BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 418/90 - 3.5.1

Application No.: 83 201 561.4

Publication No.: 0 142 579

Title of invention: Recording apparatus

Classification: H04N 1/18

D E C I S I O N
of 4 February 1991

Applicant:

Proprietor of the patent: Agfa-Gevaert naamloze vennootschap

Opponent: Océ-Nederland B.V., Venlo

Headword:

EPC Articles 54(2), 56

Keyword: "Novelty (affirmed)"
"Inventive step (yes)"

Headnote

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 418/90 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 4 February 1991

Appellant : (Proprietor of the patent)
Agfa-Gevaert
naamloze vennootschap
Septestraat 27
B-2510 Mortsel
(BE)

Representative :

Respondent : (Opponent)
Océ-Nederland B.V., Venlo
Patents and Information
Postbus 101
NL-5900 MA Venlo
(NL)

Representative :

Decision under appeal :
Decision of Opposition Division of the European Patent Office dated 27 March 1990 revoking European patent No. 0 142 579 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : P.K.J. van den Berg
Members : R. Randes
M.V.E. Lewenton

Summary of Facts and Submissions

I. European patent No. 142 579 was granted on 18 May 1988 with five claims in response to the European application No. 83 201 561.4, filed on 1 November 1983.

Claim 1 of the patent as granted reads as follows:

"1. A recording apparatus for linewise recording information on a moving photoreceptor, said apparatus comprising a recording head with a multiplicity of individually addressable and energisable point-like radiation sources arranged in staggered parallel rows for irradiating points across a photoreceptor during movement thereof relative to and in a direction normal to said rows, and driver circuits for simultaneously energising the radiation sources of each row responsive to respective data bit input signals serially applied to said driver circuits during an information line period, there being delay means for delaying energisation of the radiation sources of a first said row relative to the energisation of the sources of a second said row thereby to compensate for the distance between such rows, characterised in that
(a) the said driver circuits are provided with means which restricts the individual line exposure times for which the radiation sources of each row are energised, to a value less than one line period;
(b) the apparatus includes speed monitor means (80) for monitoring the speed of a said photoreceptor and yielding output signals indicative of photoreceptor speed variations;
(c) there is trigger means (75) effective for initiating the energisation period of each of said rows of radiation sources, by the respective received energising signals, at a moment subsequent to the commencement of one line period; and

(d) said trigger means (75) is responsive to said output signals from said speed monitor means so that the moment of initiation of the energisation period of said first row of radiation sources by data bit signals pertaining to an information line is automatically determined in dependence on any change in the photoreceptor speed subsequent to the energisation of said second row of radiation source by their data bit signals pertaining to that same information line thereby to achieve transverse alignment of the projected information line points on the photoreceptor."

The references (a), (b), (c) and (d) to the corresponding characterising features of Claim 1, although not present in the patent specification, have been used during the opposition proceedings.

II. A notice of opposition was filed against the European patent on 14 February 1989 requesting the revocation of the patent in view of the following documents:

D1: EP-A-0 051 886
D2: US-A-4 096 486
D3: US-A-4 074 318

During the opposition proceedings, after the time limit of opposition, the Opponent further cited

D4: US-A-4 318 597,

which corresponds to FR-A-2 463 680, cited in the European Search Report.

III. By a decision issued in writing on 27 March 1990, the Opposition Division revoked the patent, holding that the alleged invention was lacking in any inventive step having regard to the teachings of D1 and D2.

The Opposition Division felt that D1, representing the closest state of the art, disclosed the characterising feature (b) as well as the subject-matter of the pre-characterising part of Claim 1. Having regard to the wording of Claim 1, according to the Opposition Division all the other characterising features, that is (a), (c) and (d), could be read onto D2. It therefore appeared that the subject-matter of Claim 1 would be obvious to a skilled man. The Opposition Division in its decision mainly relied on the arguments put forward by the Opponent and pointed out that the proprietor (Appellant) had made no comments whatsoever concerning the disclosure of D2 let alone its relevance to the question of inventive step, as posed in the notice of opposition.

IV. An appeal against this decision was lodged and the appropriate fee was paid on 21 May 1990. The Grounds of Appeal were filed on 25 June 1990. The Appellant (the patent Proprietor) sought the reversal of the decision of the Opposition Division. Moreover the Appellant pointed out that the value of "d", column 10, line 54 in the description of the granted patent given to 0.010 μs was not correct and proposed to change it to the alleged correct value of 10 μs.

