Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

D E C I S I O N
of 30 January 2002

Case Number: T 0149/00 - 3.4.2

Application Number: 91300246.5

Publication Number: 0440342

IPC: G01N 21/64

Language of the proceedings: EN

Title of invention:
Laser excited confocal microscope fluorescence method

Patentee:
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Opponent:
Roche Diagnostics GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 84, 123

Keyword:
"Novelty, inventive step - first auxiliary request (yes)"

Decisions cited:
T 0487/95

Catchword:
-

Europäisches Patentamt | **European Patent Office** | **Office européen des brevets**

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0149/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 30 January 2002

Appellant I: (Opponent)
Roche Diagnostics GmbH
- Patentabteilung -
D-68298 Mannheim (DE)

Representative:
Heim, Hans-Karl, Dipl.-Ing.
Weber & Heim
Patentanwälte
Irmgardstrasse 3
D-81479 München (DE)

Appellant II: (Proprietor of the patent)
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
300 Lakeside Drive
22nd Floor
Oakland
California 94612-3550 (US)

Representative:
Cross, Rupert Edward Blount
BOULT WADE TENNANT
Verulam Gardens
70 Gray's Inn Road
London WC1X 8BT (GB)

Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 13 December 1999 concerning maintenance of European patent No. 0 440 342 in amended form.**

Composition of the Board:

Chairman: E. Turrini
Members: A. G. M. Maaswinkel
B. J. Schachenmann

Summary of Facts and Submissions

I. The appellant I (opponent) lodged an appeal, received on 11 February 2000, against the interlocutory decision of the opposition division, dispatched on 13 December 1999, on the amended form in which the European patent No. 0 440 342 (application No. 91 300 246.5) could be maintained. The fee for the appeal was paid on 11 February 2000. The statement setting out the grounds of appeal was received on 14 April 2000.

The appellant II (proprietor of the patent) likewise lodged an appeal, received on 23 February 2000, against the interlocutory decision of the opposition division. The appeal fee was paid the same day. The statement setting out the grounds of appeal was received on 20 April 2000.

II. Opposition had been filed against the patent as a whole, on the basis of Article 100(a) EPC, and in particular on the grounds that the subject-matter of the patent was not patentable within the terms of Articles 52(1), 54 and 56 EPC.

The Opposition Division held that the grounds of the opposition did not prejudice the maintenance of the patent in amended form, having regard *inter alia* to the following documents:

(BM1) Nature, Vol. 317 (1985), pages 748-749; "Three-dimensional chromatin distribution in neuroblastoma nuclei shown by confocal scanning laser microscopy".

(BM2) Science, Vol. 238 (1987), pages 336-341; "A System for Rapid DNA Sequencing with Fluorescent Chain-Terminating Dideoxynucleotides".

(BM3) Journal of the Association for the Advancement of Medical Instrumentation, Vol. 6 (1972), pages 230-234; "A laser flying spot scanner for use in automated fluorescence antibody instrumentation" (reprint, pages 103 to 107).

The following additional document was considered by the board:

(BM5) Scanning, Vol. 7 (1985), pages 66-78; "Design and Use of a Computer Controlled Confocal Microscope for Biological Applications", filed by the opponent with its opposition.

During the appeal procedure appellant II made reference to the following document, referred to in document BM5:

(BM7) Rev. Sci. Instrum., Vol. 54 (8), August 1983, pages 1047 to 1052; "Mechanical scan system for microscopic applications".

During the oral proceedings appellant I submitted the following document:

(BM10) Meyers Enzyklopädisches Lexikon, Vol. 7, 1980, page 673, Keyword "Elektrophorese".

III. Oral proceedings were held on 30 January 2002.

IV. Appellant I requested that the decision under appeal be

set aside and that the patent be revoked.

Appellant II requested that the decision by the opposition division be set aside and requested maintenance of the patent on the basis of the following documents:

Main request:
patent as granted;

Auxiliary request 1:
claim 1 as filed during the oral proceedings before the board; claims 2 to 6 from the patent specification; description to be adapted; drawings from the patent specification.

