BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 29 November 1995

Case Number: T 0179/93 - 3.2.5

Application Number: 85102956.1

Publication Number: 0194331

IPC: B41F 33/00

Language of the proceedings: EN

Title of invention:
Inspecting device for print

Patentee:
Toppan Printing Co., Ltd., et al

Opponent:
MAN Roland Druckmaschinen AG
GAO Gesellschaft für Automation und Organisation mbH

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0179/93 - 3.2.5

D E C I S I O N
of the Technical Board of Appeal 3.2.5
of 29 November 1995

Other party: (Opponent)
MAN Roland Druckmaschinen AG
Patentabteilung
Postfach 10 12 64
D-63012 Offenbach (DE)

Representative:
-

Appellant: (Opponent)
GAO Gesellschaft für Automation und Organisation mbH
Euckenstrasse 12
D-81369 München (DE)

Representative:
Klunker . Schmitt-Nilson . Hirsch
Winzererstrasse 106
D-80797 München (DE)

Respondent: (Proprietor of the patent)
Toppan Printing Co., Ltd.
5-1, 1-chome, Taito
Taito-ku
Tokyo (JP)

Representative:
Tiedtke, Harro, Dipl.-Ing.
Patentanwaltsbüro
Tiedtke-Bühling-Kinne & Partner
Bavariaring 4
D-80336 München (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 25 January 1993 rejecting the opposition filed against European patent No. 0 194 331 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: G. O. J. Gall
Members: W. D. Weiß
A. Burkhart

Summary of Facts and Submissions

I. Two oppositions were filed against the patent No. 0 194 331 as a whole based on Article 100(a) EPC (lack of inventive step).

II. The wording of Claim 1 of the patent as granted reads as follows:

"1. An inspecting device for a print for inspecting defect occurred on a print pattern of a printed sheet, comprising an optical detecting device (8) for detecting image information at every pixel by optically scanning the print pattern (3') of the printed sheet (3) in a direction perpendicularly to the feeding direction of the printed sheet (3), reference information storing means (15) for storing the image information at every pixel of the print pattern of the normal printed sheet as reference information, first differential calculating means (101) for calculating the difference between the detected image information and the reference information, delay means (103) for delaying the differential signal produced by said first differential means (101) by several pixels in the scanning direction of said optical detecting device (8), second differential calculating means (102) for calculating the difference between the differential signal produced by said first differential calculating means (101) and a differential signal delayed and produced by said delay means (103), and comparing means (105) for comparing the differential signal produced by said second differential calculating means (102) with a predetermined allowable value to output an error signal indicating the presence of a printing defect on the print pattern (3') when the differential signal exceeds the allowable range."

III. The Opposition Division found that the grounds for opposition did not prejudice the maintenance of the patent unamended and rejected the opposition.

IV. The appellant (opponent II) lodged an appeal against this decision.

His written statements as well as his arguments during the oral proceedings held before the Board on 29 November 1995 were exclusively based on the ground that the claimed subject-matter failed to involve an inventive step with respect to document

D2: EP-B-0 012 723, the disclosure of the documents
D7: DE-A-2 620 611, and
D9: DE-A-2 620 767 being incorporated therein by reference,

as the closest prior art in combination with the documents

D4: DE-A-3 010 559, and
D6: DE-A-2 752 412.

The other party under Article 107 EPC (opponent I) did not file any written arguments but communicated that it did not wish to receive any communications with respect to the appeal proceedings, but would like to be informed of the outcome. Consequently, it was not represented at the oral proceedings either.

V. The appellant requested that the decision under appeal be set aside and the European patent No. 0 194 331 be revoked.

The respondent (proprietor of the patent) requested that the appeal be dismissed and that the patent be maintained as granted (main request) or be maintained in amended form on the basis of the first or second auxiliary request presented during the oral proceedings on 29 November 1995.

VI. In support of his requests, the appellant submitted essentially the following arguments:

The subject-matter of Claim 1 differed from the inspecting device disclosed in document D2 (closest prior art) by the features

> delay means for delaying the differential signal produced by the first differential means by several pixels in the scanning direction of the optical detecting device, and second differential calculating means for calculating the difference between the differential signal produced by the first differential calculating means and a differential signal delayed and produced by said delay means.

