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D E C I S I O N
of 4 February 2004

Case Number: T 0889/01 - 3.4.1

Application Number: 91113069.8

Publication Number: 0485694

IPC: G07D 7/00

Language of the proceedings: EN

Title of invention:
High-speed document verification system

Appellant II/Patentee:
EMPIRE BLUE CROSS/BLUE SHIELD, et al

Appellant I/Opponent:
Giesecke & Devrient GmbH

Headword:

-

Relevant legal provisions:
EPC Art. 100(a), 52(1), 54, 56

Keyword:

-

Decisions cited:

-

Catchword:

-



Case Number: T 0889/01 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 4 February 2004

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Representative: -

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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
7 May 2001 concerning maintenance of European
patent No. 0485694 in amended form.

Composition of the Board:

Chairman: G. Davies
Members: M. G. L. Rognoni
G. Assi

Summary of Facts and Submissions

I. The opponent (appellant I) lodged an appeal, received on 5 July 2001, against the interlocutory decision of the opposition division, despatched on 7 May 2001, maintaining the European patent No. 0 485 694 in amended form. The appeal fee was paid on 5 July 2001 and the statement setting out the grounds of appeal was received on 10 September 2001.

The patent proprietor (appellant II) lodged an appeal against the opposition division's decision on 17 July 2001, paid the appeal fee on the same day and filed the statement of grounds of appeal on 17 September 2001.

II. The opposition had been filed against the patent as a whole, based on Article 100(a) EPC and concerned, in particular, objections under Articles 52(1), 54 and 56 EPC.

III. In the statement of grounds of appeal, the opponent referred, *inter alia*, to the following documents:

E1: DE-A-29 36 409

E2: CH-A-645 308

E6: EP-A-0 101 115

IV. Oral proceedings were held on 4 February 2004.

V. The opponent requested that the decision under appeal be set aside and the patent revoked.

VI. The patent proprietor requested that the decision under appeal be set aside and that the patent be maintained:

- as granted (**main request**);

or on the basis of the following documents:

- claims 1 to 31 as granted with amended pages 2 and 3 of the description filed on 2 January 2004 and drawings as granted (**first auxiliary request**);

- claims 1 to 28 filed on 17 September 2001 with the description to be adapted and drawings as granted (**second auxiliary request**);

- claims 1 to 25, columns 1 to 6 of the description filed on 6 February 2001 and drawings as granted (**third auxiliary request**);

- claims 1 to 21, amended columns 2 to 4 of the description filed on 2 January 2004 and drawings as granted (**fourth auxiliary request**);

- claims 1 to 19 filed on 2 January 2004 with the description to be adapted and drawings as granted (**fifth auxiliary request**).

VII. The wordings of claim 1 according to the patent proprietor's requests read as follows:

Main request and first auxiliary request:

"1. A document (10) for a document verification system comprising paper (14) having at least a portion

thereof printed with a pattern (12), said pattern having a predetermined arrangement of areas having differences that are not readily detected by the human eye but are readily detected by an optical scanner, the differences representing information regarding the document,

characterised in that

said differences correspond to variations in the print density of said pattern printed on said document."

Second and third auxiliary requests

"1. A document (10) for a document verification system comprising paper (14) having at least a portion thereof printed with a pattern (12) being essentially invisible to the human eye, said pattern having a predetermined arrangement of areas having differences that are not readily detected by the human eye but are readily detected by an optical scanner, the differences representing information regarding the document,

characterised in that

said differences correspond to variations in the print density of said pattern printed on said document."

Fourth auxiliary request

"1. A high-speed document verification system for use with documents having at least a portion thereof printed with a predetermined pattern being essentially invisible to the human eye, said pattern having areas having differences that are

not readily detected by the human eye but are readily detected by an optical scanner, wherein the differences correspond to variations in the print density of said pattern printed on a document and represent information regarding the document, comprising:

a high-speed document scanner, said scanner producing a graphic image of a scanned document printed with varying print densities; and

a comparison unit programmed for detecting varying print densities and the presence and absence of the predetermined arrangement on said graphic image."

