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D E C I S I O N
of 14 July 1995

Case Number: T 0872/93 - 3.5.1

Application Number: 85302924.7

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Title of invention:
Image modification

Patentee:
CROSFIELD ELECTRONICS LIMITED

Opponent:
Océ-Nederland B.V., Venlo

Headword:
Image modification/CROSFIELD ELECTRONICS

Relevant legal provisions:
EPC Art. 52(1), 56, 84, 102(3), 110(2), 113(1), 123(2)

Keyword:
"Claims fail to meet the requirements of the EPC as required by
Article 102(3)"

Decisions cited:
-

Catchword:
-



Case Number: T 0872/93 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 14 July 1995

Appellant: CROSFIELD ELECTRONICS LIMITED
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 27 July 93 revoking
European patent No. 0 160 526 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
G. Davies

Summary of Facts and Submissions

- I. European patent No. 0 160 526 was granted on 3 October 1990 on the basis of European patent application No. 85 302 924.7 filed on 25 April 1985 and claiming priority from GB application No. 8 410 860 dated 27 April 1984.

- II. Opposition to the patent in its full extent was submitted by the respondent on 26 June 1991, citing as grounds Articles 100(a) and (b) EPC, in that the subject-matter of claims 1 and 6 was not sufficiently disclosed in the patent, and in that the material of all the claims lacked an inventive step.

Both a main request from the proprietor for maintenance of the patent as granted and an auxiliary request for maintenance with amended claims were rejected and the patent was revoked for lack of inventive step in a decision dated 27 July 1993. The opposition division however held that the disclosure of the patent was sufficient.

- III. Notice of appeal was submitted by the proprietor on 23 September 1993 and the appropriate fee was paid on the next day. A statement of grounds was received on 24 November 1993. Included in this statement were main and auxiliary requests for maintenance of the patent on the basis of one of the corresponding new sets of claims 1 to 7 or 1 and 2 submitted with the statement. The statement of grounds further contained arguments for the inventive step of the material of the amended claims, and a conditional request for oral proceedings.

The independent claims of the main and auxiliary requests are as follows.

Main request:

"1. A method of modifying a boundary of an image defined by a number of colour separations each being represented by digital data defining the content of a respective plurality of cells, the digital data indicating for each cell whether the respective colour is "present" or "absent", the method comprising for one or more of the colour separations selecting a mask of required dimensions; and in a single pass electronically scanning the respective plurality of digital data corresponding to a region including a boundary with the selected mask, at each position of the mask determining whether the portion of the colour separation within the mask includes the boundary, and, if it does, modifying the digital data at another, predetermined position within the mask to change the content of the respective cell or cells of the digitally defined colour separation at that position to represent colour "present" or colour "absent" so as to modify the position of the boundary."

Independent apparatus claim 5 specifies features equivalent to those of claim 1.

Auxiliary request:

"1. Apparatus for modifying a boundary of an image defined by a number of colour separations each being represented by digital data defining the content of a respective plurality of cells, the digital data indicating for each cell whether the respective colour is "present" or "absent", the apparatus comprising a sequencer (16) for enabling a mask of required dimensions to be selected; processing means (15) for

carrying out in a single pass the steps of electronically scanning along a plurality of scan lines with the selected mask the respective plurality of digital data, determining at each position of the mask whether the portion of the colour separation within the mask includes the boundary, and modifying the digital data at another, predetermined position within the mask to change the content of the respective cell or cells of the digitally defined colour separation to represent colour "present" or colour "absent" so as to modify the position of the boundary; a store (12) containing spatial and high resolution data, from which the digital data is fed to a first store (13), the first store (13) having A x B cells where A is at least the number of cells in a single scan line and B is at least equal to the number of cells defining one dimension of the mask, and wherein the sequencer (16) controls the output of data from the first store (13) to the processing means (15) for scanning and modifying the data from the first store; a second store (17) having C x D cells where C defines a plurality of scan lines and D defines a plurality of scan lines at least equal to another dimension of the mask to receive first output data which has been processed by the processing means (15) and to output the received data to the processing means for further scanning and, in a direction orthogonal to the direction of scanning of data from the first store (13), to produce second output data whereby a mask is scanned along a boundary of the image to grip the boundary; and a shift register (18) to transfer the second output data to a controller to output the second output data via printer while data defining further scan lines continues to be supplied to the first store (13)."

- IV. The respondent requested in a response received on 8 April 1994 that the appeal be dismissed, arguing mainly that the material of the new independent claims

of both requests still lacked an inventive step, and disputing the admissibility of the new amendments of the claims. A conditional request for oral proceedings was also made.

- V. In a letter received 12 July 1994 the appellant withdrew his request for oral proceedings and indicated that a decision was awaited "in due course".

In consideration of Article 113(1) the Board issued a communication pursuant to Article 110(2) EPC giving the results of the preliminary examination of the appeal carried out by the rapporteur. No observations were filed by the appellant within the specified time limit. The respondent indicated his satisfaction with the preliminary opinion of the Board.

- VI. The documents considered relevant in the Board's communication were:

ref. 1 = EP-A-0 096 084
ref. 2 = US-A-4 204 232

both cited in the opposition proceedings, and

SR2 = IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE, vol. PAMI-4, no. 3, May 1982, 331-335, IEEE New York, US; R.A.ULICHNEY et al.: "Scaling binary images with the telescoping template"
SR3 = EP-A-0 053 935

from the search report.

- VII. The appellant argued in the statement of grounds that the differences between the system disclosed in ref. 1 and the invention had been undervalued in the revocation decision and that these differences were increased by

the new amendments. It was further argued that the second document taken into account by the opposition division, ref. 2, would not have been considered by the skilled man.