Appellant II furthermore filed auxiliary requests 2 to 10.

V. The wording of apparatus claim 1 according to the main request reads as follows:

"An improved gel scanner comprising:
a carrier for supporting a gel to be scanned;
means for forming a light beam of predetermined wavelength;
a dichroic beam splitter for receiving and directing said light beam toward a gel to be scanned;
an objective lens for receiving said light beam and focusing the light beam on a selected volume of the gel to cause fluorescence emission of light at a different wavelength and collecting the emitted light from samples in the
selected volume and directing the emitted light to said

dichroic beam splitter which passes said emitted light at different wavelengths and reflects light at said predetermined wavelength;
a spatial filter for receiving and passing emitted light from said selected volume and the dichroic beam splitter while rejecting background and scattered light;
means for detecting said passed, emitted light and providing an output signal;
means for providing relative movement between the focused light beam and the gel for scanning; and
a processor for receiving the output signal and providing an image of the fluorescence from the gel."

The wording of method claim 5 according to the main request reads as follows:

"A method of detecting fluorescence from DNA fragments in a gel which comprises:
exciting a predetermined volume of said gel with light energy of predetermined wavelength focused therein by an objective lens to cause fluorescence emission of light at a different wavelength from the predetermined volume;
collecting the fluorescently emitted light from said predetermined volume with said objective lens;
spectrally filtering light from the objective lens to substantially reflect light at the predetermined and other wavelengths and passing the fluorescently emitted light at the different wavelength;
spatially filtering said fluorescently emitted light of different wavelength to substantially reject background scattered light and passing fluorescently emitted light from the predetermined volume of the gel; and

applying the filtered light energy to a detector to generate an output signal representative of the fluorescence from said fragments."

The wording of apparatus claim 1 according to the first auxiliary request reads as follows:

"A gel scanner arranged for scanning an electrophoresis gel in which fluorescently labelled DNA fragments have been electrophoretically separated into bands, said scanner comprising:
a carrier suitable for supporting such an electrophoresis gel to be scanned;
means for forming a light beam of predetermined wavelength;
a dichroic beam splitter for receiving and directing said light beam toward a gel on said carrier;
an objective lens for receiving said light beam and focusing the light beam on a selected volume of the gel to cause fluorescence emission of light at a different wavelength and collecting the emitted light from samples in the
selected volume and directing the emitted light to said dichroic beam splitter which passes said emitted light at different wavelengths and reflects light at said predetermined wavelength;
a spatial filter for receiving and passing emitted light from said selected volume and the dichroic beam splitter while rejecting background and scattered light;
means for detecting said passed, emitted light and providing an output signal;
means for providing such relative movement between the focused light beam and the gel carrier as necessary for

scanning said bands in the gel; and
a processor for receiving the output signal and
providing an image of said bands."

Claims 2 to 4 and 6 are dependent claims.

VI. The arguments of appellant I may be summarised as follows.

The apparatus defined in claim 1 of the main request is anticipated by the confocal scanning microscope disclosed in document BM1, because the features "light source", "dichroic beam splitter", "objective lens for receiving the light beam and collecting the fluorescent emitted light", "spatial filter" and "processor for providing an image" are standard features of such a microscope, as illustrated by and readily identified in Figure 1 of BM1 or - equally - by the confocal microscopes disclosed in BM3 or BM5. Furthermore the object stage of the microscope shown in Figure 1 of BM1 is a carrier which is suitable "for supporting a gel to be scanned", because this feature merely refers to an object which may be positioned on the stage. A typical carrier would be a microscope slide, which has dimensions of 2.5 cm x 7.5 cm. Equally the object stage in the microscope of BM1 can be moved in X, Y and Z-direction and therefore forms a "means for providing a relative movement between the focused light beam and the gel for scanning". It is noted that a specific use of a prior art apparatus which was suitable for said use cannot render the apparatus claim novel. With respect to the microscope known from BM1, this was clearly suitable for use as a gel scanner as can be concluded from the numerical aperture (N.A.) of its optics, which is the same (N.A=1.3) as the N.A. of the

