section 15). When one of the nine predefined portions of the distorted image is selected for viewing by the user, the corresponding lens distortion factor is read from the memory and used by an image correction circuit

to correct the selected portion of the distorted image to be viewed.

The appellant does not dispute that D1 discloses a system according to the preamble of claim 1 of the patent.

3. The distinguishing features

The system of claim 1 thus differs from D1 only by the features in the characterising portion i.e. in that "said image transform processor means (5) comprises transform parameter calculation means for calculating transform parameters for said selected portion of said image and processes said digitised signal based on said calculated transform parameters to generate said output signal".

In other words, the **difference** between the system of claim 1 and that of D1 is that the former comprises calculating means for calculating transform parameters for an unspecified number of selected portions in order to correct the image distortion, whereas the latter relies on a specified number of pre-stored lens distortion factors for correcting the image distortion. The pre-stored distortion factors of D1 are obtained in advance by performing calculations similar to those performed by the system of claim 1. In the following the board will assume, in favour of the appellant, that the transform parameter calculation means of claim 1 actually calculates the transform parameters for any portion which is selected by the input means. This will be referred to as "real-time" calculation in order to distinguish this feature over a correction of image

data of a predetermined number of selectable portions by multiplication with a corresponding calculated pre-stored distortion factor, as disclosed in D1.

4. The objective technical problem

The board concurs with the appellant that, on the basis of the above assumption, the **technical effect** resulting from the distinguishing features is not only the provision of an "equivalent way of performing the distortion correction" to that of D1 but also of allowing correction of the distortion of the picture for any selected portion of an image, whereas the selected portion is limited to predefined portions of the image in D1.

The **objective technical problem** to be solved is therefore the provision of a system for providing a corrected view of any selected portion of a received distorted optical image.

5. The person skilled in the art

Both the present invention and D1 describe systems for correction of image distortion which require expert knowledge of both optics and electronics. The person skilled in the art for the present invention must therefore be regarded as having expert knowledge of both optics and electronics.

6. The common general knowledge

It is undisputed that at the priority date of the patent a wide range of electronic integrated circuits

were commonly used in electronics. Such integrated circuits included in particular various types of memories, application-specific integrated circuits (ASICs), microcontrollers and microprocessors, as acknowledged in paragraph [0027] of the patent specification.

7. Obviousness

The values of the pre-stored distortion factors of D1 are obtained in advance by performing calculations similar to those performed in real time by the transform parameter calculation means of the system of claim 1. In view of these similarities, the board is convinced that the skilled person, when starting from the system of D1, would have considered the alternative solution of performing the calculations in real time instead of pre-storing the calculated factors.

The relevant question for the proper assessment of inventive step in accordance with the so-called "could-would approach" established by the case law of the boards of appeal is therefore whether the skilled person would have done so in expectation of the advantages actually achieved (see section I.D.5 of the Case Law of the Boards of Appeal of the EPO, 6th edition 2010).

It is not disputed that at the priority date of the patent the technology of integrated circuits was sufficiently advanced to allow a person skilled in electronics to design and build such calculation means (see paragraph [0027] of the patent specification).

The pros and cons of stored pre-calculated data versus real-time calculations were well-known to a person skilled in electronics. Pre-calculated data stored in a memory can produce results fast, but may require substantial amounts of memory space and are rather inflexible to handle, in the case of D1 requiring the division of the hemispherical image into nine predefined portions. Real-time calculations were known to be more flexible because they were usually run by a mix of hardware and software (e.g. a microprocessor and the appropriate program), but required more time and more computing power.

Which of the two solutions the skilled person preferred, would depend on the intended use of the system, as well as on the performance of available memories and computing power. On the one hand, if speed were regarded as more important than increased flexibility in the selection of a portion of the image, then the skilled person would have chosen the solution of D1 with pre-stored distortion factors. If, on the other hand, flexibility was the most important factor, the alternative solution with real-time calculation means would have been regarded by the skilled person as a more desirable solution.

8. The appellant's arguments

Re the argument that the use of computerised real-time transformation would not have been contemplated in the field of optical components at the priority date

As explained under points 5 and 6 *supra*, the technical field of the present invention (and of D1) is at the

juncture of optics and electronics. It is not limited to optical components only, as implied by the appellant.

At the priority date of the patent, well-known electronic integrated circuits such as microprocessors or ASICs were available for performing such real-time calculations (see paragraph [0027] of the patent specification). The appellant has not submitted any convincing argument as to why the skilled person, with expert knowledge of electronics, would not have used such circuits. Nor is there a specific choice or configuration of calculation means disclosed in the opposed patent which made it possible to overcome a technical prejudice against using such calculation means. The sworn declaration made by Mrs Wallis, filed with letter dated 12 August 2005, attests to the fact that computers were not used in her company's optical laboratory at the priority date of the patent, other than for word processing. However, whether computers were used in the optical laboratory at Mrs Wallis' company has little bearing on the question whether the skilled person - skilled in both optics and electronics - would have replaced pre-stored distortion factors in electronic memories of the camera of D1 by real-time calculating means. As explained under section 7 *supra*, the calculation means considered by the skilled person would have been either a microprocessor or a specialised integrated circuit (e.g. an ASIC), not a (general-purpose or personal) computer. Hence the appellant's arguments based on Mrs Wallis' statement fail to convince the board.

