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Datasheet for the decision of 22 September 2009

Case Number: T 1456/05 - 3.5.04

Application Number: 00105010.3

Publication Number: 1037456

IPC: H04N 1/04

Language of the proceedings: EN

Title of invention:
Image reader and method for correcting the quantity of light of the readout light source

Applicant:
Sharp Kabushiki Kaisha

Opponent:
-

Headword:
-

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
-

Catchword:
-

Case Number: T 1456/05 - 3.5.04

D E C I S I O N
of the Technical Board of Appeal 3.5.04
of 22 September 2009

Appellant: Sharp Kabushiki Kaisha
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Representative: Müller - Hoffmann & Partner
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 21 July 2005 refusing European application No. 00105010.3 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: F. Edlinger
Members: A. Dumont
B. Müller

Summary of Facts and Submissions

I. The appeal is directed against the decision by the examining division to refuse European patent application No. 00 105 010.3.

II. The examining division found that the subject-matter of claim 1 according to all requests then on file lacked an inventive step over a combination of the documents:

D1: US 5,151,796 A and
D4: JP 10-200711 A.

III. With the statement of grounds of appeal the appellant filed new claims 1 to 6 replacing all previous claim versions then on file.

IV. In an annex accompanying the summons to oral proceedings the board informed the appellant that it tended to share the conclusion arrived at by the examining division and that the subject-matter of the claims also seemed to lack an inventive step starting from the document:

D5: JP 6-284284 A.

V. With a letter dated 20 August 2009 the appellant filed amended claims according to a main and an auxiliary request and supplied a translation of D5 into English.

VI. Oral proceedings before the board took place on 22 September 2009.

VII. The appellant's single final request made during the oral proceedings was that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 6 in the version filed as "auxiliary request" with the letter dated 20 August 2009 and the description and drawing pages indicated in this letter.

VIII. Claim 1 according to the single request reads as follows.

"An image reader comprising:

an original table (2) provided with a first standard white board (A) and a document passing area thereon;
said first standard white board being longer than the length of said document passing area with respect to a main scanning direction (MS), and being provided outside of the document passing area;

a readout section (3) having a readout light source (3a) and a read sensor (3c); and

a control section (40); wherein

said image reader is configured and adapted for effecting a document moving mode in which an original document is read by said readout section while said original document is moving through said document passing area, wherein

said control section controls said readout section in such a way that, in said document moving mode, said readout section reads said first standard white board prior to initiation of said document read to thereby perform a shading correction by determining a correction value with respect to a reading data of each pixel of said read sensor based on a difference in sensitivity for each pixel of said read sensor and a non-uniformity in the quantity of irradiation light of said readout light source, and after said document read has been initiated, said readout section, respectively, reads two or more documents, each recursion comprising reading the moving document without reading said first standard white board, and wherein

said original table is provided with a second standard white board (B, C), in an external region of an end portion of the document passing area with respect to said main scanning direction, **characterized in that**

each recursion comprises reading the reflected light of said second standard white board by using said read sensor and performing correction of the quantity of irradiation light of a said readout light source so that the quantity of irradiation light to said second standard white board and said quantity of irradiation light to said first standard white board become the same, based on a difference between a first data indicative of a quantity of light reflected from said first standard white board and a second data indicative of a quantity of light reflected from said second standard white board."

IX. The reasoning in the decision under appeal may be summarised as follows.

D1 discloses an image reader with a first standard white board in the main scanning direction for determining values for shading correction, and a second standard white board, positioned in an external region of an end portion of the document reading area, for compensating changes in the brightness of the fluorescent light source with time. The image reader of D1 operates in a stationary mode in which the document is placed on a glass plate rather than in a document moving mode. Readers operating in a document moving mode were however known from D4. It was obvious to apply the teaching of D4 to the apparatus of D1 to increase the throughput of documents. Controlling the quantity of irradiation light is furthermore known from D1, and a correction based on the differences in the quantity of light reflected by the standard white boards was immediately evident.

X. The appellant's arguments may be summarised as follows.

The present invention relates to an image reader combining the contradictory goals of good-quality copies and high throughput. Image readers operating in a slow document stationary mode, as disclosed in D1, or in a document moving mode optimised for throughput, as disclosed in D4, reflect totally different concepts. Combining them would result from hindsight.

D5 constitutes the closest prior art and discloses an image reader using a particular sensor C1 to compensate for changes in the lamp brightness by computing a correcting factor to be applied to the values read out from the sensor. D1 does not disclose directly correcting the quantity of irradiation light.