optics in the contested patent and from the focal spot sizes of both apparatuses which are also very similar. Finally the patent explicitly states in column 7, lines 46 to 52, that the claimed device is not restricted to electrophoresis gel scanning, but may be used for detecting and imaging molecules, proteins, viruses and bacteria which is a typical application of a confocal microscope such as the one in BM1. Therefore proprietor's assertions that the expression "gel scanner" implies a typical minimum size of the carrier and a positioning range of the means for providing relative movement which could not be covered by a known confocal scanning microscope are rebutted when reading the claim in the light of the patent disclosure as a whole.

With respect to claim 1 according to the first auxiliary request, the support for the new feature referring to the detection of "bands" is not clear from the original disclosure. In particular in column 6, lines 22 to 26 and column 7, lines 15 to 17 of the patent specification, only the "direct imaging" or "detection" of "DNA and RNA in gels" are disclosed, which are molecules and not "bands". Concerning inventive step, the only difference between the subject-matter of this claim with respect to BM1 is in functional, not structural features. In this respect document BM10 illustrates that electrophoresis is a separation method for small amounts of samples and has been known since 1930. Therefore it is obvious for the skilled person to use the apparatus according to BM1 also for investigation of substances separated by electrophoresis, because BM1 recommends on page 749, right column, last but one sentence, the use of confocal scanning laser microscopy in many areas of

biology. Furthermore, the contested patent itself reveals in column 7, that the claimed apparatus can also be used for the detection of fluorescent labelled molecules, because this is an "apparent", i.e. obvious alternative embodiment to the claimed detection of DNA fragments in a gel, which also implies the detection of such molecules in bands. Therefore, it is vice versa apparent or obvious for the skilled person to employ the apparatus of BM1 for the detection of DNA fragments separated into bands, and modify that apparatus accordingly, if necessary.

The method of claim 5 does not involve an inventive step, both when document BM2 or BM3 are regarded as the closest prior art.

Document BM2, Figure 4, discloses an apparatus and method of detecting fluorescence from DNA fragments in a gel including the steps of claim 5 with the exception of the following features: in the method according to claim 5 the fluorescent light is collected with the same objective lens as used for focusing the excitation beam and the fluorescent light is spatially filtered with a confocal diaphragm positioned before the detector. The technical problem solved by including these features can be defined as further improving the sensitivity of the apparatus which, according to BM2, page 338, right column, second paragraph, limits the detection of DNA peaks because of the inherent noise of the detection system. In particular on page 340, right column, lines 16 to 20, BM2 discloses that it is the varying background on which the signal is superposed which determines the inherent noise. In order to find a solution for this problem the skilled person will consult the prior art in the field of detection of

fluorescent radiation from biological samples and will find the solution in document BM1, in particular the caption of Figure 1, lines 6 to 7, which discloses that the confocal optical arrangement results in almost complete suppression of the fluorescence contributions from off-focus specimen planes. Hence, by combining the teachings of BM2 and BM1 he will arrive at the subject-matter of claim 5 without an inventive step being involved. The same analysis shows that apparatus claim 1 of the auxiliary request is also obvious if starting from the teaching of document BM2 and combining it with BM1 for increasing the apparatus' sensitivity.

The subject-matter of claim 5 is also obvious when starting from document BM3 as the closest prior art. BM3 discloses a highly sensitive scanning microscope for detection of small fluorescent biological objects (antibodies). As illustrated in Figure 1 of BM3, the sample is excited using a laser beam and the fluorescence is detected with a confocal arrangement including a pinhole aperture as a spatial filter. The only difference between the disclosure in BM3 and the claimed method is that in BM3 fluorescent antibodies are detected, whereas claim 5 defines the detection step of fluorescence of DNA fragments in a gel. This difference does not involve an inventive step, because the skilled person would consider to apply the teaching of BM3 not only to fluorescent antibodies, but also to other fluorescent biological samples. In this respect reference is made to the passage in column 7, lines 46 to 53 of the patent in suit which demonstrates that detection of DNA fragments in a gel is an equivalent alternative to the detection of other biological samples which are fluorescently labelled and separated on a carrier. Therefore the detection of DNA fragments

as defined in claim 5 is a mere technical alternative to the detection of the samples in BM3 and hence does not involve an inventive step.

