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D E C I S I O N
of 30 May 1995

Case Number: T 0417/93 - 3.5.1

Application Number: 87309491.6

Publication Number: 0266173

IPC: H04N 1/46

Language of the proceedings: EN

Title of invention:
Colour image processing apparatus

Applicant:
CANON KABUSHIKI KAISHA

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 52(1), 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0417/93 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 30 May 1995

Appellant: CANON KABUSHIKI KAISHA
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Tokyo (JP)

Representative: Beresford, Keith Denis Lewis
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Decision under appeal: **Decision of the Examining Division of the European Patent Office dated 4 November 1992 refusing European patent application No. 87 309 491.6 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: A. S. Clelland
L. C. Mancini

Summary of Facts and Submissions

I. European patent application No. 87 309 491.6, filed on 27 October 1987 claiming a priority of 28 October 1986 and published under No. 0 266 173, was refused by a decision announced at oral proceedings held on 13 October 1992, with written grounds issued on 4 November 1992.

The reason given for the refusal was that the subject matter of independent Claim 1 filed during the oral proceedings lacked novelty having regard to the disclosure of the following prior art document:

D3: US-A-4 577 219.

II. On 1 December 1992 the applicant lodged an appeal against this decision, and paid the appeal fee. On 11 March 1993 a statement setting out the grounds of appeal was filed, together with a revised Claim 1 of an auxiliary request.

In a communication pursuant to Article 110(2) EPC, setting out potential objections under Articles 84, 83 and 56 EPC, reference was made inter alia to D3 and to the following document, cited by the examining division in the communication of 31 March 1994 and referred to, apparently erroneously, as "D2":-

D4: DE-A-3 408 321

In response to this communication the Appellant submitted a new, single, request comprising substantial amendments to the description and drawings, as well as two new independent claims. At oral proceedings held on 30 May 1995, these claims were further amended.

III. The Appellant's single request is the grant of the patent on the basis of the following documents:

Claims: 1 and 2 as filed on 30 May 1995;

Description: pages 1, 4, 5, 6, 9, 21, 24, 25, 29 and 31 as filed on 19 December 1994; 7, 8, 22, 23, 26 to 28 and 32 to 37 as originally filed (with amendments as requested 19 December 1994); the other pages having been deleted;

Drawings: sheets 1 to 9 submitted 19 December 1994.

IV. The claims read as follows:

"1. Colour photocopying apparatus comprising:

scanner means (121) for scanning a first colour original image to generate colour component signals;

storage means (1502, 1503, 1504) for storing colour component signals representative of the first colour original, means (124) for generating a colour image reproduction signal; and frame sequential apparatus for printing a colour image

and characterised in that the apparatus further comprises:
first selector means (1243-2) arranged to select different colour component signals during consecutive scans by the same scanner means of a second colour original image;

control means (19, 1501) arranged to read said colour component signals from said storage means in synchronism with said consecutive scans and to output a colour component signal of the same colour as the colour component signal selected by said first selection means,

and second selection means (1243-3) controlled by said control means to select between a colour component signal generated in one of said consecutive scans, and the outputted corresponding colour component signal read from said storage means

so as to generate a colour image reproduction signal in which selected portions of the colour component signals generated by scanning said colour original are replaced by colour component signals read from said storage means so that said frame sequential image prints an image which is a combination of said first and second original images.

2. A method of electrophotographically printing colour images comprising:

scanning a first colour original to generate colour component signals with a scanning device;

storing the colour component signals in memory;

carrying out sequential scans of a second colour original with the same scanning device to generate colour component signals;

selecting during each of said sequential scans a different one of the colour component signals;

accessing the memory in which the colour signals are stored in synchronism with said sequential scans so as during each scan to generate a colour component signal corresponding to the selected colour component signal;

and selecting between either the selected colour component signal generated by scanning or the corresponding colour component signal output from memory to generate a colour image reproduction signal for supply to frame-sequential reproduction apparatus, so that an image is reproduced which is a combination of both the first and second colour image originals."

V. The Appellant's arguments in support of the patentability of the subject-matter of the independent claims may be summarised as follows:

It had been accepted in the rapporteur's communications that at the priority date no photocopier capable of mixing two sequentially scanned images was known. To the extent that a problem could be defined in the case of an innovation of this kind, that problem had therefore not been how to mix images but how in general to add to the capabilities of a colour photocopier. While the Appellant accepted that it was known in other fields to combine images, e.g. by chroma key mixing in television systems, or by computer techniques in image processing systems as disclosed in D3, it was in itself an inventive step to consider adding this facility to a photocopier. The function of a photocopier at the priority date of the application had been simply to scan an image, perhaps process it in some way (such as changing a colour), and output it immediately. There was no hint in the normal concept of a photocopier which would lead to the idea of mixing two images. Further, the claims not only expressed this inventive concept but went further to specify the way in which the mixing was

accomplished, which was elegant and unobvious in the light of the prior art. The obvious implementation would have been to provide two memories for successively scanned images and then a complicated mixing and output arrangement as described in D3. Instead, the inventor had designed a system in which it was only necessary to store one image, which was mixed with the second image as that second image was scanned.

