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Datasheet for the decision of 11 November 2010

Case Number: T 1329/07 - 3.4.02

Application Number: 03745649.8

Publication Number: 1490703

IPC: G01N 37/00

Language of the proceedings: EN

Title of invention:
System and method for characterizing a sample by low-frequency spectra

Applicant:
Nativis, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 83, 84

Relevant legal provisions (EPC 1973):
-

Keyword:
"Sufficiency of disclosure (no)"

Decisions cited:
T 0541/96, T 1785/06

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1329/07 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 11 November 2010

Appellant: Nativis, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 21 March 2007 refusing European patent application No. 03745649.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: A. G. Klein
Members: F. Maaswinkel
C. Rennie-Smith

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal, received on 31 May 2007, against the decision of the examining division, dispatched on 21 March 2007, refusing the European patent application No. 03745649.8. The fee for the appeal was paid on 31 May 2007. The statement setting out the grounds of appeal was received on 31 July 2007.

II. In its decision, the examining division held that the patent application did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC). In particular the examining division considered that a detection of a characteristic signal of a molecule sample with low frequency electromagnetic signals as in the patent application was in contradiction with the teachings of quantum mechanics. According to the decision, the patent application did not provide plausible reasoning to overcome this contradiction and the experimental results could not be regarded as convincing evidence.

III. In the statement of grounds of appeal the appellant requested that the set of claims on which the decision under appeal was based be considered as its main request. As an auxiliary request oral proceedings were requested.

IV. In a Communication sent on 4 May 2009 the Board raised objections under Article 123(2) EPC against the amendments in the claims on file. Furthermore, an objection under Article 84 EPC was raised, since

according to the claim electromagnetic emission at the sample was enhanced which implied that such emission was already present in the sample. With respect to the issue of sufficiency of disclosure the Board tended to concur with the position of the examining division that the patent application did not fulfil the requirements of Article 83 EPC.

V. With a letter of 14 September 2009 the appellant filed a new main request and a declaration of Dr. A.J. Herr discussing experimental results.

VI. In a Communication pursuant to Rule 115(1) EPC sent on 28 September 2009 the appellant was summoned to oral proceedings on 28 January 2010.

VII. In a subsequent letter sent and received on 24 December 2009 the appellant made further submissions.

VIII. Oral proceedings took place on 28 January 2010. At the oral proceedings the appellant filed a set of claims according to an auxiliary request and requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed with the appellant's letter of 14 September 2009 or of the auxiliary request filed during the oral proceedings.

IX. At the end of the oral proceedings the chairman declared that the procedure would be continued in writing. In a subsequent communication sent on 2 February 2010 the Board stated it was not convinced that the patent application fulfilled the requirements of Article 83 EPC and considered the declaration of

Dr. Herr insufficient for this purpose. However, after hearing the inventor at the oral proceedings, the Board was of the view that it might be feasible for the appellant to file further evidence which might satisfy the burden of proof under Article 83 EPC. Therefore the appeal proceedings were continued in writing for the sole purpose of permitting the appellant to file such additional evidence within four months of the deemed date of receipt of the communication. With reference to Article 116(1) EPC it was pointed out that no further oral proceedings would be appointed for this subject.

X. By letters filed on 11 June 2010 and 11 August 2010, the appellant requested extensions of time for filing the additional evidence, and these were allowed by communications dated 17 June 2010 and 9 September 2010 respectively. In a letter filed on 12 October 2010, the appellant filed a written declaration of Mr. D.L. Fugal as evidence that the original application provided sufficient disclosure for the claimed invention.

