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D E C I S I O N
of 16 December 1998

Case Number: T 0039/96 - 3.5.1

Application Number: 91917442.5

Publication Number: 0550596

IPC: H04N 17/00

Language of the proceedings: EN

Title of invention:
Means for measuring picture quality

Applicant:
TELIA AB

Opponent:
-

Headword:
Picture quality/FENG-ÖSTBERG

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

Keyword:
"Clarity (yes)"
"Fair basis (yes)"
"Inventive step (yes)"
"Patentability (yes)"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0039/96 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 16 December 1998

Appellant: TELIA AB
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Decision under appeal: Decision of the Examining Division of the European Patent Office posted 2 October 1995 refusing European patent application No. 91 917 442.5 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. K. J. van den Berg
Members: R. Randes
S. C. Perryman

Summary of Facts and Submissions

I. European patent application No. 91 917 442.5, claiming two priorities from 26 September 1990, filed on 18 September 1991 and published under international publication No. WO 92/05669, was refused by a decision of the examining division dated 2 October 1995.

II. The reason for the refusal was that claim 1 of the application did not meet the requirements of Article 84 EPC. In additional considerations in the decision it was, moreover, held that the subject-matter of claim 1, as far as its subject-matter could be construed on the basis of the description, also lacked an inventive step.

III. The applicants lodged an appeal against the decision on 28 November 1995, paid the appeal fee on 7 December 1995 and filed a statement of grounds on 8 January 1996.

IV. The appellants argued that the examining division's decision was incorrect, because the refused claims were clear and met the requirements of Article 84 EPC. The appellants also countered the arguments of the examining division in respect of inventive step, in particular in view of the document,

Db = SMPTE Journal, October 1981, Glenn A. Reitmeier: "The effects of Analog Filtering on the Picture Quality of Component Digital Television Systems" pp. 949 - 955,

mentioned in the decision. They also tried to show that none of the two other documents cited in the international search report but not used by the examining division, namely

Da = SMPTE Journal, December 1985, Bronwyn L. Jones, Lawrence E. Marks: "Picture Quality Assessment: A Comparison of Ratio and Ordinal Scales", pp. 1244-1248 and

Dc = SMPTE Journal, November 1981, Haruo Sakata: "Effect of Contour Components on Picture Quality", pp. 1075-1084,

prejudiced inventive step.

V. After several communications by the Board the appellants filed a set of new claims 1 to 8 on 17 September 1998, the independent claims of which read as follows:

claim 1,

"A set of image gauges for use in a method of measuring image quality,

characterised in that said set comprises a plurality of individual image gauges disposed on a suitable medium, each image gauge of said set bearing a picture and/or text having a precalibrated image quality, in that the set of image gauges have pictures and/or text of progressively varying image quality, and in that each image gauge bears indicia indicative of an objective physical measure of the image quality of the picture and/or text, together with a subjective indicator of image quality for images formed on one specified image medium",

claim 5,

"A method of measuring image quality **characterised by the steps of:**

- visually comparing each image gauge of a set of image gauges, as claimed in any of claims 1 to 4, with a target image;

- selecting from said set of image gauges that image gauge having an image quality closest to said target image; and

- reading the image quality indicia on said selected image gauge",

claim 6,

"A method of making a set of image gauges as claimed in any of claims 1 to 4, **characterised by the following steps**:

- producing a series of image gauges on a suitable medium having progressively reduced image quality, said image quality including objective image quality and a subjective measure of image quality;

- calibrating said objective image quality of the images of said image gauges by using standard laboratory technique; and

- determining a subjective image quality of the image of each gauge on said suitable medium;

- comparing the image of a gauge with images on a specified image medium and determining the objective quality of an image on said specified

image medium which is experienced to have the same subjective image quality as the image of said gauge;

- recording the subjective quality value of the image on said specified medium so experienced as well as the corresponding determined objective value of the image on the specified image medium onto the corresponding gauge".