VII. The arguments of appellant II may be summarised as follows.

Contrary to the argumentation of appellant I, the subject-matter of claim 1 of the main request does not define a confocal scanning microscope as disclosed in BM1, BM3 or BM5. As pointed out by Prof. Wilson, who is a leading expert in the field of confocal scanning microscopes, these devices have a typical scanning range of 1 mm x 1 mm. Prof. Eperon, an expert in the field of electrophoresis and DNA sequencing, has explained that at the priority date of the patent slab gels for electrophoresis were at least 40 cm long, with the aim to make the slabs as long as technically feasible (up to 1 m length) for increasing the number of resolved DNA-bands. Furthermore, according to Prof. Eperon, the first couple of centimetres of a DNA sequencing gel is often obscured by front effects and does not carry useful information, hence it is not expedient to reduce the size of a slab gel down to the size of a microscope slide. Therefore the features in claim 1 "gel scanner"; "carrier for supporting a gel to be scanned"; and "means for providing relative movement between the focused light beam and the gel for scanning" which implicitly define a minimum appropriate size of the positioning range of the claimed apparatus cannot be found in these documents, as further documented by reference to document BM7 which had been referred to in BM5 and discloses further details of a mechanical scanning system for conventional confocal microscopy.

As to claim 1 of the auxiliary request, a clear support for the additional features is to be found in column 6, lines 16 to 20 and Figure 6 of the patent specification. Further support that the molecules to be detected are in "bands" is in column 2, lines 10 to 12 and column 7, line 6. The claimed device is clearly distinguished from the cited prior art confocal scanning microscopes by the requirements on the carrier, which must be suitable for supporting an electrophoresis gel containing bands with DNA fragments. In this respect it is noted that in order to get significant results plural bands are to be detected, which puts a requirement on the minimum size of the carrier stage range. Furthermore, the means for providing the required relative movement define the sort of movement necessary for scanning the bands. Prior art confocal microscopes cannot be scanned to image and do not provide images of gel *bands* of DNA fragments. With respect to the references of appellant I to the passages in the description which in his opinion cast doubt on the claimed subject-matter, it should be understood that claim 1 deals with electrophoresis of gels; and that any statement in the description which would cast doubt on the claimed subject-matter should be corrected.

For the method defined in claim 5 document BM2 forms the closest prior art. Starting from the embodiment in Figure 4 of BM2 there is no reason why the skilled person *would* modify the fluorescence detection system by including the teaching of BM1 for the following reasons. Firstly in the fluorescence detection system shown in Figure 4 of BM2, the scanning is only *one*-dimensional by applying a rotational motion of the scanning mirror, whereas the DNA fragments in the

stationary plate *migrate* past the detection system, as disclosed on page 337, right column, second paragraph. In contrast the scanning in the confocal microscope system in BM1 is a *two*-dimensional scanning, which renders a straightforward combination with the system in BM2 impossible. Secondly there is no obvious reason why the skilled person would go from the optical system in BM2 to a confocal microscope system, because the field of microscopy is different from the field of DNA fragment detection in a gel and document BM2 is not concerned with microscopy. The passages in BM2 cited by appellant I discussing the noise limit of that detection system merely set the sensitivity limit without giving any hints as how to improve this, in particular not by combining a non-compatible scanning system from the unrelated technical field of confocal microscopy.