The Appellant was of the opinion that the combination of the documents D1 and D2 did not lead the skilled man to a design of a recording apparatus according to the granted Claim 1. It was admitted that the subject-matter of the pre-characterising part and moreover the characterising feature (b) of granted Claim 1 was disclosed by D1. However the characterising features (a), (c) and (d) were not disclosed by D2 as suggested by the Opposition Division and therefore the subject-matter of Claim 1 could not be considered as being obvious to a skilled man.

V. The Respondent did not comment on the arguments put forward by the Appellant. In order to avoid repetition of arguments, the arguments in Respondent's letter of 26 September 1989, filed on 28 September 1989, are referred to instead.

Moreover the Respondent represented the view that the proposed amendment made by the Appellant was not allowable, as it was not at all clear from the original application that the mentioned value should be 10 μs as proposed by the Appellant.

The Respondent requested that the appeal should be dismissed.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. To start with, the Board feels it necessary to find out if the proposed amendment (see under part IV above) made by the Appellant could be accepted. At first sight this question does not appear to be of great importance. However, the ambiguity causing the said proposal of amendment was already inherent during the opposition proceedings or directly involved in the arguments put forward by the parties and gave rise to different interpretations of granted Claim 1 having regard to the cited references. Therefore it appears to be desirable to investigate this question.

2.1 The said value of "d" relates to the time interval between the start of a line period (marked by load impulse 83 in Figure 8A in the patent specification) and the beginning of the trigging impulse 79 (Figure 8C). The beginning of the said impulse 79 is to be understood as the said "moment subsequent to the commencement of one line period" mentioned in the characterising feature (c) of the granted Claim 1 and which is initiated by the said trigger means (reference numeral 75 in Figure 7).

2.2 The Appellant, when calculating the value of "d" in the grounds of appeal, uses Figure 8 and the corresponding text. He thereby starts from a line period "a" of 625 μs (column 10, line 23) and points out that in the normal operation the trigger period "b" (impulse 79 in Figure 8C) is located symmetrically within the line period. Therefore "d" = (a-b):2 = 112.5 (μs).

The Respondent, however, feels that this derivation from the schematic Figure 8 is wishful thinking and therefore not allowed. On the other hand he asks why it should be immediately clear for a skilled man that the value 0.010 μs is wrong and should be 10 μs.

2.3 To the Board it appears that in this case it is allowable to suppose that the trigger pulse "b" must be located approximately symmetric within the line period "a", since Figure 8D clearly discloses that it must be possible both to retard and to advance the trigger impulse "c" (78,78'and 78" corresponding to impulse 79 in Figure 8C) in order to achieve transverse alignment of the projected information line points (compare column 11, lines 23 to 26 in the patent specification). Thus it appears that the said value of "d", derived from the said given values of "a" and "b", can be considered to be of the order of 100 μs.

Moreover it appears that also from the data given in column 12 in the patent specification and pertaining to a particular embodiment a minimum value for "d" can be calculated. In this case the line period "a" is also 625 μs whereby the maximum pulse duration "b" is said to be 99% of the line period. Thus "d" minimum is approximately 3 μs ((a-b):2). Therefore "d" in this case could be considered to be of the order of 1 or 10 μs.

2.4 Having regard to the teaching of the patent specification, it thus appears that the mentioned value 0.010 μs of "d" given at line 54 in column 10 is not correct. However the Board, like the Respondent, is of the opinion that the proposed amendment in this case cannot be allowed. It appears, as the Respondent says, that a value of 100 μs would be more appropriate, as the specific example of 0.010 μs (column 10, line 54) in the patent description is mentioned directly after the values of "a" and "b" (corresponding to Figure 8c) which, as shown, indicate a value of "d" of the order of 100 μs.

To the Board, it appears however that no correction is necessary. To the skilled man it is in any case clear that the given value is false. Thus the time period "d" can in no way be interpreted as the delay time of some electrical components as proposed by the Respondent in his letter to the Opposition Division of 26 September 1989 (numbered paragraph 4). To the Board it appears that the content of the whole patent (description and the claims) clearly gives the impression that according to the invention the trigger impulse (79 and 78) is to be shifted within the line period. This fact is especially supported by Claim 2, wherein it is stated that the periods for which the radiation sources of said first and second rows are energised can be varied in order to vary the optical density of the information record on a photoreceptor.

