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**Datasheet for the decision
of 17 February 2020**

Case Number: T 1485/17 - 3.4.02

Application Number: 13773343.2

Publication Number: 2870483

IPC: G01N37/00

Language of the proceedings: EN

Title of invention:

SIGNAL CAPTURE METHOD AND APPARATUS FOR THE DETECTION OF LOW
FREQUENCY ELECTRIC SIGNALS IN LIQUIDS AND BIOLOGICAL MATTER

Applicant:

Association Promethora

Headword:

Relevant legal provisions:

EPC Art. 83

Keyword:

Sufficiency of disclosure - (no)

Decisions cited:

T 1329/07, T 1796/07, T 0541/96, T 1023/00

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 1485/17 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 17 February 2020

Appellant: Association Promethora
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 7 February 2017
refusing European patent application No.
13773343.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman R. Bekkering
Members: C. Kallinger
G. Decker

Summary of Facts and Submissions

- I. The appellant lodged an appeal against the decision of the examining division refusing European patent application No. 13 773 343.2 on the basis of Articles 57 and 83 EPC.
- II. The appellant requested that the decision under appeal be set aside and that the case be remitted to the first instance with the order to grant a patent based on the set of claims on which the appealed decision was based. As a precaution, the appellant requested oral proceedings.
- III. In a communication pursuant to Article 15(1) RPBA, the board informed the appellant about its preliminary opinion that the application did not satisfy the requirements of sufficiency of disclosure (Article 83 EPC).
- IV. In a letter dated 17 January 2020 the appellant filed observations in regard of the board's preliminary opinion and a further document.
- V. In a letter dated 14 February 2020 the appellant informed the board that it would not attend the oral proceedings scheduled for 17 February 2020. The appellant requested that the proceedings continued without the appellant by virtue of Rule 115(2) EPC.
- VI. Oral proceedings in absence of the appellant were held on 17 February 2020. At the end of the oral proceedings the chairman announced the decision of the board.

VII. The appellant's sole request is that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims on which the appealed decision was based, i.e. claims 1 to 10 filed with the letter dated 27 January 2015.

VIII. Claims 1, 9 and 10 of the appellant's sole request read as follows:

"1. A bioharmonic signal detection system for measuring a dynamic low frequency electrical field that surrounds biological systems, liquids, and bioactive materials, comprising of:

- a signal oscillator (1);*
- a tunable resonator circuit (2, 3, 4, 5, 6, 7, 8) that receives a signal at its input;*
- a signal from the signal oscillator, wherein the tunable circuit further comprises an antenna that is coupled to a sample to receive the structured field;*
- a ground plane resonator circuit (10) that receives at its input an output from the tunable resonator; and*
- an amplifier (9) that receives at its input an output from the ground plane resonator and amplifies the bioharmonic signal measurement corresponding to the structured field;*

whereby the tunable resonator circuit, the ground plane resonator circuit and the amplifier are grounded to a common potential which is configured to be floating."

"9. Use of the bioharmonic detection system as claimed in anyone of claims 1 to 8 for detecting and identifying the presence of specific types of biological organisms such as fungi, plants, fish, birds, insects, animals, and people."

"10. Use of the bioharmonic detection system as claimed in any one of claims 1 to 8 for detecting and identifying specific types of responses in a biological system such as the reaction of a biological system to an applied physical, chemical or electromagnetic stimulus."

IX. The following documents will be referred to in this decision:

Document cited in the search report:

D1 Meghan E. Halse et al: "Terrestrial Magnetic Field NMR: Recent Advances" In: "Encyclopedia of Magnetic Resonance", 15 March 2009 (2009-03-15), John Wiley & Sons, Ltd, Chichester, UK, XP055087393

Documents submitted by the applicant during the oral proceedings before the examining division:

- A1 Print-out of a presentation given by Mr. Pier Rubesa titled "Bioscope Agro, E.coli Experiments".
- A2 S.R. Cole, B. Voytek, "Brain Oscillations and the Importance of Waveform Shape", Trends in Cognitive Sciences Vol. 21(2), 2017, 137-149.
- A3 M. Sammer et. al, "The Bioscope System - Testing and Validating a Novel Sensor for Aqueous Solutions", J. of Water Chemistry and Technology Vol. 33(6), 2011, 369-376.
- A4 M. Souvignet, "Evaluation de méthodes innovantes de diagnostic dans une culture de blé en Agriculture Biologique", Research thesis at LaSalle Beauvais, 2015-2016.
- A5 S. Bourguet, "Mesure des énergies subtiles avant et après traitement technologique de fruits et de

légumes a l'aide du système Bioscope", Diploma thesis at the University of Applied Sciences Western Switzerland, 2008.