Fifth auxiliary request

"1. A high-speed document verification system for use with documents having at least a portion thereof printed with a predetermined pattern being essentially invisible to the human eye, said pattern having areas having differences that are not readily detected by the human eye but are readily detected by an optical scanner, wherein the differences correspond to variations in the print density of said pattern printed on a document and represent information regarding the document, comprising:

a high-speed document scanner, said scanner producing a graphic image of a scanned document printed with varying print densities; and

a comparison unit programmed for detecting varying print densities and the presence and absence of the predetermined arrangement on said graphic image, wherein said comparison unit is an optical character recognition system."

VIII. The opponent argued essentially as follows:

The word "*pattern*" in claim 1 according to the **main request** and to the **first auxiliary request** related to areas of the claimed document which could be printed on a printed or unprinted background. E1 showed a document for a document verification system comprising a pattern of printed characters which carried information regarding the document's authenticity in the form of variations in their respective print densities. As all the features recited in claim 1 were known from E1, the subject-matter of this claim was not new within the meaning of Article 54 EPC.

Claim 1 according to the **second and third auxiliary requests** differed from claim 1 according to the main request in that the pattern was "*essentially invisible to the human eye*". E2 taught to make a pattern invisible to the human eye by printing the pattern areas and their background with lines of varying resolution. One of the embodiments shown in E1 (see Figure 3) used characters printed with lines of different thickness and spacing in order to obtain contrast variations invisible to the human eye. Though E1 did not specify that also the background could be printed with lines so as to make the characters indistinguishable, it would have been obvious to a person skilled in the art to combine the teachings of

E1 and E2 and thus arrive at the claimed document. Thus, the subject-matter of claim 1 did not involve an inventive step within the meaning of Article 56 EPC.

As to claim 1 according to the **fourth auxiliary request** and claim 1 according to the **fifth auxiliary request**, their subject-matter could not be regarded as inventive because it related to a system which relied on features known from E6 for verifying documents on the basis of an obvious printed pattern. Moreover, according to the description of the patent in suit, systems as claimed were known.

IX. The patentee's arguments can be summarized as follows:

E1 did not take away the novelty of the subject-matter of claim 1 according to the **main and first auxiliary requests** because the wording of the claim clearly and unambiguously identified a "*printed pattern*" as an arrangement of **adjacent** areas printed with different degrees of print density. Hence, this claim excluded strings of characters printed on an unprinted background, as shown in E1. In fact, all specific embodiments of the contested patent showed a pattern consisting of a printed background and a printed foreground defining a word or an icon. Even if the description contained a portion that might be interpreted as an embodiment not covered by the expression "*a portion thereof printed with a pattern*", it was the description which was in contrast with the unambiguous definition used in the claim and which had to be properly interpreted by the person skilled in the art. Such a person, reading the description in the context of the present invention and realizing that it

contained some unclear passages, would not give the word "pattern" an interpretation which did not conform with the wording of the whole independent claim.

Claim 1 according to the **second and third auxiliary requests** further specified that the pattern was "*essentially invisible to the human eye*". This feature necessarily excluded patterns consisting of printed areas on an unprinted background . Though E2 appeared to show such a pattern, it did not constitute relevant prior art because it addressed the problem of distinguishing photocopies from original documents. Moreover, E2 taught to print the pattern areas with lines of varying thickness and spacing so as to obtain a **uniform** print density, defined as the ratio between the surface area covered with ink and the total surface area. This feature went against the teaching of the present invention, as specified in claim 1, which required that the information regarding the document should be encoded as **variations** in the print density. Hence, the subject-matter of claim 1 was novel and inventive with respect to E1 and E2.

Claim 1 according to the **fourth auxiliary request** related to a high-speed document verification system "*for use*" with documents having a particular identification pattern. Even if the claim specified some features which appeared to be known from E6, the explicit reference to the documents to be verified distinguished the claimed system from the prior art. In fact, it would not have been obvious to a person skilled in the art, starting from E6, to effect all the alterations and adjustments required to verify documents marked with the special patterns of the

present invention. The high-speed document verification system specified in claim 5 according to the fifth auxiliary request was further removed from the prior art, since its comparison unit was "*an optical character recognition system*". Hence, both requests were based on subject-matter which was new and inventive over the prior art.