D1 explicitly dismisses the alternative of varying the intensity of the fluorescent light source, because this would require an additional photosensor and involve a considerable cost.

According to the present invention, the read sensor (CCD line sensor) is longer than the length of the document passing area, and at least one element at the end thereof is used for reading a second standard white board. Thus the same sensor is used for reading the document and for correcting the quantity of irradiation of the light source. This surprising and advantageous solution renders the image reader according to the claims novel and inventive over the combination of D1 with either D4 or D5.

Reasons for the Decision

1. The appeal is admissible.

2. The board agrees with the appellant that D5 reflects the closest prior art. D5 discloses an image reader comprising the features of the preamble of claim 1, namely an original table (figure 1) with a first standard white board ("main white reference plate" 40), a second standard white board ("sub white reference plate" 50A) and a document passing area, a readout section (70A) with a light source and a read sensor, and a control section performing shading correction (see paragraph [0004] of the translation of D5).

The image reader is operable in a document moving mode ("conveyance reading mode") for recursively reading two or more documents without reading said first standard white board, so as to increase throughput (see paragraphs [0002] and [0007] of the translation of D5).

This is not contested by the appellant.

3. The appellant regards the features of the characterising portion of claim 1 as lending novelty and inventive step to the image reader.

4. In the document moving mode according to D5 the element C1 at the end of the CCD sensor is used to supply, in a position P2, first data (W1) indicative of the light reflected by the first standard white board, and to supply, in a position P3, second data (W1') indicative of the light reflected by the second standard white board (see figures 3 and 4; page 9, lines 10 to 25; and page 11, lines 2 to 19, in the translation). The element C1 according to D5 thus corresponds to the sensor element located at one end of the CCD in the present invention (see page 23, lines 4 to 12; page 25, lines 12 to 16; figure 4 and the corresponding paragraphs [0061] and [0067] of the patent application as published). The data are used both in D5 and in the present invention to compensate for variations in the intensity of the light source, for instance due to a rise in temperature, during the continuous copying of a series of sheets in the document moving mode, without reducing the throughput (see page 5, lines 2 to 16, in the translation of D5; and page 3, last paragraph, to page 4, paragraph 2, and the corresponding paragraphs [0009] to [0011] of the patent application as published).

   The board sees the following difference in the use of the data read by the sensor element. In D5 the data are used to compute a "light intensity change ratio" (W1'/W1) compensating for changes in the intensity of the light source by correcting the values read out of the CCD sensor (see, for instance, step ST24 in figure 4). In contrast thereto, a difference between the first and second data is used in the present invention to (directly) act on the light source to correct the quantity of irradiation light of the readout light source as specified in claim 1 (see also the paragraph bridging pages 23 and 24 and the corresponding paragraph [0063] in the patent application as published).

5. The problem solved by the distinguishing feature can therefore be formulated as devising an alternative way of compensating for variations in the intensity of the light source (for instance due to temperature variations) during continuous reading of a plurality of documents in the document moving mode.

   D1 mentions in its introductory part the control of the current in the (fluorescent) light source according to the intensity of the light source detected by a sensor as a way to render the light source less dependent on the ambient temperature (see column 1, lines 34 to 39 and 47 to 54). The alternative solution according to the invention is therefore known in the prior art for solving the same problem.

The appellant argues that D1 expressly dismisses the solution because it would require an additional photosensor for detecting the light intensity. However, this statement in D1 relating to conventional measures is made in the context of image readers which do not have a second standard white board and corresponding elements of a read sensor. By contrast, the CCD element C1 of D5 already acts as such an "additional" photosensor providing the necessary data. The skilled person starting from D5 would therefore not regard the requirement of a sensor as an obstacle to implementing the conventional measure referred to in D1 as an alternative to the solution adopted in D5.

The appellant further argues that D1 expressly dismisses the solution because it would involve a considerable cost increase, for instance in the control circuitry for the electric power source. The cost involved in each alternative solution may vary from case to case, for instance according to the type of light source and its power supply. This alone would not lead the skilled person to *a priori* dismiss a conventional measure, but rather to assess the pros and cons of the various alternative solutions and to opt for the most appropriate one, as an obvious matter of design. The board also notes that the present application does not disclose details making the alternative according to claim 1 more cost-effective.

6. Thus the board is not convinced by the appellant's arguments and regards the implementation of a known alternative measure, as disclosed in D1, in the image reader of D5 as an obvious matter of design.

7. As a result, the subject-matter of claim 1 lacks an inventive step in the meaning of Article 56 EPC 1973. The single request by the appellant is therefore not allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar The Chairman

L. Fernández Gómez F. Edlinger