The basic problem of document D2 was the same as that to be solved by the subject-matter of the patent in suit, namely to suggest a device for examining the quality of printed objects which, in spite of admissible variations in the colour density, can detect print defects. The principle of the solution claimed by the patent in suit merely consisted in that a previous (delayed) differential signal, instead of an average value calculated over a certain surrounding area, was subtracted from the actual differential signal. Any person skilled in the art who knew that a high effort had to be invested to calculate an average value would search for options to reduce this effort. This search

would lead him to document D6 located in the related technical field of rating excessively dirty banknotes. Since according to the patent in suit, the determination of the first differential value merely served to eliminate the influence of the print pattern and to create a virtual blank paper surface, the situation after the determination of this first differential value there was quite the same as where the controlling method disclosed in document D6 started.

Moreover, autocorrelation using a time delay step was a well known and generally used principle for the proof of which document D4 was cited.

VII. The above submissions were contested by the respondent who argued essentially as follows:

It was true that document D2 aimed at solving the same problem as the invention (detecting printing defects independently of long distance variations in colour density) but it used quite different means for this purpose. A person skilled in the art who wanted to simplify the device according to document D2 would have had no reason to leave the digital evaluation disclosed in this document but would have followed the teaching given in this document and would have reduced the "surrounding area" which was considered when calculating the average value rather than searching in a remote technical area for something which could be recognised as a solution for his problem only by hindsight.

Document D4 was concerned with the detection of irregularities which may occur in the regular pattern of photographic pattern plates for the production of television screens. Consequently this device was particularly adapted to the periodicity of this pattern

and, therefore not applicable for the basic problem of the invention.

Reasons for the Decision

1. *Novelty*

1.1 There is general agreement that document D2 is the closest prior art.

It is undisputed that this document discloses

(a) an inspecting device for a print for inspecting defect occurred on a print pattern of a printed sheet, comprising an optical detecting device for detecting image information at every pixel by optically scanning the print pattern of the printed sheet in a direction perpendicularly to the feeding direction of the printed sheet,

(b) reference information storing means for storing the image information at every pixel of the print pattern of the normal printed sheet as reference information,

(c) first differential calculating means for calculating the difference between the detected image information and the reference information.

This document, further, discloses a second differential calculating means (D2, column 4, lines 12 to 21) and

(f) comparing means for comparing the differential signal produced by said second differential calculating means with a predetermined allowable

value to output an error signal indicating the presence of a printing defect on the print pattern when the differential signal exceeds the allowable range (D2, Figure, reference numerals 9 and 17/12; column 5, lines 22 to 47; column 7 lines 40 to 58).

1.2 Consequently, the subject-matter of Claim 1 differs from what is disclosed in document D2 by

(d) delay means for delaying the differential signal produced by said first differential means by several pixels in the scanning direction of said optical detecting device, and in that

(e) the said second differential calculating means calculate the difference between the differential signal produced by said first differential calculating means and a differential signal delayed and produced by said delay means.

Since, therefore, even the closest prior art does not disclose the whole combination of features of Claim 1, novelty cannot be questioned on the basis of the documents cited by the appellant.

2. *Inventive step*

2.1 According to its description (EP-B-0 194 331, page 2, lines 19 to 30, and lines 55 to 59; page 7, lines 52 to 57), the patent in suit aims at solving the problem of creating an inspecting device of a printed sheet which is usable on-line in a printing process and which is capable of detecting and rating printing defects, such as dripped oil or stains, independently of global variations in colour density. Moreover, the circuit arrangement of the inspecting device should be simplified.

The inspecting device according to document D2, its "Tönungskorrektur" step being activated, is obviously capable of detecting and rating printing defects independently of global variations in colour density. For this purpose, the known device comprises means to store the differential signals of a certain area surrounding a pixel under examination and to calculate their average value. This average value is then subtracted from the differential value of the pixel under examination. This means that the rating of any pixel cannot be done immediately after the determination of the differential value of this pixel under examination but has to wait until the differential values of a certain amount of upstream pixels, which are needed for the calculation of the said average value, have been determined. Even disregarding the fact that the known device requires a not negligible data storing and computing capacity to perform its intended function, the average calculating step, depending on how large the area surrounding the pixel under examination is chosen, brings about a certain sluggishness of the rating process which may inhibit the incorporation of the inspecting device into a printing production line and having it working in pace therewith.

2.2 Consequently, an on-line use, as it is intended by the patent in suit, requires that the means performing the step of "Tönungskorrektur" should work as "real time" as possible with the least possible hardware investment.