Reasons for the Decision

1. The appeal is admissible.
2. The patent in suit relates to a document verification system which utilises optical scanning techniques to detect a pattern printed on the document to be verified. The document's validity is checked by the differential response of an optical scanner to subtle variations in the reflectivity of the printed pattern. As pointed out in the description (cf published patent specification, column 2, lines 13 to 19), these variations may be in the width of lines in the pattern (resolution), or in the density or fluorescence of the ink used for printing the pattern.

Main and first auxiliary requests

- 3.1 Claim 1 of the main and first auxiliary requests are directed to a document for a document verification system comprising essentially the following features:
 - (a) paper having "*at least a portion thereof printed with a pattern*",

- (b) the pattern having "*a predetermined arrangement of areas having differences that are not readily detected by the human eye but are readily detected by an optical scanner*",
- (c) the "*differences representing information*" regarding the document,
- (d) the differences correspond to "*variations in the print density of said pattern printed on said document*".

3.2 Document E1 relates, *inter alia*, to a document provided with a security code which may be used to guarantee its authenticity (cf page 4 (hand-written numbering), lines 11 to 14). The security code consists in attributing some predetermined physical and /or chemical "properties", such as different half-tones or colour densities, to selected characters printed on the document. The verification device establishes the document's authenticity when the printed characters show the predetermined properties.

The background on which the characters are printed may be coloured and may be different from one character to another, whereby their differences, which remain invisible to the human eye, can be based on different colour densities or different contrasts with respect to the background (cf page 6, lines 3 to 5).

3.3 Thus, E1 shows a document for a document verification system comprising the following features recited in claim 1:

- (i) paper having a portion thereof printed with "characters";
- (ii) said string of characters having a predetermined arrangement of areas having differences that are not readily detected by the human eye but are readily detected by an optical scanner, the differences representing information regarding the document, ie its authenticity;
- (iii) said differences correspond to variations in the print density of said "characters" printed on said document.

4.1 As to the expression "*paper having at least a portion thereof printed with a pattern*", the Board considers, in accordance with the opponent's view, that it does not necessarily define a portion **completely** covered by an arrangement of printed areas, but it may also relate to a portion of the claimed document which bears an arrangement of printed areas separated by unprinted spaces.

4.2 This reading of claim 1 of the main and first auxiliary requests is further confirmed by several passages of the description which refer to "*pattern*" as an arrangement of printed areas of higher reflectivity separated by spaces of lower reflectivity, or of areas printed with fluorescent ink on a unspecified background (emphasis added):

- (column 3, lines 37 to 42) - "*A check 10, as shown here, or any document which may require verification, is printed so that a predetermined*

pattern or icon has a higher reflectivity (e.g., due to higher density ink, fluorescent inks or lower resolution lines) than the remainder of the document".

- (column 4, lines 44 to 50) - *"If a portion of the document is coated with an ink having fluorescent properties, the area having the fluorescent ink can readily be detected. The scanner for such a document must shine an ultraviolet or "black light" on the document during the scanning process in order for the pattern to appear on the "graphics image file."*

 - (column 2, line 58 to column 3, line 5) - *"Alternatively, the reflectivity can be varied between portions of the document by coating one portion with ink having fluorescent material."*
- 4.3 In other words, a "pattern" could be formed by coating some areas of the document with a fluorescent ink, whereby the background need not be covered with ink of different fluorescence. In fact, the addition of a fluorescent background would even appear to make the detection of a fluorescent foreground, which contains "information regarding the document", more difficult.
- 4.4 Thus, the Board has no reason to believe that the wording "at least a portion printed with a pattern" was intended to define only portions completely covered with an arrangement of printed areas, and that the cited passages of the description should not be construed as possible embodiments of the claimed invention.