XI. The wording of claim 1 of the main request reads as follows:

"Apparatus for interrogating a sample that exhibits molecular rotation, the apparatus comprising:

a container adapted for receiving said sample, said container having both magnetic and electromagnetic shielding,

an adjustable Gaussian noise injector for injecting Gaussian noise into the sample, with the sample in said container, and for adjusting the level of the injected Gaussian noise such that a low-

frequency electromagnetic emission at the sample is enhanced,

a detector for detecting an electromagnetic time-domain signal composed of the enhanced low-frequency electromagnetic emission of the sample and the injected Gaussian noise,

a storage device for storing said time-domain signal and a second time-domain signal separately detected from the same or a similar sample, and

an electronic computer which is adapted to receive the stored signals from the storage device, and to process the detected time-domain signal to generate an output that includes information relating to low-frequency signal components that are characteristic of the sample ".

The wording of claim 14 of this request reads:

"A method for interrogating a sample that exhibits molecular rotation, the method comprising:

placing the sample in a container having both magnetic and electromagnetic shielding,

injecting Gaussian noise into the sample and adjusting the level of injected Gaussian noise such that a low-frequency electromagnetic emission at the sample is enhanced;

recording an electromagnetic time-domain signal composed of the enhanced low-frequency electromagnetic emission of the sample and the injected adjusted Gaussian noise, and

processing the recorded time-domain signal to generate an output that includes information relating to one or more low-frequency signal components that are characteristic of the sample ".

Claims 2 to 13 and 15 to 26 of this request are dependent claims.

XII. The wording of claim 1 of the first auxiliary request reads as follows:

"Apparatus for interrogating a sample that has a dipole moment and exhibits molecular rotation in the earth's magnetic field, the apparatus comprising:

a container adapted for receiving said sample, said container having both magnetic and electromagnetic shielding,

an adjustable Gaussian noise injector for injecting Gaussian noise into the sample, with the sample in said container, and for adjusting the level of the injected Gaussian noise such that a low-frequency electromagnetic emission of the sample is enhanced,

a detector for detecting an electromagnetic time-domain signal composed of the enhanced low-frequency electromagnetic emission of the sample and the injected Gaussian noise,

a storage device for storing said time-domain signal and a second time-domain signal separately detected from the same or a similar sample, and

an electronic computer which is adapted to receive the stored signals from the storage device, and to process the detected time-domain signal to generate an output that includes information relating to low-frequency signal components that are characteristic of the sample ".

The wording of claim 14 of this request reads:

"A method for interrogating a sample that has a dipole moment and exhibits molecular rotation in the earth's magnetic field, the method comprising:

placing the sample in a container having both magnetic and electromagnetic shielding,

injecting Gaussian noise into the sample and adjusting the level of injected Gaussian noise such that a low-frequency electromagnetic emission of the sample is enhanced;

recording an electromagnetic time-domain signal composed of the enhanced low-frequency electromagnetic emission of the sample and the injected adjusted Gaussian noise, and

processing the recorded time-domain signal to generate an output that includes information relating to one or more low-frequency signal components that are characteristic of the sample ".

Claims 2 to 13 and 15 to 26 of this request are dependent claims.

XIII. The arguments of the appellant may be summarised as follows.

The present invention relates to detecting electromagnetic time-domain signals caused by electromagnetic sample-source emissions that are enhanced by injected Gaussian noise. In this manner, a characteristic emission spectrum of the sample can be obtained. In its decision refusing the patent application the examining division, referring to common rotational spectroscopy wherein molecules are

identified based on their quantum levels of rotational energy, argued that the electromagnetic fields of the low-frequency type disclosed in the patent application would not be suitable for causing an excitation of the molecules sufficient for any change between the rotational levels, since the required infrared electromagnetic fields would have frequencies many orders of magnitude larger than those employed. This reasoning is based on the assumption that the present invention uses low-frequency Gaussian noise for exciting a sample and to characterise the sample based on the so-excited rotational energy quantum levels. However, there is nothing inherent in the claimed apparatus or method that would require or depend on rotational modes of sample molecules. Furthermore, the Gaussian noise is not injected to excite the sample but to enhance an already present electromagnetic sample-source emission. Therefore it is submitted that the reasoning in the decision under appeal is based on incorrect assumptions. Rather, the present invention takes the existence of low-frequency signal components as a fact and provides a solution for detecting such low-frequency signal components to obtain a characteristic low-frequency spectrum.