2.5 It appears that the expression "a moment subsequent to the commencement of one line period" in the characterising feature (c) should be interpreted as a moment "after the commencement ..." or "later than the commencement ...". Having regard to the wording of the characterising feature (a), it however appears that the characterising feature (c) is clear enough. In feature (a) it is clearly said that the individual line exposure times are restricted to a value less than one line period. From this it thus must follow that the triggering of the energisation period according to feature (c) is delayed in relation to the beginning of the line period.

3. Although the Opposition Division revoked the granted patent on the grounds of lacking inventive step, it appears that the Respondent (Opponent) in the said mentioned letter of 26 September 1989 wanted to point out that D1 could be interpreted in such a way that it would destroy the novelty of Claim 1 of the granted patent.

The Board, like the Opposition Division, the Respondent and also the Appellant is of the opinion that D1 represents the closest prior art. The Board also concurs with the view of the Opposition Division and the parties that D1 discloses the subject-matter of the preamble of Claim 1 of the granted patent and moreover the characterising feature (b) of that claim.

However the Board cannot agree to the opinion of the Respondent put forward in the said mentioned letter of 26 September 1989, that also the features (a), (c) and (d) would be disclosed by D1. As has been explained under point 2.4 above, it is quite clear that the "moment subsequent to the commencement of one line period" in the

characterising feature (c) of Claim 1 in no way must be compared with a probable delay time of some electrical components in the recording system disclosed in D1.

The Board is also of the opinion that neither are the characterising features (a) and (d) disclosed by D1. Thus the Board does not agree with the interpretation made by the Respondent that D1 discloses that the line exposure time is restricted to a value less than one line period. It appears that the leading edge of an impulse 45a or 45b (Figure 7 in D1) starts the activation of the corresponding row of writing elements 20a and 20b, via the buffer registers 51a and 51b which hold the signal once this has been loaded into those registers by the closing of switches 52a and 52b. As has been noticed by the Appellant (letter of 30 January 1990, filed on 3 February 1990 - page 6, fourth paragraph), the termination time of the activation of the writing elements is not identified in D1. Therefore the conclusion made by the Respondent, that the trailing edge of the said impulses (45a, 45b) controls the termination of the activation is not correct. Thus the characterising feature (a) is not disclosed by D1. Neither is feature (d) disclosed by D1. This fact is apparent already in that - as has been shown above - D1 does not disclose such trigger means as defined in the characterising feature (c) of Claim 1 and the function of which is defined in the characterising feature (d) of Claim 1. Moreover, it appears, as has been observed by the Appellant (letter of 30 January 1990, filed on 3 February 1990, page 4 under "point 4"), that the light valves 22a in D1 are apparently activated with a delay of a fixed delta t. Nothing has been said of the possibility to make the delay variable with the speed. Thus, the disclosure of D1 does not destroy the novelty of the claimed subject-matter.

It may be noted that the control system 40 according to D1 takes indeed into account variations of the peripheral speed of the xerographic drum 12 but this governs the correct spacings of recorded information, i.e. equal distances between recorded lines. This has nothing to do with the alignment of points within one recorded line which, according to D1, is achieved by a delay delta t which is constant, as already noted.

The Board is further satisfied that none of the other documents cited discloses a recording apparatus having all the features set out in Claim 1, and since this was not disputed during the appeal proceedings, it is not necessary to give detailed reasons for this conclusion.

4. As shown above, the closest prior art is represented by D1. The subject-matter of the preamble of Claim 1 and moreover the characterising feature (b) are disclosed by that document. Thus the characterising features (a), (c) and (d) distinguish the subject-matter of Claim 1 from the teaching of D1.
The subject with which the invention according to the patent in suit is concerned can therefore principally be formulated as has been done by both parties, that is, when using radiation sources disposed in two rows, the illumination of the sources forming the more downstream (first) row according to the direction of motion of the photoreceptor, must be delayed relative to the sources of the other (second) row in order to assure that the projected images of the different rows of sources shall be on a common transverse line across the photoreceptor. The problem to be solved according to the introduction part of the description of the patent is to provide a recording apparatus wherein accurate alignment of the projected images of different rows of radiation sources is achieved

in a more convenient and economic manner, in that a complicated and expensive driving system is to be avoided, thus, that instead of using e.g. a voltage-controlled D.C. motor, a conventional asynchronous A.C. motor may be used, so that the said alignment will also be guaranteed when the speed of advance of the photoreceptor is not kept rigorously constant.