4.5 Furthermore, it should be added that E1 explicitly refers to characters being printed on a data carrier provided with a half-tone pattern, so that the contrast of the individual characters may be determined with respect to the corresponding background (see E1, page 6, line 26 to page 7, line 1: "*Eine weitere Möglichkeit besteht darin, einen Datenträger, der beispielsweise mit einem Grautonmuster versehen ist, mit den aufzubringenden Daten zu bedrucken, und die Bedruckung anschließend mit einer Leseeinrichtung abzutasten, die für die Einzeldaten den Kontrast relativ zu dem jeweiligen Untergrund feststellt*"). Though E1 does not specify how to form the half-tone pattern, it is implicit that such pattern could be applied by printing.

4.6 As the document for a document verification system known from E1 falls within the terms of claim 1 of the main and first auxiliary requests, the subject-matter of this claim is not new within the meaning of Article 54 EPC.

Second and third auxiliary requests

5.1 Claim 1 according to the second and third auxiliary requests differs from claim 1 of the main and first auxiliary requests in that the pattern is "*essentially invisible to the human eye*".

5.2 According to the patent proprietor, the wording "*essentially invisible*" necessarily implied that all areas of the portion of the document paper which constituted the pattern were printed and that the pattern was "*invisible*" in the sense that the whole

printed portion appeared **uniform** to the human eye, so that no actual pattern was distinguishable.

5.3 This interpretation of the claim is supported by the description which, *inter alia*, specifies that the "*pattern of low and high density areas is arranged so that it can be detected by the scanner and recognized by the comparison unit, but is essentially invisible to the human eye*" (column 2, lines 52 to 57).

6.1 As pointed out above, E1 teaches, *inter alia*, that the document may be provided with a half-tone pattern ("*mit einem Grautonmuster versehen*" (page 6, line 27)), on which characters are printed with different print densities in order to encode security information. In this case, the reading device would then determine the contrast of the individual characters with respect to the associated background (cf page 6, line 26 to page 7, line 1).

6.2 The subject-matter of claim 1 of the requests under consideration differs from the above embodiment of E1 in that:

(i) the pattern is essentially invisible to the human eye;

and in that the above feature implies that:

(ii) the background is printed.

6.3 As to feature (ii), it is implicit to the teaching of E1 that a half-tone pattern ("*Grautonmuster*") could be formed by printing (see item 4.5 above).

As to feature (i), it involves the selection of "print densities" which the human eye cannot distinguish but which can be detected by an optical scanner.

6.4 E2 teaches to provide a document with a portion thereof printed with a pattern essentially invisible to the human eye (see Figure 1 and page 3, left-hand column, lines 41 to 43). The pattern consists of a predetermined arrangement of areas (2, 4) (Figure 1) having "differences" ("*Kontrast zwischen Flächenbereichen 2 und Zonen 4 auf der Kopie*", page 3, left-hand column, lines 60 to 62) which are not readily detected by the human eye but are readily detected by an optical scanner (cf page 3, left-hand column, lines 46 to 64). Such "differences" are obtained by printing areas with lines of varying resolution (see page 3, left-hand column, lines 29 to 34).

6.5 According to the patent proprietor, the teaching underlying the present invention was clearly distinguishable from E2 because the former relied on different print densities, whereas each area of the pattern (ie of the icon and of the background) shown in E2 had a print density, defined as the ratio between the surface covered with ink and the total surface, which was kept constant in order to make the pattern invisible to the human eye (cf E2, page 3, left-hand column, lines 34 to 37: "Die Liniendicke (Anzahl Linien pro cm) ist so gewählt, dass die Flächenbereiche 2 und die angrenzenden Zonen 4 jeweils dieselbe bedruckte Fläche pro Flächeneinheit aufweisen").