Addressing the doubts by the Board concerning the sufficiency of disclosure of the patent application, it is observed that the Case Law mentions as the criterion for sufficiency that the disclosure should be reproducible without undue burden for the skilled person. In the Case Law book no "level" or "reference" for the contents of a disclosure is specified. In particular the Decision T 0541/96 referred to in the Board's Communication of 4 May 2009 is vague in this

respect. In contrast, the present patent application is quite detailed in containing over thirty pages of description, a number of Examples and some fifteen Figures, therefore the appellant considers that the level of disclosure is unusually high. With respect to the objection by the Board that the Examples do not specify the sample temperatures, it is noted that the skilled person would readily recognise that the sample is preferably in liquid form, see [0122], and therefore should be recorded at a liquid phase temperature. Also the Board's objections that the skilled person would be unable to detect electromagnetic emissions by the claimed method, and therefore it would be impossible to apply Gaussian noise at a level that is 30-35 decibels above the emissions sought, are traversed: the data shown in the specification and the spectral data supplied with the declaration of Dr. Herr demonstrate that agent-specific molecular emissions are detected in the method, and a skilled person would therefore be able to adjust noise to a desired level above the signals to be detected. The Board also argued that the data obtained by the method would not enable the skilled person to interrogate a sample based on its low-frequency spectral features, in accordance with the invention. Again, this point is refuted by the spectral data presented in the above declaration, which demonstrates that agent-specific spectral information is obtained by the method, following the detailed procedures laid out in the specification.

A further criterion discussed in the Case Law is, whether the disclosure offers experimental data or proofs. In this respect, apart from the data shown in the Figures of the patent application, the applicants

have submitted the declaration of Dr. A.J. Herr and experimental results and, in addition, and subsequent to the Board's Communication of 2 February 2010, the written declaration of Mr. D.L. Fugal who carried out the invention using only the information in the application as originally filed. In particular, Mr. Fugal explains in detail at paragraphs 9 to 12 of his declaration how he used the guidance given in the original application to adjust the level of the injected Gaussian noise to a level suitable for effecting low frequency electromagnetic emissions characteristic for the interrogated sample. Then, in paragraphs 13 to 18 of the declaration, Mr. Fugal demonstrates that detecting and processing time domain signals resulting from the low frequency electromagnetic emissions in a manner described in the original application results in spectral information that is characteristic for the interrogated sample. Therefore, it is the appellant's belief that the declaration of Mr. Fugal provides sufficient evidence that the claimed invention is disclosed in the original patent application in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. Accordingly, the declaration of Mr. Fugal should provide sufficient evidence on the subject matter of sufficiency of disclosure, thereby confirming that the claimed invention complies with the requirements of the EPC.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 *Article 84 EPC*

2.1.1 Claim 1 defines an apparatus for interrogating a sample that exhibits molecular rotation. According to the claim, an adjustable Gaussian noise generator is employed to enhance a low-frequency electromagnetic emission at the sample, the term "enhance" implying that the sample is (steadily) emitting a low-frequency radiation. Thus the sample has the following properties:
i) it exhibits molecular rotation; and
ii) it emits low-frequency electromagnetic radiation.

2.1.2 It is noted that the appellant in its Grounds of Appeal argued that the patent application takes the existence of low-frequency emission of a sample as a fact. Apparently, apart from the requirement that the sample exhibits molecular rotation, no further conditions for this phenomenon to occur are required, at least the patent application does not disclose such conditions. Rather the sample may be in gaseous, liquid or even solid form other than a solid metal (see paragraph [0035]); and the sample is enclosed in a container having both magnetic and electromagnetic shielding (see claim 1), implying that, without the noise applied, the sample is not exposed to an external electromagnetic or magnetic field.

