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D E C I S I O N
of 16 October 2003

Case Number: T 0643/00 - 3.5.1

Application Number: 93300749.4

Publication Number: 0555048

IPC: G06F 15/64

Language of the proceedings: EN

Title of invention:
Image processing apparatus and method therefor

Applicant:
CANON KABUSHIKI KAISHA

Opponent:
-

Headword:
Searching image data/CANON

Relevant legal provisions:
EPC Art. 52, 54, 56, 84, 123(2)
EPC R. 86(4)

Keyword:
"Patentable invention (yes)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
T 1177/97, T 1194/97, T 0049/99, T 0244/00, T 0641/00

Catchword:

An arrangement of menu items (or images) on a screen may be determined by technical considerations. Such considerations may aim at enabling the user to manage a technical task, such as searching and retrieving images stored in an image processing apparatus, in a more efficient or faster manner, even if an evaluation by the user on a mental level is involved. Although such evaluation *per se* does not fall within the meaning of "invention" pursuant to Article 52 EPC, the mere fact that mental activities are involved does not necessarily qualify subject matter as non-technical since any technical solutions in the end aim at providing tools which serve, assist or replace human activities of different kinds, including mental ones.

Case Number: T 0643/00 **-** 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 16 October 2003

Appellant:	CANON KABUSHIKI KAISHA 30-2, 3-chome, Shimomaruko Ohta-ku Tokyo (JP)
Representative:	Beresford, Keith Denis Lewis BERESFORD & Co. 2-5 Warwick Court High Holborn London WC1R 5DH (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted 19 January 2000 refusing European application No. 93300749.4 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman:	S. V. Steinbrener
Members:	R. R. K. Zimmermann
	B. J. Schachenmann

Summary of Facts and Submissions

I.   European patent application number 93 300 749.4 was
        filed by CANON K.K. (JP) for an invention in the field
        of image processing with priority dates of 3 February
        and 28 April 1992.

II.   The invention, which concerns, in particular, searching
        hierarchically encoded image data, was the subject of a
        European search yielding just the following two
        citations, both in the document category "A":

        EP-A-0 392 753 (CANON K.K., published in 1990)

        SIGNAL PROCESSING: IMAGE COMMUNICATION, vol. 4, no. 2,
        April 1992, AMSTERDAM, pages 103 - 111, HAMPEL,
        H. et al. "Technical features of the JBIG standard for
        progressive bi-level image compression", chapter 2.2.
        "Compatible progressive/sequential coding".

III.   During examination, reference was also made to
        "standard textbook knowledge" and, in addition, to
        US-patent US-A-5 159 468 (CANON K.K., published in
        October 1992), a document which was already cited in
        the application as originally filed.

IV.   Essentially on the basis of the EP-document, the
        application was then refused by the examining division
        in oral proceedings for lack of inventive step. In
        addition, claim amendments requested were rejected by
        making reference to the provisions of Rule 86(4) EPC.

        The decision in writing was posted on 19 January 2000.

V.   A notice of appeal, including an order for payment of
        the appeal fee, was filed by the applicant on 10 March
        2000. The filing of the written statement setting out
        the grounds of appeal followed on 26 May 2000.

        In oral proceedings held on 16 October 2003 before the
        Board, the appellant amended the claims, the
        independent claims reading as follows:

        "1. An image processing apparatus for searching an
        image for output comprising:
        input means (2) for inputting image data;
        storage means (6) for storing hierarchically encoded
        image data derived from the input image data in an
        order of registration;
        first decoding means (7) for decoding image data stored
        in said storage means;
        video frame memory (9) for storing image data decoded
        by said first decoding means, whereby images based on
        said image data stored in said video frame memory can
        be displayed on a display means (10); and
        control means (13) for controlling the operation of the
        apparatus;
        wherein said input means are adapted to receive non-
        hierarchically coded image data; and
        wherein the apparatus further comprises second decoding
        means (3) for decoding the non-hierarchically coded
        input image data to generate first image data of a
        first resolution, hierarchically encoding means (5)
        adapted hierarchically to encode said first image data
        with different resolutions and store the hierarchically
        encoded image data in said storage means;
        said control means being adapted to cause said first
        decoding means (7) to decode in the order of