Dependent claim 4 reads as follows:

"A set of image gauges as claimed in any previous claim

characterised in that each image gauge of said set of image gauges bears two objective indicators of image quality, each indicator corresponding to reproduction of said image on a different medium".

VI. The appellants request that

- the decision under appeal be set aside, and

- a patent be granted on the basis of claims 1 to 8 filed on 17 September 1998, description, pages 1 to 5 and drawing sheets 1/3 to 3/3 as published under WO 92/05669 (filed as PCT/SE91/00624).

Reasons for the Decision

1. *Admissibility*

The appeal is admissible.

2. *Clarity and Support*

The Board considers that the new claims are clear and meet the requirements of Article 84 EPC.

The statement of claim 1 that a set of individual image gauges is disposed on a "suitable medium" is understood in the way that the gauges of a set are all disposed on the same medium, e.g. on one of the media, such as computer or TV screens, photographs or other types of pictures or print-outs. According to the embodiment in the description of the application photographic prints (the "TN series", see the description, page 4 under "Examples") are used as gauges in a set.

Moreover, the claim makes clear ("each image gauge...varying image quality") that the different gauges in a set, each have a precalibrated image, and that the images on the different gauges have a progressively varying image quality.

The last part of claim 1 states that

"each image gauge bears indicia indicative of an objective physical measure of the image quality .... together with a subjective indicator of image quality for images formed on one **specified image medium**" (emphasis added),

i.e. it is made clear that indicia on the gauges correspond to a picture on a medium which may be different from the said "suitable medium" of the gauges. This is in correspondance to the embodiments ("Examples") at pages 4 and 5 of the description of the patent application. Thus, e.g. gauge No. 1 (see the table at the top of page 5), which is a gauge in a set comprised of photoprints, bears the objective MFTA

value 10,6 (cf. Figure 4 at the top) together with the subjective indicator "very good". These indicia correspond to pictures on the "specified image medium", which in this case is the medium "screen image".

Claim 1, therefore, meets the requirements of Article 84 EPC.

The features of the claims 2 and 3 relate to quality measures mentioned in the description.

Claim 4 defines that an image gauge may have two objective values corresponding to two different media. In spite of the fact that Figure 4 discloses that only one objective value on said specified medium is recorded, the Board considers that the claim also meets the requirements of Article 84 EPC. This is because the description discloses (cf. the table on page 5) that each subjective value of a test gauge corresponds to two objective values.

The subject-matter of independent claim 5 relates to the method that, indeed, is the core of the invention and is clearly supported by the description.

Claim 6 is directed to a method of machining a set of image gauges which has a basis in the description.

Claims 7 and 8 correspond to original claims 2 and 3.

Thus the claims now on file meet the requirements of Article 84 EPC. Since the present description corresponds to the original description they also meet the requirements of Article 123(2) EPC.

3. *Grounds of refusal*

In the decision of the examining division, the ground for refusal was that claim 1 did not meet the clarity requirements of Article 84. Nevertheless, the examining division in the last part of the decision under the heading "Notes relating to novelty/inventive step" quite exhaustively investigated the questions relating to novelty and inventive step of the subject-matter of the claims. The Board, therefore, considers itself to be in a position also to assess novelty and inventive step of the invention.

4. *Analysis of the cited documents*

Having regard to the cited prior art, the Board agrees with the applicants that document Db, showing television test pictures, does not relate to measurement of image quality per se, but is concerned with distortion introduced into an image by a specific image system, i.e. by the television system. The document only discloses a number of test pictures on the screen used to illustrate the effects of image degradation produced by different filter combinations. However, the different areas on the screen are not compared with image gauges of varying quality. Instead it could be considered that each area of the display image of the screen is compared with the corresponding area of the original test picture. Also the different areas of the original test picture, although they show groups of lines of various spatial frequencies, apparently are all of the same quality. Moreover, the different areas of the pictures are not calibrated with dual measure of image quality and therefore cannot be described as image gauges in the sense of the invention.