Re the argument that the skilled person would have arrived at a different solution by increasing the number of predefined portions of the image

The board agrees with the appellant that the skilled person would also have considered increasing the number of predefined portions of the image in the system of D1. In D1, the number of pre-stored distortion factors is proportional to the number of predefined portions of the image. Thus increasing the number of selectable portions of the image, in order to increase flexibility in the selection by the user of the portion of interest, would also increase the size of the memory required to store these data. A larger memory inevitably costs more and/or takes more space. The board notes that the system of D1 already uses more predefined portions than strictly necessary to cover the whole image, since these portions are overlapping. Five of these nine portions (for instance, those shown in fig. 3(A), 3(B), 3(D), 3(F) and 3(H)) would have sufficed to cover the whole image. Hence this may be taken as an indication of a compromise between flexibility and cost, and it would have been obvious to the skilled person that the balance could have been tilted further in favour of flexibility by further increasing the number of predefined portions.

However, the board disagrees with the appellant that the above route towards greater flexibility would have dissuaded the skilled person from also considering real-time calculations. Indeed, significantly increasing the number of predefined portions would have been more complex and costly while only increasing flexibility to a limited extent. The skilled person

would thus have arrived at the conclusion that real-time calculations were preferable where high flexibility in the selection by the user of a portion of the image was of particular importance.

Re the argument that the claimed invention would have been perceived by the skilled person as potentially disadvantageous over D1

As explained in the previous paragraph and in section 7 *supra*, the skilled person, starting from D1, would have perceived the alternative solution of using real-time calculation means as having both advantages (increased flexibility) and disadvantages (more computing power, possibly involving higher costs) compared to the system of D1 using pre-stored distortion factors. Depending on the intended use of the system, the skilled person would have considered that, at least for some applications, the advantages of real-time calculation outweighed its disadvantages.

9. Conclusion

For the above reasons, the board concludes that the subject-matter of claim 1 according to the main request does not involve an inventive step in view of D1 and the skilled person's common general knowledge.

Accordingly, the appellant's main request is not allowable.

First auxiliary request

10. The additional feature ("the system utilising no moving parts") inserted into claim 1 serves to overcome a possible objection under Article 100(c) EPC 1973. The appellant does not dispute that this feature is known from D1 which discloses a system also utilising no moving parts for the purpose indicated in present claim 1.

11. Hence, the conclusion reached for claim 1 according to the main request also applies to claim 1 of the first auxiliary request.

12. Accordingly, the first auxiliary request is not allowable.

Second and third auxiliary requests

13. The additional features further clarify that, in contrast to D1, the user can view any portion of the field of view.

14. The reasoning set out in points 2 to 8 *supra* applies to claim 1 according to the second and third auxiliary requests, because it is based on the assumption that the user can select any portion of the received image without being limited to selecting from predefined portions.

15. Hence the second and third auxiliary requests are not allowable.

Fourth and fifth auxiliary requests

16. The additional feature in claim 1 according to the fourth auxiliary request specifies that the system is commensurate with a zoom function that allows a change in the field of view of the output image. The additional features in claim 1 according to the fifth auxiliary request further add that the zoom is not a fixed zoom but rather that its magnitude can be varied, as impacted by the different specified features.

17. It was well-known to the person skilled in the technical fields under consideration (see point 5 *supra*) that a digital zoom could be performed on a digital image (the image in D1 is digital) by simple image-processing and conversion techniques and that the magnitude of the digital zoom is always a function of the resolution of the input camera, the resolution of the output display, the clarity of the output display and the amount of pixel averaging that is used in a given display. The board therefore concludes that these additional features do not render inventive the subject-matter of claim 1 according to the fourth or fifth auxiliary request.

18. Hence the fourth and fifth auxiliary requests are not allowable.

Sixth auxiliary request

19. The additional features further specify that the step of transforming the image is performed at real-time video rates.

20. It is undisputed that fisheye lens cameras have been commonly used for surveillance purposes. It would therefore have been desirable for such purposes to take still pictures of the area under surveillance at short time intervals, ideally at real-time video rates. The skilled person would therefore have wanted to achieve this when starting from the camera of D1. Since, according to the patent specification, at the priority date the technology of integrated circuits was sufficiently advanced for calculating distortion corrections of a selected portion of an image at real-time video rates, this technology would also have been available for adapting the camera of D1. As already stated under point 8 *supra*, the opposed patent does not disclose a specific choice or configuration of calculation means which made it possible to overcome a technical prejudice against using such calculation means even in the context of calculation at real-time video rates.

21. Hence the subject-matter of claim 1 according to the sixth auxiliary request does not involve an inventive step in view of D1 and the skilled person's common general knowledge.

22. Accordingly, the sixth auxiliary request is not allowable.

Conclusion

23. Since none of the appellant's requests is allowable, the appeal must be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Fernández Gómez F. Edlinger