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Bezeichnung der Erfindung: Method and system to depict a picture of an object  
Title of invention:  
Titre de l'invention :

Klassifikation / Classification / Classement : G03F 1/00

**ENTSCHEIDUNG / DECISION**

vom / of / du 22 September 1987

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

The Gerber Scientific Instrument Company

Einsprechender / Opponent / Opposant :

Dr.-Ing. Rudolf Hell GmbH

Stichwort / Headword / Référence : Lasergravieren/Gerber

EPO / EPC / CBE Article 56 EPC

Kennwort / Keyword / Mot clé :

"Identical, neighbouring and remote technical fields; the competent skilled person in a team of experts; Inventive step (no)"

**Leitsatz / Headnote / Sommaire**

Europäisches  
Patentamt

Beschwerdekammern

European Patent  
Office

Boards of Appeal

Office européen  
des brevets

Chambres de recours



Case Number : T 222/86

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.1  
of 22 September 1987

**Appellant :**  
(Proprietor of the patent)      The Gerber Scientific Instrument Company  
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**Representative :**

**Decision under appeal :**      Decision of Opposition Division of the European  
Patent Office dated 22 May 1986      revoking  
European patent No. 0 038 513      pursuant to  
Article 102(1) EPC.

**Composition of the Board :**

**Chairman :** K. Lederer  
**Members :** H. Reich  
G. Paterson

### Summary of Facts and Submissions

- I. European patent No. 0 038 513, granted on 1 August 1984, pursuant to European patent application No. 81 102 852.1, filed on 14 April 1981, was assigned to the Appellant on 2 October 1985. Following Appellant's request the language of the proceedings was changed from German into English.
- II. As a result of the opposition filed by the Respondent said patent was revoked by a decision of the Opposition Division, dispatched 22 May 1986.
- III. The revocation was based on the ground of lack of inventive step in the subject-matter of independent Claims 1 and 2 with regard to the image forming method and device known from DE-A-2 603 556 (document D1), the detailed illustration of threshold monitoring known from the document D.M. Costigan: "FAX; The Principles and Practice of Facsimile Communication", Chilton Book Company, 1971, pages 47 to 49 and 137 to 138, and with regard to the technique of shortening print-pulses as known from US-A-3 484 791 (document D2).
- IV. On 17 July 1986, the Appellant lodged an appeal against this decision, requesting that it be set aside, and the patent be restored as granted. The appeal fee and the statement setting out the grounds of appeal were received in due time. In his answer to the statement setting out the grounds of appeal, the Respondent alleged an own prior use of the object of the impugned patent without indicating any evidence.
- V. The Rapporteur issued a communication pursuant to Article 110(2) EPC informing the Appellant that there are strong reasons to consider the subject-matter of Claims 1

and 2 to be obvious with regard to the state of the art known from only documents D1 and D2, and citing textbooks as expert opinion for a skilled person's interpretation of document D1 and for a facsimile-expert's general knowledge, comprising both laser and electrostatical writing means.

In answer to this communication, the Appellant filed on 9 September 1987 new Claims 1 to 3 as well as corresponding amendments of the description, and in support of inventive step cited DE-A-2 318 133 (document D3), showing that a method and apparatus according to the generic parts of new Claims 1 and 2, are not only known from document D1 but also from document D3, published about four years earlier.

VI. Independent Claims 1 and 2 have the following wording:

"1. Lasergravierverfahren mit Abbildung einer von einem Leselaserstrahl abgetasteten Eingabevorlage auf einen Aufzeichnungsträger mittels eines Schreiblaserstrahls, bei dem ein Videosignal bei der Abtastung der Eingabevorlage durch den Leselaserstrahl erzeugt wird, bei dem der Pegel des Videosignals sich entsprechend der Tönung der Eingabevorlage verändert, bei dem das Videosignal durch eine Schwellwertüberwachung zu einem rechteckförmigen Signal digitalisiert wird, das eine Reihe von Pulsen vorgegebener Höhe und einer Pulsbreite umfaßt, die sich mit dem Pegel des Videosignals ändert, und bei dem die Pulse den aus dem Schreiblaser austretenden Schreiblaserstrahl so modulieren, daß er während des Auftretens der Pulse auf den Aufzeichnungsträger auftrifft, um diesen zu belichten, und in der übrigen Zeit den Aufzeichnungsträger nicht belichtet, dadurch

gekennzeichnet, daß die Pulsbreite jedes Pulses um einen vorgegebenen Betrag am Anfang des Pulses verringert wird, und daß die Pulse verringerter Breite zur Modulation benutzt werden.