6.6 This objection would be correct, if the expression "print density" in the contested patent referred to a **uniform** distribution of ink over a predetermined area. However, as correctly pointed out by the patentee in the letter dated 27 March 2002 (emphasis added):

"A definition of the expression variations in the print density of the pattern is readily obtained from the patent specification by looking at the structure of the claim set and the embodiments of the inventions covered by these claims ..." (page 5, paragraph 2)

"From the above structure it is quite clear that the expression "variations in print density" is the generic term for all differences between the areas of the first type (word, icon, specified area) and of the second type (background) which are obtained by printing the areas of the first type and the areas of the second type in a different manner." (page 5, paragraph 3)

"Then on a first level, the variations in the print density can be embodied by printing the first and second type of areas with lines of varying resolution (4th embodiment) ..." (page 6, paragraph 1)

6.7 In fact, the description of the patent in suit points out the following:

"the density variation ... could be an icon or merely a specified area of denser (or less dense) ink or higher resolution lines" (column 3, lines 46 to 49);

"... the patterns recognized on a video image of the document may be due to the resolution limitations of

the scanner in conjunction with reduced width and close spacing of the pattern lines in certain areas"
(column 6, lines 1 to 5).

- 6.8 Hence, the fact that the pattern known from E2 comprises areas with lines of reduced width and closer spacing implies that such areas show "*variations of the print density*" according to the definition given in the contested patent.

As to the provision in E2 of selecting the line widths and spacings in the different areas so that the ratio between printed and unprinted surface areas is substantially constant, this constitutes an additional feature **not excluded** by the contested patent and essentially directed to making the pattern invisible to the viewer by reducing the contrast between different areas, as sensed by the human eye.

- 7.1 A question to be considered now is whether it would have occurred to the person skilled in the art to combine the documents E1 and E2.

E1 teaches essentially to code information concerning the authenticity of a document in areas which are printed so as to have a different contrast with respect to the corresponding background. According to one embodiment, a character (a predetermined area of the pattern) may be printed with lines of varying resolution in such a way that the selection of the spacing determines the detected half-tone (E1, page 10, lines 6 to 10: "*Bei dem Zeichen 17 in Fig. 3 bestehen die dickeren Striche aus mehreren dicht nebeneinanderliegenden dünnen Einzelstrichen. Dadurch*

kann einerseits der Grauwert des Schriftzeichens beeinflußt werden, indem der Strichabstand der dünnen Einzelstriche entsprechend gewählt wird.")

Furthermore, E1 specifies that the reading head may be chosen with an optical resolution sufficient either to recognize the separate lines or to determine merely the half-tone resulting from a plurality of thin lines (page 10, lines 10 to 16: "*Das Schriftzeichen 17 bietet außerdem eine weitere Möglichkeit der Auswertung mit zwei Leseköpfen, von denen der eine ein solches optisches Auflösungsvermögen hat, daß er die Einzelstriche erkennt, während der andere ein geringeres Auflösungsvermögen hat und nur einen bestimmten Grauton feststellt*".)

7.2 In other words, E1 already hints at the possibility of using lines of different resolution to vary the contrast of the printed areas detected by an optical sensor and thus relies on the same solution adopted in E2 for a pattern detectable by an optical scanner but invisible to the human eye. The fact that the purpose of the pattern in E1 and E2 is different cannot be an obstacle to the combination of their teachings, since both E1 and E2 are essentially directed to the identification of a document by means of information carried by a printed pattern which is only detectable by an optical scanner.

7.3 Summarising, the Board considers that it would have been obvious to a person skilled in the art, starting from a document verification system known from E1 and wishing to render the pattern indicative of the document's authenticity essentially invisible to the

human eye, to rely on the teaching of E2 and thus arrive at a document falling within the terms of claim 1 of the second and third auxiliary requests (Article 56 EPC).

8.1 The above assessment of E2 implies that the pattern shown in Figures 1 and 2 and the pattern specified in claim 1 according to the second and third auxiliary requests have the same structural features and differ only in their functions (detection of a copy and verification of authenticity, respectively). However, since a document as shown in E2, ie identified by a pattern according to Figures 1 and 2, would also be suitable for a document verification system, it would not be distinguishable from the claimed subject-matter.

8.2 Thus, in the opinion of the Board, it can also be argued that the subject-matter of claim 1 of the second and third auxiliary requests is not new with respect to E2 (Article 54 EPC).