2.1.3 In its Communication of 4 May 2009 the Board explained that, while the effect of a moving or rotating dipole in an external magnetic field producing electromagnetic radiation is known from the field of electrodynamics, a phenomenon of a sample spontaneously emitting

electromagnetic radiation is unknown in established electromagnetic theory. In particular the established theory of electrodynamics does not leave room for a spontaneous emission of low-frequency radiation by a sample that exhibits (i.e. that is able to undergo) molecular rotation, unless the molecule actually moves/rotates in an external magnetic field.

2.1.4 Therefore the Board finds that the expression "such that a low-frequency electromagnetic emission at the sample is enhanced" is obscure for which reason the claim does not meet the requirements of Article 84 EPC.

2.2 *Article 83 EPC*

2.2.1 In its decision, the Examining Division reasoned that, according to the known theories on molecular spectroscopy as documented in textbooks, for identifying rotational or vibrational levels in molecules, electromagnetic waves having wavelengths in the infrared part of the electromagnetic spectrum are needed and that electromagnetic waves in the frequency range lower or equal to 50KHz ("low-frequency") would not be able to cause a detectable effect in such molecules. The Board concurs with this position in that, at least according to well-established theory, applying such a low-frequency signal to a sample that exhibits molecular rotation does not lead to any measurable effect. Therefore, in attempting to reproduce the claimed apparatus and method for interrogating a sample, the skilled person could not rely on the established theory on molecular spectroscopy for predicting any result.

2.2.2 In the Grounds of Appeal, page 5, last two paragraphs, it is argued that "sample-molecules emit low-frequency signals" which emission is (page 6, 1st paragraph) "already present", even without the application of a Gaussian noise signal. The established theory of electrodynamics does not leave room for a spontaneous emission of low-frequency radiation by a "sample that exhibits (i.e. that is able to undergo) molecular rotation, unless the molecule actually moves/rotates in an external magnetic field (as is acknowledged in paragraph [0039] of the published patent application). Therefore, even if the purported effect that the so-called "sample-source emission" would be present, the skilled person in attempting to reproduce the claimed apparatus and method could not use the theory of electrodynamics for predicting any result.

2.2.3 On page 6, 2nd paragraph, of the Grounds of Appeal the appellant argues that "the fact that the underlying physical mechanisms …are not exactly understood in the art can not be regarded as prejudicial for the patentability of the present invention". The Board concurs with this argument insofar as the European Patent Convention does not exclude the patenting of "revolutionary" inventions. However, as explained in Decision T 0541/96, point 6.2 of the Reasons, the provisions of Article 83 EPC require that the European patent application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by the skilled person and that, in particular "*if the invention seems, at least at first, to offend against the generally accepted laws of physics and established theories, the disclosure should be detailed enough to prove to a skilled person*

conversant with mainstream science and technology that the invention is indeed feasible (i.e. susceptible of industrial application). This implies, inter alia, the provision of all the data which the skilled person would need to carry out the claimed invention, since such a person, not being able to derive such data from any generally accepted theory, cannot be expected to implement the teaching of the invention just by trial and error". Contrary to the opinion of the appellant, that this Decision is "vague" in defining the level or reference for a disclosure to be sufficient, the Board finds that the requirements summarised in point 6.2 of Decision T 0541/96 are quite unambiguous. The Board also notes that these criteria have also been applied in other more recent Decisions, see T 1785/06, point 3.4.3 and see the Case law of the Boards of Appeal, 6th edition 2010, Section II.A.7.

2.2.4 Concerning the present patent application it is observed that:-

i) An interrogation of a sample exhibiting molecular rotation using low-frequency electromagnetic waves for identifying or detecting sample properties is, according to the theory of molecular spectroscopy, not possible, therefore the skilled person is not able to derive any data from this theory;

ii) Classical electrodynamics does not describe or explain "electromagnetic sample-source emissions", at least not without the simultaneous presence of magnetic fields and moving charges; hence, this theory cannot be used by the skilled person to predict or verify the proper conditions for reproducing the claimed apparatus and/or method in a successful way;

iii) This implies that, for a successful reproduction of the apparatus, method and the results in Figures 11 - 15, the skilled person would have to rely entirely on the original application documents, because the general accepted theory of electromagnetic waves and spectroscopy are of no use to him.