VIII. In the Board's communication the rapporteur assessed the issues as follows:

"5. The questions at issue appear to be the allowability of the amendments made to the claims of the current requests as compared with those granted (respondent's letter of 8 April 1994, pages 1 and 4), and the inventiveness of the currently claimed material.

6. Allowability of the amendments.

...

6.3 The phrase "in a single pass" of the second amendment is apparently not used in the patent as granted and its meaning, in this context, is unclear. There is an indication in the statement of grounds that it is intended to mean that any datum is read only once from disk store 12, but this meaning is arbitrarily imposed, there being no support for such an interpretation in the description or in the general meaning which would be assigned by the skilled man. To quote the statement of grounds, "there is a degree of feedback through temporary store 17 but this is only to enable the mask fully to scan the data and in particular it should be noted that scanning of the same data by a particular dimension of the mask is never repeated." Laying aside any questions about the support for this statement in the patent, the skilled man would certainly classify the procedure described in this statement not as single-pass but as multi-pass, the data in a single store being scanned twice by the same processing means, one scan for each dimension of the mask.

Further the statement of grounds classifies the process of ref. 2 as multi-pass because it uses "several iterations". However when reference is made to ref. 2, it is evident that these "iterations" are in fact stages in a pipeline (figure 6 and column 5, line 10, to column 6, line 61), and that data passes through each stage in the pipeline only once. Therefore it is quite clear that if the process of ref. 2 is to be considered multi-pass then so is that of the patent.

Thus, this second amendment is unclear, in violation of Article 84 EPC. To the extent that any meaning can be inferred from it, the amendment is not supported by the description (also Article 84) and, since it is a newly introduced feature, constitutes an extension of the application as originally filed (Article 123(2))."

IX. With respect to the inventiveness of the subject-matter of the independent claims of the main request, the rapporteur argued as follows:

"7.1 The rapporteur is inclined to agree in general with the appellant's arguments (statement of grounds, points 6 to 11) distinguishing ref. 1 from the patent.

...

7.2 ... However, it would seem to the rapporteur that the material of the current independent claims 1 and 5 of the main request and claim 1 of the auxiliary request is still lacking in inventive step, for the reasons set out as follows.

7.3 Ref. 1 and the prior art cited therein establish that the problem of adjusting the boundaries of colour separations to avoid white streaks in a final print was already appreciated in the field of digital image processing at the priority date of the patent. In

particular it had been dealt with in a case where the colour separations were binary, ie each pixel merely represented "colour present" or "absent" (ref. 1, page 1, line 32, to page 2, line 22). That is, while no details are given in ref. 1, it was known to "modify a boundary of an image defined by a number of colour separations each being represented by digital data defining the content of a respective plurality of cells, the digital data indicating for each cell whether the respective colour is "present" or "absent" (using the new formulation for convenience).

7.4 The problem faced by the skilled man therefore was to find an efficient way of adjusting boundaries of a binary image. He would therefore certainly consider documents in the prior art relating to black-and-white images, where they relate to a similar problem. In particular, he would consider any of ref. 2 (cf. respondent's letter dated 8 April 1994, page 2, "Re 4"), SR2 and SR3.

7.5 Moreover, it would immediately be clear to the skilled man that the process of "thickening" an image is identical to that required for gripping. From the teaching of eg page 334 of SR2 (which it may be noted was cited in a "Y" combination with ref. 1 in the search report of the application) he would see that he can scan the image with a rectangular mask of varying dimensions, according to the effect required, "at each position of the mask determining whether the portion of the colour separation within the mask includes the boundary and, if it does, modifying the digital data at another, predetermined, position within the mask to change the content of the respective cell or cells of the digitally defined colour separation at that position to represent colour "present" or colour "absent" so as to modify the position of the boundary". In other words, the skilled

man would immediately arrive at the material of the independent claims of the main request, without the exercise of inventiveness (ignoring the inadmissible "in a single pass")."

- X. Discussing the additional features of the independent claim of the auxiliary request, the rapporteur pointed to further apparently unclear and contradictory features, putting forward his interpretation in the light of the description. The inventiveness was assessed as follows:

"7.6 Neither ref. 1 nor SR2 give a detailed implementation appropriate to the problem faced by the skilled man, in terms of the hardware to be employed. However, from ref. 2, also dealing with thinning and thickening, he would learn that a pipelined solution could be used, for a real-time system (figure 6 and column 5, line 10, to column 6, line 61, already cited above), ... Ref. 2 also shows multiple memories for consecutive lines of the image, and processing means so that what is read from a first memory is processed and passed on to a second memory, as well as the use of shift registers.

The system of the patent does not apparently show a continuous pipeline, because of the element of feedback mentioned in the statement of grounds. However, it would seem that choice and implementation of a particular variation in the range between processing a mask in one stage (as is the case, for example, in SR3) and processing it in a full pipeline of multiple stages as in ref. 2 would lie within the normal technical competence of the skilled man.

7.7 Thus it would seem that the additional details of the implementation specified in the independent claim of the auxiliary request do not overcome the lack of inventive step which is seen in the independent claims of the main request."

Reasons for the Decision

1. The appeal is admissible.

2. The appellant not having submitted any further arguments rebutting the analysis put forward by the rapporteur (Sections VIII to X above) and that analysis being considered to be convincing, it is concluded that the newly submitted claims of both the main and auxiliary requests fail to meet the requirements of the EPC, as required by Article 102(3) EPC. The independent claims are unclear and unsupported by the description (Article 84) and add new material (Article 123(2)), in particular through the new phrase "in a single pass" (see XIII above). They further appear to lack the inventive step required by Articles 52(1) and 56 EPC, as argued in IX and X above.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

M. Kiehl

P. K. J. van den Berg