2. Lasergraviersystem zum Abbilden einer von einem Leselaserstrahl abgetasteten Eingabevorlage auf einen Aufzeichnungsträger mittels eines Schreiblaserstrahles, mit einer dem Leselaser nachgeschalteten Abtastvorrichtung, die den Leselaserstrahl Zeile um Zeile auf der Eingabevorgabe rasterförmig ablenkt, mit einer Faseroptik- und Fotovervielfacheranordnung, die das von der Eingabevorlage reflektierte Licht empfängt und in ein Videosignal entsprechend der von der Eingabevorlage gelesenen Information umwandelt, wobei ein Schwellwertdetektor (19) vorgesehen ist, der das Videosignal der Faseroptik- und Fotovervielfacheranordnung (17) empfängt, auf den Pegel des Videosignals anspricht und ein rechteckförmiges Signal (21) erzeugt, das aus einer Pulsreihe mit Pulsen vorgegebener Höhe und mit dem Pegel des Videosignals sich ändernden Pulsbreiten besteht, wobei die Pulse dem aus dem Schreiblaser (66) austretenden Schreiblaserstrahl (32) über eine Treiberschaltung (36) einem Modulator (34) im Strahlengang des Schreiblaserstrahls (32) zugeführt werden, um diesen nur während der Dauer der Pulse von dem Modulator (34) zu einer Abtastvorrichtung (37) zu leiten, die den Schreiblaserstrahl (37) zeilenweise über den Aufzeichnungsträger (33) ablenkt, dadurch gekennzeichnet, daß der Schwellwertdetektor (19) mit Einrichtungen (22, 23) zur Verringerung der Pulsbreite

jedes Pulses des rechteckförmigen Signales (21) um einen vorgegebenen Betrag (t) verbunden ist, und daß das verkürzte rechteckförmige Ausgangssignal (26) der Einrichtungen (22, 23) dem Modulator zugeführt wird."

Claim 3 is dependent on Claim 2.

VII. In an oral proceedings held on 22 September 1987, the Appellant requested to set aside the impugned decision and to maintain the patent in amended form on the basis of new Claims 1 to 3 and the published description with the amendments as filed on 9 September 1987. He supported this request essentially by the following arguments:

- (a) Document D1, reflecting the state of the art according to the generic parts of Claims 1 and 2, and document D2, from which the features in the characterising parts of Claims 1 and 2 are known per se, do not relate to the same technical field. Document D1 as well as the impugned patent belong to the field of laser engraving of transmitted pictures. In order to arrive at the field of document D2, a skilled person would have to generalise the field of document D1 into picture transmission and then again to specialise it into electrostatic printing of transmitted pictures. Such a generalisation and subsequent specialisation would have to be regarded to lead to a remote technical field following the decision "pencil sharpener/Möbius" of the Technical Board of Appeal 3.2.1 of the EPO (T 176/84, published in OJ EPO 1986, 50). Also, the omission of the transformer and bridge rectifier mentioned in document D2, column 5, lines 42-49, in the event of an appropriate recording signal at the output of the logical AND gate, gives no hint to differ from the use of an electrostatic recording stylus.