Furthermore appellant I's assertion that alternatively BM3 would be a suitable closest prior art document for the method defined in claim 5 is not well founded, because that document is not concerned with detecting fluorescence from DNA fragments in a gel, but the imaging of fluorescent antibodies by confocal microscopy.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 Claim 1

2.1.1 Novelty

Claim 1 is directed to "*an improved gel scanner*". The claimed apparatus comprises technical features which, except for the explicit reference to "gels", are intrinsic to conventional confocal scanning microscopes. Document BM1, Figure 1, for instance, discloses such a microscope which includes a carrier (*x,y,z-object stage*); a means for forming a light beam of predetermined wavelength (*laser source*); a dichroic beam splitter for receiving and directing said light beam toward an object to be scanned (*dichroic mirror*); an objective lens (*high numerical aperture objective lens)* for receiving said light beam and focusing the light beam on a selected volume of the object to cause fluorescence emission of light at a different wavelength and collecting the emitted light from samples in the selected volume and directing the emitted light to said dichroic beam splitter which passes said emitted light at different wavelengths and reflects light at said predetermined wavelength; a spatial filter for receiving and passing emitted light from said selected volume and the dichroic beam splitter while rejecting background and scattered light (*pin hole*); means for detecting said passed, emitted light and providing an output signal (*detector*); means for providing relative movement between the focused light beam and the object for scanning (*mechanical scan control of object stage*); and a processor for receiving the output signal and providing an image of the fluorescence from the object (*computer with display*).

According to appellant II, the features in claim 1 "*gel* scanner"; "carrier for supporting a *gel* to be scanned";

and "means for providing relative movement between the focused light beam and the *gel* for scanning" define requirements with respect to the dimensions of the object to be supported by the carrier and to the dynamic range which the means for providing relative movement needs to cover. In his opinion, none of the prior art confocal scanning microscopes is suitable for carrying and positioning gels with the sizes of electrophoresis slab gels, whence the subject-matter of claim 1 is novel. Disagreeing with this, appellant I considers that the references in the claim to "gels" and "gel scanning" do not define a technical distinction between the claimed apparatus and prior art confocal scanning microscopes.

For the assessment of this controversial issue, the board refers to Article 84 EPC which requires that the claim must be supported by the description. Therefore the claim is to be interpreted in the light of the description, in particular the references in the description to "gels" and the objects to be scanned. It is noted that the objects to be scanned by the apparatus of claim 1 are defined as "gels" in a global sense. With respect to the dimensions of "gels", the patent specification refers in column 7, lines 5 to 7 to a DNA sequencing gel with a "250 µm thick gel and a 3 mm wide sample well". In column 7, lines 42 to 43, it is stated: "Preferred embodiments of this invention can detect DNA samples that cannot be detected by conventional fluorescence detection methods". And in lines 46 to 52 of this column it is disclosed that embodiments of the invention may be used to "detect and image fluorescent labeled molecules, proteins, virus and bacteria, etc., which are electrophoretically or otherwise separated on a variety of carriers such as

membranes, filter paper, petrie dishes, glass substrates, etc.". Interpreting the controversial term "gel" in the light of the cited passages it would appear that the apparatus defined in claim 1 of the main request should be suitable of scanning an object in gel form of a typical size of the order of one or some millimetres; that it should be able to detect DNA samples; and that it should render possible the imaging of microscopic-size objects. These uses are typical for prior art confocal scanning microscopes as shown in document BM1. Therefore in the opinion of the board, the subject matter of claim 1 of the main request lacks novelty and the main request is not allowable (Articles 52(1) and 54 EPC).

3. *First auxiliary request*

3.1 Claim 1

3.1.1 Amendments

The additional features of this claim are in substance that the gel scanner is arranged for scanning an electrophoresis gel in which the fragments have been separated in *bands*; and that there are means "for providing such relative movement between the focused light beam and the gel carrier as necessary for scanning said bands in the gel". The board is satisfied that in particular the passage in column 6, lines 16 to 17 of the patent specification (corresponding to page 7, lines 36 to 37 of the originally filed patent application), which discloses that the image shown in Figure 6 is "obtained by this embodiment of the invention" provides fair support for this amendment. Therefore the amended claim is not objectionable under

Articles 84 or 123(2) EPC. Since the amended claim defines a narrower protection than the granted claim it also meets the requirement of Article 123(3) EPC.