registration the hierarchically encoded data of a
predetermined plural number of images stored in said
storage means to generate second image data of a second
resolution which is lower than the first resolution, to
cause said video frame memory (9) to store the second
image data (S23-1) in divided areas thereof for display
by said display means, and wherein the apparatus
further comprises means (11) for selecting one image
from said displayed second image data, and wherein said
control means is adapted to clear (S61-1) said video
frame memory based on the detection of an instruction
(S28-1) for displaying the selected image of the
predetermined number of simultaneously displayed images
in a third resolution higher than the second resolution,
to perform decoding of the hierarchically coded data
corresponding to the selected image by the first
decoding means (7), and to generate an image of the
selected image at the third resolution (S63-1), store
the generated image of the third resolution in the
video frame memory (9), and cause the display of said
third image of the third resolution on said display
means (10), and
wherein said control means is adapted to perform
selectively the following processes:
(i) in the case where an instruction for displaying
the selected and displayed third image of the third
resolution in a fourth resolution higher than the third
resolution is detected (S65-1), said control means is
adapted to clear said video frame memory on the basis
of the detected instruction, to perform decoding of the
hierarchy coded data corresponding to the selected
image by the first decoding means (7), and to generate
an image of the selected image at the fourth resolution,
to store the generated fourth resolution image in the

video frame memory (9), and to generate display of said selected fourth resolution image on the predetermined display means (10);

(ii) in the case where an instruction for again displaying said second image is detected (S67-1), said control means is adapted to clear said video frame memory on the basis of the detected instruction, to perform decoding of the hierarchically coded data corresponding to the predetermined number of images again by the first decoding means (7), and to generate said second image (S23-1), store the generated second image data in the video frame memory (9), and to generate a display of the second image data of the second resolution stored in said video frame memory (9) on the predetermined display means (10); and

(iii) in the case where an instruction is received for outputting a selected image, said control means is adapted to perform decoding of the hierarchically encoded data corresponding to the selected image to generate image data of the first resolution and to write the decoded image of the first resolution into a working memory (8)."

"6. A method of searching for an image, the method comprising:
inputting image data into an image processing apparatus;
storing in storage means hierarchically encoded image data derived from the input image data in an order of registration;
decoding encoded image data stored in said storage means ; and
storing the decoded image data in a video frame memory so that the decoded image data can be displayed on display means, and wherein the input data is non-

hierarchically encoded image data and the method
further includes decoding the non-hierarchically
encoded input image data to generate first image data
of a first resolution;
hierarchically encoding said first image data with
differing resolutions and storing the hierarchically
encoded image data in said storage means;
decoding in the order of registration the
hierarchically encoded data of a predetermined plural
number of images stored in said storage means to
generate second image data of a second resolution which
is lower than the first resolution;
storing said second image data in divided areas of said
video frame memory;
displaying said second image data;
selecting an image from said displayed second image
data;
clearing said video frame memory in response to a
command to display the selected image of the
predetermined number of simultaneously displayed images
in a third resolution higher than the second resolution;
performing decoding of the hierarchically encoded data
corresponding to the selected image to generate image
data of the third resolution;
storing the image data at the third resolution in said
video frame memory, and
displaying the third resolution image data, and wherein
when an instruction is received for displaying the
selected and displayed image of the third resolution in
a fourth resolution higher than the third resolution,
clearing said video frame memory;
decoding the hierarchically encoded image data
corresponding to the selected image to generate image
data of the fourth resolution;

storing the fourth resolution image data in said video
frame memory, and displaying the fourth resolution
image data, and wherein when an instruction is received
for redisplaying said second image data, clearing said
video frame memory, decoding the hierarchically encoded
image data corresponding to the predetermined plural
number of images to generate again said second image
data;
storing the regenerated second image data in said video
frame memory and redisplaying said second image data,
and wherein when an instruction is received for
outputting a selected image;
decoding the hierarchically encoded data corresponding
to the selected image to generate image data of the
first resolution corresponding to the selected image
and writing the decoded image of the first resolution
into a working memory for output."