Citation Da of the search report is concerned with the comparison of two different subjective scale methods for picture quality assessment, the ratio and the ordinal scale methods, in order to see which of them is the better. The article does not mention assessing picture quality using test gauges.

Citation Dc, however, discloses that evaluation photographs of different "quality" can be made up in order to investigate to what degree the contour components affect the sharpness and solidity (=the feeling of depth) of a picture. However, these photographs neither bear the dual measure of image quality nor are they used as image gauges for comparison of image quality with other pictures, but are only used to assess the "quality" of the photographed images themselves.

5. *Novelty*

Thus it is apparent from the above that the different aspects of the invention according to the independent claims 1, 5 and 6 are novel having regard to the cited documents.

6. *Problem*

It does not appear that the teaching of any of the cited documents would have been an appropriate starting point for the invention. Also it is noted that only Db was discussed by the examining division in the appealed decision. The Board, in fact, considers the closest state of the art to be that summarised on the first page of the patent application (second paragraph), where it is stated that "measuring and assessing picture quality has so far been a time-consuming chore for laboratory engineers having access to expensive and

complicated electro-optical measuring equipments..... There are also research results relating to the objective measure and subjective judgement scale of picture quality and the connection between these".

In the Board's opinion the objective problem to be solved in the present case is inherent in the next sentence, which reads (page 1, lines 32 to 37 of the description): "Despite this nobody has so far been able to use the theories of picture quality research to meet the users' desires to measure and judge their picture material, such as computer screens, photographs and other types of pictures and print-outs with respect to picture sharpness and picture quality in a simple and reliable way". Thus, it appears that the problem to be solved must be seen in the simplification of the measuring method and also in providing appropriate measuring means to be used in the method.

7. *Inventive step*

Having regard to this problem to be solved and in the light of the argumentation under reason 4 above, in particular the lack of disclosure of test gauges, it is clear to the Board that the teachings of the cited documents Da, Db and Dc would not deprive the invention as now claimed of inventive step.

However, it is noted that the examining division in its argumentation against inventive step mainly relied on techniques which were not disclosed in the cited documents, but which in its opinion were well-known in the art. Thus, the examining division's suggestion, that "it is common to compare reference pictures to pictures produced on a display or by printing in order to assess the quality", may be correct. However, the Board is of the opinion that this knowledge does not in

an obvious way lead to the invention, since this general statement does not reveal or even hint at the idea of the invention which requires that a series of dual calibrated image gauges is compared with a target image.

Also, the assessment of "colour 'quality' of prints", referred to by the examining division, does not in the Board's opinion lead in the direction of the invention. The examining division in this respect pointed out that "to use 'test gauges' in the form of colour charts used for assessing the colour 'quality' of prints by comparing.... the prints with these colour charts (test gauges)" is common in the art. The Board is, however, of the opinion that such colour charts, which apparently always have been used in connection with colour printing, cannot be compared to the test gauges of the present invention, since they are not calibrated in terms of image quality. It is certainly true that in various contexts colour may be considered as a component of quality. However, in the sense of the invention it appears that "image quality" is related to characteristics like sharpness (page 1 of the application, line 36), contrast (page 3, lines 10 to 14), brightness and solidity (= feeling of depth, Dc,page 1076, middle column). It is also noted that such colour charts are not provided with an objective physical measure together with a subjective indicator of image (colour) quality for images formed on one specified image medium. The skilled person, therefore, would not get the idea of the invention from the use of such colour charts; or differently expressed, to get this idea from the use of such colour charts, thereby using a subjective value of the image gauge on a suitable medium to match an image on a specified medium, and thus arrive at the invention would in the Board's opinion, in fact, amount to an inventive step.