3.1.2 Novelty

Claim 1 requires that the claimed apparatus is *arranged* for scanning an electrophoresis gel in which DNA fragments have been separated into *bands* under the influence of *electrophoresis* (applied electric field). With respect to the dimensions of such a gel the argument of appellant II that in order to get significant results of scanning an electrophoretic gel *plural* bands are to be detected, which puts a requirement on the minimum size of the gel, seems credible to the board. Even assuming a typical minimum *width* of one band or lane of 3 mm (as disclosed in column 7, line 7 of the patent specification), it follows from Figure 6 of the patent specification that the *length* of a sample to be scanned is much larger. Reference can also be made to Figure 3 of document BM2, which shows a similar relationship between the width of one lane or band and the length of a sample separated by electrophoresis. Therefore, in contrast to the typical object field of a confocal microscope, a gel sample comprising electrophoretically separated bands is a macroscopic object. More particularly, the devices according to BM1, BM3, BM5, BM7 are not arranged for "scanning an electrophoresis gel in which fluorescently labelled DNA fragments have been electrophoretically separated into bands" because these confocal scanning microscopes are designed for and typically produce

submillimeter-size images. Therefore in the opinion of the board the subject-matter of claim 1 of the first auxiliary request is novel.

3.1.3 Inventive step

Claim 1 is directed to a gel scanner arranged for scanning an electrophoresis gel in which DNA fragments have been separated into bands. Having regard to the available prior art on file, the closest prior art appears to be document BM2, because this discloses a system for rapid DNA sequencing (*see: Title*) where fluorescently labelled DNA fragments have been electrophoretically separated into bands (*see: Figure 3*) and are detected by a fluorescence detection system (*see: Figure 4*).

The gel scanner system defined in claim 1 differs from the one disclosed in BM2 in that the apparatus according to claim 1 comprises a dichroic beam splitter; an objective lens which both focuses the light beam onto the selected volume of the gel and collects the fluorescent light emitted by the excited molecules; and by the spatial filter which transmits the fluorescently emitted light and rejects background and scattered light. In the system of BM2, the excitation light beam is focused onto a spot which is scanned along a line, and the fluorescently emitted light is collected by two elongated photomultiplier tubes which span the width of the gel (*see: Figure 4 and its caption*).

The objective problem deriving from these differences in the optical arrangements may be seen in developing a high sensitivity detection system, which might lead to

the possibility of detecting smaller amounts of DNA and the use of thinner gels (*see: patent specification, column 2, lines 6 to 19*). The problem of limiting sensitivity caused by noise and its origin (scattered laser radiation, Raman scattering, fluorescence of other sources) is discussed in BM2, page 337, right column; and page 340, right column, lines 8 to 20. Document BM2 also offers a solution (removal of scattering light by a filter stack consisting of an interference filter, a fiber-optic face plate and a colored glass absorbing filter (page 337, right column, last paragraph)).

In view of the fact that the detection system in BM2 already includes explicit measures to optimise the system sensitivity and suppress noise sources, no obvious reasons appear to exist why the skilled person, starting from the concrete detection arrangement shown in Figure 4 of BM2, *would* modify this system by including an arrangement with an objective lens used in autocollimation, a dichroic beam splitter and a spatial filter as known from confocal scanning microscopes. Firstly, the detection system disclosed in BM2 already offers a solution for suppressing noise. Secondly the incorporation of the optical arrangement referred to above into the system of BM2 would not be a simple "addition" of the new elements to the system of Figure 4, rather it would require a complete redesign of that system; for instance, the photomultipliers which span the width of the gel and their associated filter stacks would have to be discarded; also the focusing lens integrated in the scanning optics would have to be replaced by an autocollimating objective, a dichroic beam splitter and a spatial filter. No hint towards such a solution is found in BM2. Nor is the

field of confocal scanning microscopes closely related to the field of DNA gel scanners, apart from possible applications (detection of fluorescently labelled objects). Therefore a modification of the detection system disclosed in BM2 by inclusion of a confocal scanning system known from BM1, BM3, BM5 or BM7 does not appear obvious.