The Board feels that the objective problem also includes the condition that a variation of the radiated energy to each information line must be possible.

This problem is solved in the patent as described in Claim 1. By providing means which restrict the individual line exposure times (feature (a)), the energy radiated and corresponding to one information line can be easily controlled. As a cheap conventional drive mechanism is used and the speed of the photoreceptor is not constant, a speed monitor is provided (feature (b)) which controls the trigger means (feature (c)) in the way that - even if changes in the photoreceptor speed occur between the triggering of the second row and the first row - transverse alignment of the projected information line points on the photoreceptor is achieved from the two different rows of radiation sources (feature (d)).

5. As said under part III above, the Opposition Division in its decision relying on the arguments of the Opponent (Respondent) found that D2 disclosed the characterising features (a), (c) and (d) of Claim 1. However, the Board, having studied the said document D2 and the arguments put forward by the Appellant in the Grounds of Appeal, cannot identify such features in the text of D2.

5.1 D2 discloses a recording system having a plurality of parallel rows of LED's, the LED's in adjoining rows being

offset in a direction perpendicular to the transport direction of the recording medium. For any given transverse line of image points to be formed, the control signals associated with this line are applied to the different rows of LED's with different respective time delays. The control signals applied to the LED's of the nth row (as counted in the transport direction) are delayed in time relative to those applied to the LED's of the first row by a time interval which corresponds to the spacing between the first and the nth row and which takes account of the average speed of the relative transport between the LED's and the recording medium (see column 1, lines 44 to 54 in D2).

Therefore this recording system principally corresponds to the one as identified in the preamble of Claim 1 of the granted patent.

5.2 Figure 3 and the corresponding text in D2 (column 4) discloses, as pointed out by the Appellant (Grounds of Appeal, page 6), a control apparatus having many features corresponding to the ones shown in Figure 5 of the granted patent (shift-, latch- and delay registers). However it is nowhere disclosed that trigger means corresponding to feature (c) and/or means which restrict the individual line exposure time according to the characterising feature (a) of Claim 1 of the patent are present. In the only embodiment described in the description of D2 (the bridging paragraph between columns 4 and 5) the control signals to the successive LED-rows R_2, R_3,...R_{10} are arranged to be time-delayed by intervals corresponding to 10, 20, ...90 exposure cycles (line periods), which in no way does indicate that an individual line exposure time could be restricted within the corresponding line period. Therefore the idea that the individual exposure time could be exactly shifted within the corresponding line period in

accordance to the speed variations cannot be derived from that document. Thus, as correctly concluded by the Appellant, in the absence of features (c) and/or (a) in D2 it is not surprising that neither the characterising feature (d) can be disclosed therein.

5.3 Having regard to feature (b) of Claim 1 of the patent, it is said in D2 (column 1, lines 52 to 54) that the said delay time interval takes into account the average speed of the relative transport between the LED's and the recording medium. It appears that the Appellant rightly wonders whether the applicants of D2 ever recognized the consequences of instant speed variations (see the Grounds of Appeal, page 6). It is clear that the use of average speed to govern the delaying of the respective recordings will not produce the results achieved by the invention according to the patent in suit, because such average speed is not representative of instant speed changes. The teaching of D2 only gives the impression, that the drive mechanism in the arrangement is of the mentioned expensive type that is to be avoided by the invention.

5.4 Therefore the Board can see no convincing arguments why a skilled man who starts from the teaching of D1 and tries to solve the said problem by using the teaching of D2 would arrive at a recording apparatus according to Claim 1 of the granted patent.