2.2.5 In this respect in the Board's opinion the skilled person, if studying the present disclosure, is left with a number of questions, because details, necessary for its successful reproducing, are lacking:

i) According to paragraphs [0073] and [0074] and claim 3 as filed the sample may be temperature controlled to a preset or selected temperature. However, with respect to the Examples (Figures 11 - 15) no temperatures are disclosed; the appellant has referred to paragraph [0122] which discloses that the sample is "typically a liquid sample" from which the appellant concludes that it should be recorded at liquid phase temperature. However in the same sentence it is disclosed that the sample "…may be gaseous or solid or semi-solid as well, as long as at least one component of the sample has one or more rotational degrees of freedom". Therefore this passage does not allow one to draw a conclusion concerning the temperatures applied.

ii) The Examples also do not disclose values of the applied magnetic field at the Helmholtz coils. In this respect the statement on page 13, lines 6 - 8, that "noise is applied and adjusted until the noise is 30 to 35 decibels above the molecular electromagnetic emissions sought to be detected" is of no assistance since, as explained before, the skilled person familiar with the field of electrodynamics and molecular spectroscopy cannot obtain any information about the

expected level of "molecular electromagnetic emissions" from the established theories;

iii) Finally, although Figures 11 - 15 show "spectral plots" in dependence of frequency, and "data" are listed in Tables 1 to 3, the skilled person does not have information to relate such data to a deterministic model which would enable him to reproduce the claimed "interrogation of a sample that exhibits molecular rotation" in a predictable way.

It therefore appears that the skilled person, while not being able to derive from the description the teaching necessary for reproducing the claimed apparatus from established scientific theories because the purported conditions are in apparent contradiction with these theories, is also not presented with all the data to implement the invention without undue experimentation.

2.2.6 With respect to the objections ii) and iii) raised in the Board's Communication of 4 May 2009, the appellant has argued that in its opinion the patent application disclosed all the required data so that the apparatus and method can be reproduced by the skilled person, as was illustrated by the declarations of Dr. Herr and Mr. Fugal.

2.2.7 These arguments are not found to be conclusive by the Board: as explained in the Board's Communication of 2 February 2010, it understands from the declaration of Dr. Herr that he was not involved in the generation and collection of the data, and had only been involved in the data processing.

2.2.8 The data discussed in the context of the declaration of Mr. Fugal cannot convince the Board, because apparently these data have been collected at the premises of the appellant, presumably employing the apparatus of the appellant. Therefore the collection of these data is not comparable with the position in which the skilled person finds himself if, starting from scratch and only having at his disposal the original patent application and his background in the technical field of physics, tries to reproduce the apparatus and method as originally disclosed. This in particular because, on the one hand, he understands that a sample exhibiting molecular rotation and emitting low-frequency radiation is the basis of the disclosure but, on the other hand, he is not in a position to provide such a sample with the desired behaviour, at least not starting from established physics theories. This implies that in the original patent application there is essential information missing.

2.2.9 These objections equally apply to method claim 14.

2.2.10 For these reasons the Main Request is not allowable.

3. *First Auxiliary Request*

3.1.1 The independent claims 1 and 14 of this Request define as further features of the sample that it has a dipole moment and that it exhibits molecular rotation in the earth's magnetic field. This requirement merely implies that the sample exhibits molecular rotation if it is exposed to the earth's magnetic field.

3.1.2 Since however, according to these claims, the sample is positioned in a magnetic container having both magnetic and electromagnetic shielding it appears that the sample, while being present within this container, is not exposed to an external magnetic field including the earth's magnetic field (see point 2.1.2 supra).

3.1.3 Therefore including the above additional features in claims 1 and 14 of this Request cannot overcome the objections raised for the Main Request.

4. Hence the Board concurs with the position of the First Instance, that the present patent application does not fulfil the requirements of Article 83 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl A. G. Klein