Fourth auxiliary request

9.1 Claim 1 according to the fourth auxiliary request relates to a "*high-speed document verification system*" for use with documents comprising all the features recited in claim 1 of the second and third auxiliary requests. Said system comprises:

- a high-speed document scanner, said scanner producing a graphic image of a scanned document printed with varying print densities; and

- a comparison unit programmed for detecting the varying print densities and the presence and absence of the predetermined arrangement on said graphic image.
- 9.2 Document E6 relates to a method and an apparatus for examining banknotes and similar valuable sheet-like objects. The apparatus comprises a matrix buffer memory having as many lines as there are light-sensitive cells, the number of columns corresponding to the number of times that the transverse dimension of said cells is comprised in the length of the largest area of the banknote to be examined. Each memory cell is adapted to contain a plurality of digital values corresponding to the different light densities measured by the light sensitive cells, in such a manner that this buffer memory will form a digital picture of the transmission pattern of the banknote. The memory contents are compared in a comparator with the corresponding contents of partial memories, each comprising a standard pattern for specific banknote value (cf. page 2, lines 15 to 33).
- 9.3 As the graphic image referred to in the claimed system is merely a digital image stored in a memory and claim 1 is not limited to reflection scanners, all the features of the system according to this claim are known from E6.
- 9.4 According to the patentee, however, the fact that the system according to claim 1 was meant to be "*for use*" with a document having a particular validation pattern implied that its components had to be especially adapted for this purpose and, thus, that they were

different from the corresponding features of E6, which were merely used to examine banknotes.

9.5 It may be open to question whether the clause "for use" in the present case implies some special feature which would distinguish the claimed system from the prior art. However, it cannot involve any inventive step on the part of the skilled person to make a system as shown in E6 suitable for verifying documents on the basis of a procedure known from E1 and of printed patterns which are also known from E1 or result from an obvious combination of the teachings of E1 and E2. This opinion of the Board is corroborated by the fact that the description of the contested patent contains, for instance, the following direct references to prior art scanning systems or high-speed check handling devices considered suitable for use with the described documents:

- *"High speed check handling equipment is also known in the art; for instance U.S. Patent No. 4,523,330 to Cain and the UNISYS Reader Sorter DT. These devices create a video image of each check to be processed. The data on the check's image may then be forwarded to an operator to verify payment."*
(patent specification: column 1, lines 35 to 40)

- *"The documents to be verified are fed into the high-speed scanner 27, which has a resolution and density discrimination capabilities. The IBM 3898 Image Processor and the UNISYS Reader Sorter DT series have these capabilities."* (ibid. column 4, lines 21 to 25)

- "The system described above may be attached to the high-speed check scanners already known in the art, such as the UNISYS Reader Sorter DT or IBM 3898 Image Processor." (column 5, lines 38 to 41)

9.6 Hence, the subject-matter of claim 1 according to the fourth auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

Fifth auxiliary request

10.1 Claim 1 according to the fifth auxiliary request is directed to a high-speed verification system as recited in claim 1 of the preceding request with the additional feature that *"the comparison unit is an optical character recognition system"*.

As specified in the description of the contested patent (column 5, lines 35 to 36), more *"complicated markings will require the use of an Optical Character Recognition system as the comparison unit 29"*.

10.2 E6 teaches to form a digital image of the pattern of a banknote and to compare it in a comparator with the corresponding contents of partial memories each comprising a standard pattern for a specific bank-note value, whereby the comparator is connected to a circuit adapted to perform a statistical correlation operation. Thus, the comparator operates as **a character recognition system** in the sense that it looks for the best match between a sensed image and a plurality of stored images in order to identify the sensed image.

10.3 In other words, the document verification system according to claim 1 is based on features known from E6 and, consequently, for the same reasons given above, it does not involve an inventive step within the meaning of Article 56 EPC.

11. In summary, the Board finds that none of the appellant's requests is allowable and that, therefore, there is no basis for the maintenance of the patent.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

R. Schumacher

G. Davies