- (b) Moreover, there exist technological differences between laser engraving and electrostatic printing. In laser engraving contour broadening of an image is caused by the intensity distribution within the cross-section of the write beam and by the scattered light within the photosensitive layer and the reflection at the carrier surface (halation). This causes in particular an unwanted loss of resolution at narrow writing distances, where partially exposed side regions of neighbouring signs overlap and contribute to density. In electrostatic printing, contour-broadening of an image is produced by the electrostatic charges appearing opposite the total area of the stylus top, so that in a linear writing process each printed sign is prolonged with regard to the original by an area corresponding to the cross-section of the stylus. Any contour-broadening surpassing the area of the stylus cross-section is not reported in document D2.
- (c) Document D3 shows on page 28, paragraph 2, that the problem of contour-broadening of images in laser engraving - as well as a solution of this problem by an absorbing layer in between the photosensitive layer and its carrier - have already been known since 1973. Document D2 was published in 1969. The time interval until the priority date of the impugned patent in 1980 is a strong indication of sufficient inventive level.
- (d) Though the length-reduction of the laser write pulses represents a technical means only to shorten the written signs in scan direction, it follows from the description of the impugned patent, column 7, lines 2-5, that shorter write pulses also reduce the

VIII. The Respondent's submissions were essentially as follows:

- (a) The pulse-shortening technique of the impugned patent via delay means 22 and logical AND gate 23 (Figure 1) is identically known from figure 4 of document D2. The wording in column 5, lines 18, 30 to 32, and 43 to 48 discloses a variety of applications, which would enable a skilled person to recognise that the teaching of document D2 is more general than the given example, and would consist in avoiding a broadened contour of an imaged sign by pre-shortening its printing pulse.
- (b) According to said decision T 176/84, a saving box is not suited for sharpening a pencil and a pencil sharpener is not able to store money. Furthermore, the slot closure of a pencil sharpener solves the problem of soiling the surroundings of the sharpener, and the slot closure of the saving box solves the problem of losing money. Thus, a pencil sharpener and a saving box serve different purposes and solve different problems. In contrast to this, a write laser beam and an electrostatic recording stylus serve both the same purpose, i.e. to record signs. Furthermore, print pulse shortening solves the same problem in a write laser beam and in an electrostatic recording stylus, i.e. to avoid the recording of broadened images. Moreover, this problem would be known to appear in each of the known recording techniques, independent of the fact, whether the recording means is a laser, a xenon lamp, an electron beam, an electrostatic recording stylus or a mechanical needle. Devices with said different recording means are furthermore very often produced in the same factory.

- (c) The technological difference between of the devices known from documents D1 and D2 consists in their different recorder terminals, being a write laser in document D1 and an electrostatic printer in document D2. When applying the teaching of document D2 in the write laser of document D1, it is only necessary to adapt the modulator signal to the diverging needs of the terminal. Such an adaptation lies within the normal skill of an expert, who knows, that laser light and electrostatic charges are only different forms of printing energy, which can be applied alternatively.
- (d) By analogy with the generally accepted obviousness of a replacement of an old-fashioned electron tube by a modern transistor, nothing inventive can be seen in the teaching to replace an outdated electrostatic printing terminal by a recently developed laser engraving terminal. Though lasers are already known for many years, it took some time to construct long life-time lasers with a stable output of an actinic spectrum, so that they are suited for a recorder terminal.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.
2. New Claims 1 to 3 differ from published Claims 1 to 3 essentially in their delimitation to a "laser engraving" method and system as disclosed in the original description; see also column 1, lines 14 and 15.

Furthermore, in new independent Claims 1 and 2 the words "characterised by" have been shifted in order to comprise in the generic parts all characteristics which in combination are known from document D1. The subject-matter of the claims, description and drawings is adequately based on the original disclosure. Thus, there is no objection to their current version as far as Articles 123(2) and 123(3) EPC are concerned.

3. An examination of the citations revealed by the search or presented by the Respondent (Opponent) shows that none of them discloses a laser engraving method or system wherein the length of the pulses, controlling the laser exposure of the recording carrier, is shortened by a preset amount and wherein the shortened pulses are input to the modulator of the write laser. In the laser engraving method and system known from document D1, corresponding to the prior art statements in the generic parts of Claims 1 and 2, no such pre-shortening of modulator pulses for the write laser is used.