VI.   According to arguments submitted by the appellant, the
        invention was to be seen in an improved image searching
        concept. The simultaneous display of, for example,
        eight images in a reduced resolution ensured the fast
        realization of multiple image data and allowed the user
        to grasp the image content at a glance and to select
        the searched image for output in a fast and efficient
        manner. The function of switching between different
        levels of resolution ensured that the user could
        subject the selected image to a thorough visual check
        before printing or using it otherwise.

        Document D1 was mainly concerned with an automated
        method for editing images stored in a hierarchically
        encoded form in a database; only in passing it
        mentioned the issue of searching images and even then

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only as a preliminary stage of an image editing process.
Except for the hint that the lowest encoded resolution
layer of the images should be used for search purposes,
the document did not give any relevant technical
details regarding the image search but it treated it as
a side aspect of the image editing process. Because of
the sparsity of the disclosure, the skilled reader
would be confronted with many different possibilities
to embody the poor information scattered over this
document. The search might be based, for example, on
names, numbers, categories, or the like and then be
displayed in a thumbnail manner. On the display, the
images could be rendered one-by one in sequence, or in
random groups having overlapping display regions or not,
in a fixed or in varying resolutions. It was therefore
not obvious to render, in a first step, a plurality of
small images in the order of their registration, and to
give the user then the possibility to realise the
selected image selectively in at least four different
levels of resolution.

VII.   The appellant, accordingly, requested that the decision
under appeal be set aside and that a patent be granted
on the basis of claims 1 to 9 submitted at the oral
proceedings of 16 October 2003.

VIII.   The Board announced the appeal decision in the oral
proceedings on 16 October 2003.

Reasons for the Decision

1.   The appeal is admissible. It is also allowable on the
merits since the grant of a patent can be envisaged on

the basis of the amended claims, which meet the
mandatory provisions of the EPC.

Amendments and claim requirements

2.   The Board is satisfied that the amended claims comply
        with the requirements of Article 123(2) EPC as well as
        with the requirements of Article 84 EPC in respect of
        support by the description.

        Independent claims 1 and 6 include all features which
        are essential to the conversion of non-hierarchical
        image data into hierarchically encoded image data and
        to image processing under user control for searching an
        image which is the basis of the four embodiments of the
        invention described with reference to figures 6 to 13,
        14 to 18, 19 to 23, and 24, respectively. These
        embodiments were already subject of the original
        application.

        Dependent claims 2, 5, 7 and 9 have a basis in the
        first embodiment, dependent claims 3, 4, and 8 in the
        second embodiment of the invention.

3.   Furthermore, the Board considers the amended claims to
        comply with the provisions of Rule 86(4) EPC.

        The Board holds that this provision only applies if in
        connection with the claims as originally filed lack of
        unity existed with the amended claims, requiring the
        payment of a further search fee under Rule 46(1) EPC.

        The amendments to the claims, however, only narrowed
        the scope of the original claims 1 and 5 without

introducing any alternative solutions so that the subject-matter of the amended claims cannot be nor include "other inventions" within the meaning of Rule 46(1) EPC.

4.   The claim wording is also in compliance with the clarity requirement of Article 84 EPC, i.e. the scope of protection as conferred by the claims can be determined and the invention for which the claims seek protection can be examined for patentability (see, for example, decision T 49/99 - Information modelling/INTERNATIONAL COMPUTERS, not published in OJ EPO, point 12).

Most of the claim wording is plainly clear in this sense. Only few definitions require interpretation: it is *prima facie* left open whether selecting an image and providing the "commands" and "instructions" as defined in the claims are functions of the image processing apparatus or refer to direct user interaction. However, in the light of the description it becomes clear that the invention, and in particular the method of searching an image as claimed, invoke human interaction for "selecting" a particular image from the displayed image data, for providing (at least as a result of such interaction) a "command" to display the selected image, and for providing the "instructions" for displaying, redisplaying and outputting the respective images.

Although there are no principal objections to be raised against claiming subject-matter involving human interaction, such claims have to be carefully examined with regard to the technical character of such features.

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Examination for patentability

5.   The examination for patentability can be limited to the
        subject-matter of claims 1 and 6 since claims 2 to 5
        and 7 to 9 are truly dependent claims merely defining
        particular embodiments of the invention.