2.3 Starting from document D2 as the closest prior art, the subject-matter of Claim 1 meets these requirements by the combination of the features (d) and (e) enumerated under point 1.2 above.

The Board concurs with the appellant that the principle of this solution consists in that a differential value delayed by several pixels, instead of an average value calculated from the differential values in a certain area surrounding an actually determined differential value, is subtracted from the actually determined differential value.

2.4 The Board, however, cannot follow the appellant's assertion that this solution is obvious in the light of the documents D6 or D4 or even of what is generally known as the principle of autocorrelation.

Document D2 is particularly concerned with the inspection and rating of freshly printed banknotes which have to meet a higher standard of quality than "normal" print products. Consequently in the best mode of executing its teaching which is apt for the inspection of banknotes and is represented by the diagram of its only Figure, document D2, between the means (8) for calculating the first differential value and the final quality rating means (12), has arranged a hierarchy of the three correction steps "Tönungskorrektur 9", "Minimalschwellenkorrektur 10", and "Fehlerbergbildung 10". Document D2, in its description (column 7 lines 36 to 58), states that the quality rating means 12 may be arranged after "Tönungskorrektur 9" or even immediately after the first differential calculating means. These simpler embodiments are less precise and applicable whenever a lower quality of the printed product is acceptable.

The patent in suit concerns a product the rating of which requires a correction with respect to variations or the colour density (EP-B-0 194 331, page 2, lines 58 and 59). A person skilled in the art, who wants to apply the teaching of document D2 to inspect his printed

product, may omit the steps "Minimalschwellenkorrektur 10" and "Fehlerbergbildung 11" but must maintain the step "Tönungskorrektur 8".

As already mentioned in point 2.1 above, the "Tönungskorrektur 9" involves the calculation of an average value from the differential values of all the pixels located in a certain area surrounding the pixel under consideration. This means that values of pixels have to be considered which are determined by the same sensor as the pixel under consideration but lie upstream and downstream of the latter together with values of pixels which are determined simultaneously but by neighbouring sensors in the array.

The person skilled in the art who wants to make the known device fit for the use in a production line and therefore to increase its rating speed and to reduce its calculating and data storing capacity would, in the first place, tend to reduce the number of pixels used to calculate the average value entered in the "Tönungskorrektur" before he would start to search for solutions lying outside the philosophy of the teaching given in document D2.

2.5 Document D6 discloses a device for the rating of dirty banknotes and, for this purpose, scans along one single track along the margin of the banknote which is free of a print pattern. The single photodiode sensor delivers a continuous analogous signal (page 9, second paragraph, Figure 5) from which the same signal is subtracted which has been delayed by a delay line and results in an analogous differential curve (Figure 4c) having a swing whenever the scanning sensor meets a dirty crease running across the banknote. Since this known device functions on a merely analogous basis, there is no

dissolving of image information into pixels. Moreover, there is no scanning in a direction perpendicularly to the feeding direction.

Before he could even consider the teaching of document D6 to modify, a person skilled in the art would first have to have the idea to replace the digitally working scanning array used according to document D2 (column 2, lines 9 to 35) by an array of photodiodes delivering analogous signal curves which would have to be treated independently of each other. Having done this rather improbable mental step the skilled person would finally arrive at an analogously working device which would have nothing to do with the device according to Claim 1.

2.6 Document D4 is concerned with the detection of irregularities which may occur in the regular pattern plates for television screens. This device is particularly adapted to the periodicity of the pattern. Since this condition does not occur in the print products which are to be inspected by the device according to the patent in suit, this document has no relevance to the subject-matter of Claim 1.

2.7 Autocorrelation is generally known as a concept from the theory of irregular processes and is normally used to predict the probable future behaviour of a time dependent variable. The determination of the autocorrelation function involves a sophisticated calculation involving a plurality of stochastically determined values and resembles more the average calculation applied according to document D2 than to the simple subtraction of two values used according to the patent in suit.

2.8 Therefore, the subject-matter of the independent Claim 1 as granted involves an inventive step.

The subject-matter of the dependent Claims 2 to 8 concerns particular embodiments of the device according to Claim 1, they are, therefore also not objectionable under Article 52 EPC.

3. The grounds for opposition invoked by the appellant do not therefore prejudice the maintenance of the patent unamended.

The main request of the respondent being allowable, his auxiliary requests need not be considered.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Townend G. Gall