Reasons for the Decision

1. *Admissibility*

The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. *Added Subject-Matter*

The submitted amendments to the description, drawings and claims serve to excise a considerable amount of the originally filed subject-matter; they do not, in the Board's view, go beyond the disclosure of the original documents. The amended claims are further adequately clear and supported by the description. Hence the requirements of Articles 84 and 123(2) EPC are considered to be met.

3. *Sufficiency of Description*

The Board has also considered the question of whether the application satisfies the requirements of Article 83 EPC. There is no clear disclosure of various important elements of the system, for example a mechanism for specifying what respective parts of the final image are supplied by the stored first image and the scanned second image, or how and at what stage the additive RGB

colour components are converted to subtractive CYMB components. However, in the light of the Board's negative conclusion below on the issue of inventive step it has not proved necessary to decide on this point.

4. *Novelty and Inventive Step*

4.1 Turning to novelty and inventive step, the Board considers that the most appropriate starting point is a colour photocopier comprising colour reader and colour printer, as known at the priority date of the application from, for example, D4. Although D4 refers to an image processing system ("Bildverarbeitungssystem") rather than a photocopier, it is observed that a photocopier, whether colour or monochrome, is in essence the combination of a scanner and a printer, usually a laser printer. Thus an image processing system of the kind disclosed in D4 does not differ fundamentally from a photocopier, which merely leaves out the processing steps.

4.2 Moreover, colour laser printers are by their nature "frame sequential", that is, complete frames of colour components are presented and printed in succession. Thus it can be seen for example from D4 that while the scanner generates all three colour components, RGB, simultaneously on each scan, an image to be printed must be converted into CYMB colour components and presented to the printer in four successive steps, i.e. frame-sequentially. From D4 - and also D3 - it can be seen that it was known at the priority date to scan an image, store it, manipulate it, and finally print the resultant image.

4.3 Although the Board is aware of disclosures of image processing systems in which images are stored, for example D3, it is accepted that the storage of one image

and its combination with an image being scanned is not disclosed in the prior art at the Board's disposal. The subject matter of both Claims 1 and 2 is thus novel.

4.4 In the Board's view the question to be answered is whether the skilled person, setting out to enhance the capabilities of a standard colour photocopier, would have found it obvious to provide for the combination of images, one scanned and one stored. If this question is answered in the affirmative then all the remaining features of Claims 1 and 2 follow as a matter of course.

4.5 At the priority date of the application, the practice of combining images was known in the image processing field from D3. It was also well known per se in several related technical fields. It has long been practiced in photography and cinematography. It would therefore not have required an inventive step to consider combining images in a photocopier. Moreover, the use of chroma keying has long been conventional in TV systems; in such a system a plain background, usually blue, is used to signal that this background should be replaced by another image; thus, for example, an image of a weatherman in front of a blue background can have the latter replaced with a weather map. Such systems require storage means for the newly introduced background and a mechanism for recognising what parts of the image form the background to be replaced, i.e. control means and selection means for selecting between a scanned signal and one read from the storage means. Similarly, before the claimed priority date the captioning of television programmes was carried out by gating the live (or VTR) image with letters from a character generator or from another camera focussed on rolling titles, both in effect memory means. Thus the skilled person in the field of colour photocopiers would at the claimed priority date have been aware that in related image

processing fields the combination of two images, one of which was not stored but being scanned, was being carried out.

4.6 It is observed that image storage is expensive; in the preferred embodiment a full-colour A4 image would require 4752 x 3360 x 3 bytes, i.e. nearly 50 MB, an amount of RAM which even today would give the skilled person cause to consider whether an approach requiring less RAM was feasible. The skilled person would thus have good reason for not storing images unnecessarily, and it would moreover have been apparent to him that there was no actual necessity for storage of two images since as noted above he would have been familiar with the idea of mixing one image into another as it was scanned or transmitted, from for example chroma keying. Thus it would have been obvious for him to adopt such a solution.

4.7 Since the conventional frame-sequential colour reader delivers four frames, one of each base colour, to the printer element of the photocopier, it is apparent that each colour component of the first image must be mixed with the corresponding colour component of the second image at some stage in its processing through the system. Hence it would have been the most obvious choice to store the colour components of the first image in such a way (e.g. in colour planes) that one colour component of the stored image could conveniently be selected for each colour scan of the second image, and to supply the appropriate control means and selector. Then just as in chroma keying, the two (colour component) images to be mixed would be supplied in synchronism to a selector which would pass on just one of the two signals.

4.8 Thus all the features of Claim 1 follow logically from the skilled person's decision to modify a standard colour photocopier to provide image processing capabilities in the light of the common general knowledge in the related art of video processing. In the Board's judgement, therefore, it would not have required an inventive step to consider adding the ability to combine images, using one stored and one scanned image, to such a conventional colour photocopier.

4.9 Claim 2 is a method claim in essence directed to the steps carried out by the colour photocopying apparatus of Claim 1 and is open to the same objection of lack of inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

M. Kiehl

The Chairman:

P. K. J. van den Berg