5.5 The Board notices that the Respondent in his letter of 31 October 1990 did not defend the decision of the Opposition Division, but referred to the said letter of 26 September 1989, wherein his main objection against Claim 1 of the granted patent is to be seen therein, that D1 can be interpreted in the way that all the features of Claim 1 of the granted patent "are known from the said document or at least obviated by it". However, as has been

shown in part 3 above, D1 does in no way destroy the novelty of the subject-matter of Claim 1 of the granted patent. Neither can this document alone destroy the inventive step of the said subject-matter. Since D1 does not disclose - contrary to the opinion of the Respondent (Opponent) in the said letter of 26 September 1989 - any of the characterising features (a), (c) and (d), the skilled man cannot get any ideas from this document to solve the said problem (see part 4 above).

5.6 In the said letter of 26 September 1989 the Respondent (Opponent) also refers to documents D3 and D4.

D3 is said to be cited to show that it is known to vary the energisation period within a line period, whereby this period is said to start on a "control clock burst". However to the Board it appears that in this case the energisation period is varied because of a quite different principle than according to the granted patent. Thus the light output of each of the LED's is controlled successively and individually by controlling the time duration during which a corresponding LED is lit up while the intensity is kept constant. Moreover, in this document the expression "line period" has not been mentioned and its relation to the energisation period has not been discussed. In fact it appears, as the Appellant (Proprietor) has noticed in the letter of 30 January (filed on 3 February), page 7, that such unequal exposure times of different LED's in a row would lead to a line-wise distorted image when applied on the apparatus according to the patent. Thus, this document rather leads away from the invention and cannot contribute to the solution of the said problem.

D4 discloses a recording apparatus corresponding to the preamble of Claim 1. Figure 9 in D4 principally corresponds to Figure 5 in the granted patent. The Respondent apparently intends to say (the said letter of 26 September 1989) that enable-pulses given via input port 101 to the drivers 121 and 122 of the light emitting device arrays in the said document can be compared with the the trigger-pulses (feature (c)) according to the patent. Referring to the sentence, column 6, lines 14 to 17, that "the time intervals can be adjusted electrically by means of clock pulses given by L/V, assuming the displacement of the photosensitive surface 18 as V" (L = distance between two rows of light images), the Respondant suggests that this can be understood in the sense that there is an electrical adjustment means to adjust the clock pulse frequency as a function of the speed of the photoreceptor.

To the Board, however, it appears that the said enable-pulses as identified by the Respondant in D4 cannot be compared to the energising signals initiated by the trigger means (feature (c)) according to Claim 1 of the granted patent, as no triggering time points or delays relative to the load pulses have been given. The only time delay which is mentioned is the said delay corresponding to the distance between the two rows and which corresponds to the prior art delay according to the preamble of Claim 1.

Moreover, the Board understands the said cited sentence like the Appellant (letter of 30 January 1990, page 7, last paragraph), that is the velocity V must be exactly known, otherwise there can be no adjustment in order to obtain the desired setting of the delay to obtain the desired spacing L. Thus apparently an expensive drive mechanism is used that the invention according to the

patent tries to avoid. Therefore also the teaching of this document fails to lead the skilled man to the solution of the said problem.

5.7 For these reasons, the Board is satisfied that the solution of the underlying problem offered by the patent in suit is not suggested by prior art. The subject-matter of Claim 1 thus involves an inventive step according to Article 56 EPC.

6. Claims 2 to 5 are dependent on Claim 1 and thus derive their patentability from that claim. They are therefore also held valid.

7. As has been shown above, D1 represents the closest prior art. However not all the features which are disclosed by D1 are present in the pre-characterising part of Claim 1. Thus Claim 1 formally is not delimited against the closest prior art. In this respect it must however be borne in mind that Rule 29(1)(a) and (b) EPC is no ground of opposition. Also, although the characterising feature (b) (speed monitor means) is formally disclosed by D1, the function of the speed monitor means is quite different from the apparatus of the patent. Since the characterising part of Claim 1 of the granted patent principally defines the function of the claimed apparatus and since the said speed monitor in fact influences the function of all other characterising features of the claim, it appears that the delimitation of Claim 1 of the patent could also be considered as an acceptable delimitation against D1.

8. During the appeal proceedings the Respondent has mainly referred to his letter of 26 September 1989 directed to the Opposition Division. The Board has noticed that in that letter the Opponent asked for oral proceedings in case the Opposition Division would decide against him.

However the Respondent has not asked for oral proceedings before the Board of Appeal, so that the Board may decide without such proceedings (Art. 116(1) EPC).

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 maintain the patent as granted.

The Registrar: The Chairman:

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