The Board is, accordingly, of the opinion that independent claims 1, 5 and 6, each of which relates to a specific aspect of the invention, indeed, solves the said problem (cf. under reason 6) in a simple and reliable way. Moreover, since the invention is not obvious having regard to the prior art, the invention involves an inventive step as required by Article 56 EPC.

8. *Patentability*

The Board notes that the examining division did not touch on the question of whether the present invention is patentable under Articles 52(2) and (3) EPC. However, since the appellants themselves in the statement of the grounds of appeal have addressed this question and suggested that the claims do not contain subject-matter which relates to activities excluded from patentability, it is appropriate to investigate the question.

8.1 To start with, the Board notes that the problem to be solved (cf. reason 6) in this case relates to a method that in the past has been carried out (see second paragraph of the page 1 of the patent application) with the aid of "complicated electro-optical measuring equipments". Thus the method used in the past has clearly been of a technical nature and the result has also been of technical nature (assessment of picture quality). Therefore, it appears to the Board that the present problem to be solved, i.e. the simplification of a technical method and the provision of appropriate measuring means for this method, must also be of a technical nature.

8.2 According to the present application, the solution to the problem has been defined in the three independent claims 1, 5 and 6, each of them identifying one aspect of the invention, i.e. the measuring means, the measuring method and the fabrication of the measuring means. The different aspects fit into the overall concept of the invention which leads to a simplified measuring method.

8.3 The said set of image gauges according to claim 1 contains separate gauges, each gauge having a well defined image quality, i.e. said gauges have been calibrated with the aid of technical apparatus (measuring of the objective values) and thus contain information of technical nature. Moreover, the gauges are provided with both objective and subjective indicators. The said indicators on the surface of the gauges together with the image of the gauge itself are parameters or values in a measuring process, that makes it possible for the operator to decide the result (in this case the quality of a target picture). Thus the set of gauges may be seen as an image quality measuring instrument in which the selected test gauge represents both the needle that indicates the measured value and the scale from which the value is read. It is this ability to yield a measurement of a technical parameter which distinguishes the image gauge from a mere presentation of information.

8.4 The independent claim 6 may contain non-technical features. Its core, however, is concerned with technical features, since the fabrication and calibration of gauges (apparently with technical means) and the (physical) application of indicators onto the gauges are clearly of a technical nature. Moreover, it appears that the features in the claim which at first sight may appear to be non-technical ("determining a

subjective image quality..." and "comparing the image of a gauge"), in the context of the claim, i.e. in combination with the other (technical) features, in fact, contribute to the technical effect of the invention (fabrication of the measurement means) and to the solution of the problem (a simple way of measurement). It is precisely the determination of the subjective image quality on the gauge and the comparison of it with the subjective image quality on said specified medium, thereby recording both the subjective and the objective value of the image on the specified medium on the gauge, that is the key to the invention. This match between the gauge and the target picture is then used in the method according to claim 5.

8.5 At first sight it may appear that the method according to claim 5 contains only "rules and methods for performing mental acts" excluded under Article 52(2)(c) EPC. The Board, however, considers that the subject-matter of the claim contains the core of the overall concept and that the claim proposes the real solution to the objective technical problem, indicating how the *technical instrument* made up of the separate gauges has to be used. Moreover, the method according to claim 5 appears to be included in the field of measurement methods, which methods normally are considered to have a technical character. The fact that in the present case the result is read by an operator does not mean that the invention relates to "presentation of information", but rather that the last step of the measuring process is executed by a human being, in correspondance to reading a voltmeter or a measuring-tape.

8.6 Thus the Board arrives at the result that the subject-matter of all independent claims involves a contribution to the art in a field not excluded from patentability. This is also not suprising, since as has been pointed out above the problem to be solved is concerned with the simplification of a technical method. It appears that a technical method used for arriving at technical results must still, even after it has been changed and simplified be of a technical character.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the appellant's request specified at paragraph VI above.

The Registrar: The Chairman:

M. Kiehl P. K. J. van den Berg