In the method and system known from document D2, pre-shortened pulses are input to the modulator not of a laser beam but of an electrostatic recorder stylus.

The laser engraving method and system known from document D3 do not go further than document D1 and reflect the prior art according to the generic parts of Claims 1 and 2. The write laser beam and the read laser beam in document D3, however, are realised by splitting the output beam of the same laser emitter into two partial beams via a semi-reflecting mirror.

The other documents cited by the parties or in the European Search Report do not come closer to the subject-matter of Claims 1 and 2 and need not be discussed for an assessment of novelty. Therefore, the subject-matter of Claims 1 and 2 is considered novel.

4. The question now to be considered is whether the subject-matter of method Claim 1 and apparatus Claim 2 involves an inventive step. Due to their identical technological subject-matter, Claims 1 and 2 can be jointly dealt with. It was not contested that the features in the generic parts of Claims 1 and 2 are known from document D1 and that the features in the characterising parts of Claims 1 and 2 are known per se from document D2. Thus, it remains to be examined whether it would be obvious for a skilled person to combine the teachings of documents D1 and D2, i.e. to use in laser engraving a pre-shortening of modulator pulses which is already known from electrostatic printing.

- 4.1 The Board is satisfied that - as also stated in the description of the impugned patent, column 3, lines 12-21 - an objective formulation of the technical problem refers to an improvement of prior art laser engraving methods and systems with a scanning write laser beam, such as known for instance from document D1. The objective technical problem faced was to avoid any broadening of the boundaries of imaged signs on the recording carrier in the scan direction. This problem and its scientific explanation by halation are known from document D3 (as well as a solution of this problem by an absorbing layer underlying the photosensitive layer); see also point VII-c above. For this reason, no contribution to inventive step is to be found in the recognition of the technical problem.

- 4.2 It is a generally accepted and reasonable approach in the assessment of inventive step, that a skilled person is deemed to look for suitable solutions of his technical problem in his own and also in neighbouring technical fields, where he expects parallel developments. The question, who is the competent skilled person and what art comprises his own and a neighbouring field, in the Board's view has to be answered on the basis of the individual technologic background of a given case as a matter of fact (see also the above-cited decision T 176/84, point 5.3.1).
- 4.2.1 It was not contested that the subject-matter of Claims 1 and 2 belongs to the technical field of laser engraving. In the opinion of the Board, laser engraving represents an advanced technology, where it is appropriate to identify the skilled person to be a production team of the following three experts: a physicist, who is competent for the laser, an expert in electronics, who is competent for the scanning and modulation, and a chemist, who is competent for the photosensitive layer of the recording carrier. The person qualified to solve a problem is regarded to be the specialist of the particular technical field, in which the particular problem prompts a skilled person to seek its solution; see also Decision T 32/81, point 4.2 (OJ EPO 1982, 225). In a first approach, a skilled person will always try to solve a problem on the basis of its visual phenomenon before entering into a detailed study of its scientific reasons. A prima facie investigation of the present problem points to the fact that the observable contour-broadening in the scan direction is produced by recording the image via a scanning writing means. For these reasons, the Board is satisfied that in the present case the competent skilled person is the electronics-specialist for scanning and modulation.

4.2.2 It appears to the Board to be realistic to suppose that an electronics engineer can be expected to develop in practice scanning and modulating equipment for different needs, in particular for all kinds of different recording systems, which are more or less produced within the same type of factory. Therefore, he can be regarded to have cooperated with both the laser engraving specialist and the electrostatic recording specialist, and to be familiar with the recent development of scanning and modulation means for both applications. For these reasons, the Board regards it justified to consider that the competent skilled person would have known document D1 as well as document D2. For the above reasons, the Board is satisfied that having regard to scanning and modulation, documents D1 and D2 belong to the same technical field of the competent skilled person.