The further argument of appellant I, that document BM1 could be seen as the closest prior art for the discussion of inventive step of claim 1 of the first auxiliary request is not persuasive because the patent specification as well as the independent method claim clearly disclose that the technical field of the invention is the field of detection of fluorescence from DNA fragments in a gel. Since document BM1 does not make reference to detection of fluorescence of DNA fragments in a gel nor to the specific problems related to such detection it would not appear to form a technically realistic starting point (see "Case Law of the Boards of Appeal of the European Patent Office", 3d. Edition, EPO 1999, Chapter I, D-3.2: "Choice of the closest starting point", in particular Decision T 487/95, points 6.1 and 6.2, locally cited).

Therefore claim 1 of the first auxiliary request is neither anticipated nor made obvious by the cited prior art.

3.2 Claim 5

3.2.1 Novelty

The novelty of the subject-matter of this claim was not disputed amongst the parties.

3.2.2 Inventive step

Claim 5 is directed to a method of detecting fluorescence from DNA fragments in a gel. According to appellant I, either document BM2 or BM3 may be seen as the closest prior art.

Since document BM3 is directed to the imaging of a fluorescent dye stained antibody by a confocal scanning microscope system and, unlike document BM2, does not make reference to detection of fluorescence of DNA fragments in a gel, it does not stem from the same technical field as the claimed subject-matter and does not form the closest prior art (*see also point 3.1.3 supra*). Therefore for the discussion of inventive step of claim 5 the board considers document BM2 as the closest art.

The method of detecting fluorescence from DNA fragments in a gel according to claim 5 differs from the detection method known from document BM2 by the collection of the fluorescently emitted light by the same objective lens as used for focusing the excitation light in the gel; by spectrally filtering the fluorescent light transmitted through this lens; and by spatially filtering this fluorescent light.

As discussed before, in the detection scheme known from document BM2 a filter stack comprising a *spectral* (interference and absorbing colour filter) and a *spatial* (fiber-optic face plate) filter is provided, see in particular Figure 4 and the passage on page 337, right column, last paragraph. This filter stack, however, is arranged in front of elongated photomultiplier tubes, which, because of their extended

fields of view, do not require any further optics for collecting the fluorescently emitted light. In the board's view, there is no obvious reason why a skilled person *would* have modified the system in Figure 4 of BM2, since this would have meant to discard a considerable part of the detection system and would have required a new design of the system. No hints in this direction are obtainable from document BM2. In particular does this document not make any reference to confocal scanning microscopes. A combination with the teachings of one of the documents BM1, BM3, BM5 and BM7 can therefore be excluded for the same reasons as given in point 3.1.3 supra. Therefore the method defined in claim 5 is not obtainable from the prior art in an obvious way.

3.3 Claims 2 to 4 and claim 6 are dependent on claims 1 and 5 and, therefore, their subject-matters also involve an inventive step.

3.4 The description

In view of the amended claims of the first auxiliary request and in order to exclude that the description contains passages which might cast doubt on the claimed subject-matter, the description should be amended. The case is therefore remitted to the first instance to bring the description into conformity with the new set of claims.

4. Since the first auxiliary request of appellant II is allowable, there is no need to address his further requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of the first instance with the order to maintain the patent in amended form on the basis of the following documents according to the first auxiliary request:

   Claims: claim 1 of the first auxiliary request as filed at the oral proceedings before the board;
   claims 2 to 6 of the patent specification;

   Description: to be adapted; and

   Drawings: of the patent specification.

The Registrar: The Chairman:

P. Martorana E. Turrini