6.   From the description, column 3, lines 34 to 49 as well
        as from the arguments forwarded by the appellant in the
        course of the appeal proceedings it must be concluded
        that the claimed inventions are the result of the idea
        to make the searching process easier to the (human)
        user, who has conventionally to comb the images one by
        one on the display at a high resolution in order to
        select a particular image for output. This goal is
        achieved by arranging a plurality of images in a side-
        by-side manner at a low resolution and providing for
        hierarchical display at higher resolutions so that a
        comprehensive survey as well as a fast check for
        details are possible.

Requirement of novelty (Article 54(1) and (2) EPC)

7.   The publication HAMPEL et al. (see point II, supra) and
        the document US-A-5 159 468 deal with subject-matters
        like bi-level image compression, image browsing over
        communication links, and progressive image transmission,
        but they do not disclose any method or apparatus for
        searching images in databases in the sense the present
        application is concerned with. In the present case
        therefore these citations are irrelevant in respect of
        the invention claimed. Hence, the question of whether
        or not the priority dates of the present application
        are valid need not be considered.

This leaves document EP-A-0 392 753 as the only relevant piece of prior art.

8. This EP-document discloses an image searching apparatus comprising input means (figure 1: reader 4) for inputting non-hierarchically coded image data (from a photoelectrically read original image, see column 2, lines 26 to 27) and decoding means (reader 4) for decoding the non-hierarchically coded input image data to generate first image data of a first resolution (at the digital output of reader 4). Hierarchically encoding means (encoder 9) are adapted hierarchically to encode said first image data with different resolutions and to store the hierarchically encoded image data in storage means (database 5) in an order of registration. Decoding means (decoder 10) are operational for decoding image data stored in said storage means and video frame memory (either memory 26 or a separate memory in display 3) for storing image data decoded by said first decoding means, whereby based on the data stored in said video frame memory the user may display images on display means (display 3) or output them to another system (see column 4, lines 15 to 18). The apparatus is controlled by control means (CPU 1) and comprises means (keyboard 2) by which images can be selected from the image data stored in the database 5 (see column 2, lines 47 to 53).

9. The prior art of document EP-A-0 392 753 seems to aim at a high speed search of images by using the lowest resolution image data of the images hierarchically encoded and stored in the database 5 (see figure 1, and in particular column 1, lines 28 to 34, column 2,

lines 51 to 53, column 3, lines 25 to 27, column 4,
lines 32 to 34, column 5, lines 4 to 15, column 6,
lines 42 to 44 and claim 13). The details how the
search could be done, however, remain in the dark.

Apparatus

10.   The image processing apparatus of claim 1, therefore,
        differs from the prior art of document EP-A-0 392 753
        in the functionality which allows the image processing
        apparatus, in response to user input, to decode and
        render a predetermined plural number of hierarchically
        encoded images, in the order of registration and at the
        lowest level of resolution, in separated portions of
        the display, and to select and render one of these
        images at any of four different levels of resolution,
        and finally to output the selected image or to continue
        the search with the predetermined plural number of
        images next in the order of registration. The apparatus
        claimed is thus not anticipated by the EP-document.

Method

11.   The method of claim 6 is closely related to the image
        processing apparatus of claim 1 in that the image
        search is defined essentially by the steps of operating
        the said apparatus functions rendering the apparatus
        novel.

12.   In summary it follows that the requirement of novelty
        is met by the apparatus as well as the method as
        claimed.

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Inventive step

13.   The Board applies, as a test for inventive step, the
       "problem-and-solution approach" according to which an
       invention is to be understood as a technical solution
       to a technical problem, assessed by the person skilled
       in the relevant field of technology in the light of the
       prior art (see the decision T 641/00 - Two
       identities/COMVIK, OJ EPO 2003, 352, point 5 of the
       Reasons).

Apparatus

14.   Starting from document EP-A-0 392 753, the objective
       technical problem solved may be seen in providing a
       technical tool for efficient search, retrieval and
       evaluation of images stored in an image processing
       apparatus.

15.   Although in the present case human activities are
       involved in solving this problem, which activities may
       relate to the information contents of images looked for
       and may be motivated by personal interests and/or other
       non-technical preferences, the Board considers the
       claimed features relating to the format of images
       displayed, not to be presentation of information as
       such.