4.3 It needs no expert knowledge to foresee the following functional relationship: Whenever a laser beam or electrostatic writing stylus travels in its active state over a shorter distance of the recording carrier, the result will always be a shorter visible image. Thus, the Board considers that a specialist in electronics would foresee that shortening of the write pulse length is suited to conform an image, which is excessively broadened in the scan direction, to the length of the original, independent from the particular character of the writing mechanism. It is only of secondary importance to said skilled person that there is a first geometrical relation between the active cross-section of the laser beam and the area of impinged light quanta, which area surpasses the threshold for activating the photosensitive layer, and a second, different geometrical relation between the cross-section of the electrostatic recording stylus and the area of electric charges attracting toner particles. These

different geometrical relations only teach a specialist for scanning to set the preselected amount by which the write pulse has to be shortened for 1:1 imaging differently in laser and electrostatic writing. But, in the Board's view, the different scientific explanation of the image broadening mechanism in laser engraving and in electrostatic recording would not prevent a specialist in scanning from recognising the causality between the shortening of the write pulse length and its technical effect of reducing the image boundaries in scan direction. Said different scientific explanations, therefore, represent no hinderance for the skilled person to apply the electrostatic write pulse-length-shortening technique also in laser engraving. For the above reasons, the subject-matter of Claims 1 and 2 reduces in the Board's view to an obvious use of a known technique in a closely analogous situation.

- 4.4 As shown above, the competent skilled person is regarded to have a direct access to both documents, D1 and D2, pertaining to his own technical field, and need not abstract and specialise any technical field in order to find a link from the first to the second document; see also the Appellant's contrary view in point VII-a above. The direct access to the second document is essentially due to the following factual differences between the "Pencil-sharpener/Möbius" case and the present one: Contrary to image recording systems with various writing means, pencil-sharpeners and saving boxes are most unlikely to be produced in the same type of factory. Thus, it appears rather unrealistic that the sharpener-expert would observe or be familiar with any technical development in saving boxes. Moreover, a skilled person can foresee that write pulse shortening has in laser

engraving and in electrostatic printing the same technical purpose, i.e. imaging a sign in 1:1 scale. Slot closure in pencil sharpeners and in saving boxes, however, has a different technical purpose. In a pencil sharpener it protects the neighbourhood against soiling and in a saving box it protects the box interior against loss of money. In such a case additionally the intellectual effort has to be considered, which is needed to recognise the suitability of the transferred measure for its new purpose.

4.5 In the Board's view, any unforeseeable extra effect which can be observed during the practical use of an obvious technical teaching does not make such teaching inventive. The skilled person did not have to make an inventive step in order to proceed from documents D1 and D2 to the subject-matter of Claims 1 and 2 (see in particular point 4.3 above). The boundary reducing effect of the shortened write pulses perpendicular to the scan direction (see point VII-d above) merely represents a non-relevant bonus; see also Decision T 21/81, point 6 (OJ EPO 1983, 15).

4.6 The fact that the state in the art has been inactive from the publication of the document D3 in 1973 to the priority date of the present case in 1980, as put forward by the Appellant (point VII-c above), could only be regarded as indicative of inventive step, if a need for an improvement had existed during this time; see also Decision T 109/82, point 5.5 (OJ EPO 1984, 473). The existence of such need, however, cannot be recognised in the present case due to the fact that document D3 does not only describe a technical problem but also its solution.

- 4.7 The Board regards it useful to mention that an assessment of inventive step, which would start from document D2, leads to no different result. On the basis of document D2 an objective formulation of the technical problem would be to increase the scan velocity of the writing means, which is an obvious object in scanning. The solution of this problem - replacing the electrostatic recording stylus in document D2 by the write laser beam known from document D1 - is again obvious, because for the competent image recording expert said replacement represents an analogue use of a known means.
5. For the reasons set out in points 4 to 4.6, the subject-matter in Claims 1 and 2 does not involve an inventive step within the meaning of Article 56 EPC. Therefore, Claims 1 and 2 cannot be granted having regard to Article 52 EPC. Dependent Claim 3 cannot be granted because of its reference to unallowable Claim 2.

#### Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

F.Klein

K.Lederer