16.   It is true that non-technical aspects may be found in
       the design and the use of an interface through which
       the user interacts with a system (see decision
       T 244/00-Remote-control/MATSUSHITA, not published in
       OJ EPO). Indeed, presenting information through a user
       interface, if the only relevant effect of the

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presentation relates to the visually attractive nature
of the graphic design or artwork, does not have
technical character. However, in its decision the Board
has not excluded that an arrangement of menu items (or
images) on a screen may be determined by technical
considerations. Such considerations may aim at enabling
the user to manage a technical task, such as searching
and retrieving images stored in an image processing
apparatus, in a more efficient or faster manner, even
if an evaluation by the user on a mental level is
involved. Although such evaluation *per se* does not fall
within the meaning of "invention" pursuant to
Article 52 EPC, the mere fact that mental activities
are involved does not necessarily qualify subject
matter as non-technical since any technical solutions
in the end aim at providing tools which serve, assist
or replace human activities of different kinds,
including mental ones.

Furthermore, in accordance with case law, the use of a
piece of information in a technical system, or its
usability for this purpose, may confer a technical
character on the information itself in that it reflects
the properties of the technical system, for instance by
being specifically formatted or processed (see decision
T 1177/97-Translating natural languages/ SYSTRAN, not
published in OJ EPO, point 2 of the Reasons).
Additionally, functional data (line numbers, coded
picture lines, addresses and synchronisations) recorded
on a record carrier to be used in a picture retrieval
system are to be distinguished from the cognitive
content encoded (see decision T 1194/97-Data structure
product/PHILIPS, OJ EPO 2000, 525, point 3.3 of the
Reasons). Even if the overall information could be

interpreted in an infinite number of different ways in other technical or human contexts, this does not detract from its technical function in the relevant context of the claimed invention (see T 1194/97, at the end of point 3.3). In this context, the Board cannot see a fundamental difference between an image processing system using a specific electrical picture access structure (binary code string) for easy image retrieval and an image processing system using a specific optical picture access structure (simultaneous display of a plurality of low resolution images) for the same purpose. Whether the actual retrieval and selection process is then carried out automatically or with the aid of human interaction is, in the Board's view, not decisive for the technical character of the claimed image processing functions.

17.   In the present case, the functions/steps of processing the images in a specific format, i.e. a predetermined plural number of images in a side-by-side manner at a low level of resolution, and allowing selection and display of an image at higher resolutions provide information to the user in the form of a technical tool for an intellectual task he has to master, and hence contribute to the technical solution of the technical problem of an efficient search, retrieval and evaluation of images stored in an image processing apparatus insofar as this is supported by the specific image format chosen. In this respect it is neither mere aspects of art design, like a pleasant look or feeling, that matter, nor the mere information content of images presented, but the organisation of an overall image structure in view of a technical problem.

18. The invention solves this problem by providing a bundle of image processing functions which, if applied in a concerted manner by the user, ensure a time-saving and well manageable search operation as compared to the rudimentary disclosure of document EP-A-0 392 753. Even if each single one of these image processing functions, taken alone, were considered obvious to the skilled person in the light of common general knowledge and normal programming practices, in the technical context of an image database storing hierarchically encoded image data, these functions combine to yield a fast, easy to handle and in summary efficient searching tool, which goes beyond the mere aggregation of normal design options. The fact that the prior art lacks any clear hint to the claimed combination of image processing functions thus carries weight and must lead to the conclusion that the presence of inventive step as required by Article 56 EPC has to be acknowledged.

Method

19. Since the method of claim 6 involves the application of the said bundle of apparatus functions the requirement of inventive step is met by the method as well, substantially for the same reasons as indicated above in respect of the apparatus claim.

Summary

20. It follows that the amended claims form a valid basis for granting a patent. The adaptation of the description to the claims can be the subject of the further prosecution of the application in the first instance.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the examining division with the
        order to grant a patent with claims 1 to 9 filed at the
        oral proceedings and a description to be adapted.

The Registrar: The Chairman:

M. Kiehl   S. V. Steinbrener