- A6 K.-C. Chou, "Biological Functions of Low-Frequency Vibrations (Phonons)", *Biophys. J.* Vol. 45, May 1984, 881-890.
- A7 A. Amyan, S. Ayrapetayan, "The Biological Effect of Extremely Low Frequency Electromagnetic Fields and Vibrations on Barley Seed Hydration and Germination", *TheScientificWorldJOURNAL* Vol. 4(S2), 2004, 55-69.
- A8 G.A. Gordon, "Extrinsic electromagnetic fields, low frequency (phonon) vibrations, and control of cell function: a non-linear resonance system", *J. Biomedical Science and Engineering* Vol. 1, 2008, 152-156.

Documents filed by the appellant during the appeal procedure:

- AA1 A.M. Pietak, "Endogenous electromagnetic fields in plant leaves: a new hypothesis for vascular pattern formation", *Electromagnetic Biology and Medicine* Vol. 30(2), 93-107
- AA2 A.M. Pietak, "Structural evidence for electromagnetic resonance in plant morphogenesis", *BioSystems* 109, 2012, 367-380.
- AA3 J. Lipkova, J. Cechak, "Human electromagnetic emission in the ELF band", *MEASUREMENT SCIENCE REVIEW* Vol. 5(2), 2005, 29-32.
- AA4 W. Ross Adey, "Biological Effects of Electromagnetic Fields", *Journal of Cellular Biochemistry* Vol. 51, 1993, 410-416.
- AA5 same as A2
- AA6 https://en.wikipedia.org/wiki/Low_frequency
- AA7 https://en.wikipedia.org/wiki/Very_low_frequency

- AA8 V. Shalatonin, "A Study of the Endogenous Electromagnetic Field into the Space Around the Flower Plants", Conference Paper, 2007, DOI: 10.1109/ICIMW.2007.4516504, Source: IEEE Xplore
AA9 US 7,986,990 B2.
AA10 S. Grimnes and O.G. Martinsen, "Bioimpedance and Bioelectric Basics", Academic Press, Oxford, 2008, page 2.

X. The appellant's arguments can be summarised as follows:

In contrast to typical bioimpedance measurements, which provided only a simple voltage and/or current output, the claimed invention provided a steady state complex signal waveform output when coupled to a biological sample. In particular, the claimed detection system was capable of detecting a "*bioharmonic signal*" resulting from a "*dynamic low frequency field that surrounds biological systems*" (see claim 1) that was the result of a phenomenon uniquely present in biological systems and would not provide an output for an inert substance, even when that substance was internally or externally polarised.

This signal, which was referred to in the claims and the description as "*bioharmonic signal*", related to low frequency electric waves that could be extracted from water, organic liquids and biological matter. Although this term was not generally used, the application provided a definition, i.e. a "*bioharmonic signal*" was "*used to identify a novel wave phenomenon, [...] a low frequency electrical waveform that is related to the state and or behavior of a biological system*" (see description, page 1, second paragraph).

The appellant argued that the field phenomenon referred to as *bioharmonic* was an active frequency, or harmonically related series of frequencies, that were a result of a dynamic interplay of natural processes including physical, chemical and electromagnetic interactions and that the measured "*bioharmonic signals*" were only observed in samples of a biological nature and in water but were not observed in any other material. The existence of such endogenous electromagnetic fields, also referred to as global and coherent electrical fields in biological systems, was a proven fact, as could be seen from the documents provided by the appellant.

The appellant further argued that the fact that the existence of these fields "*can not be explained by standard biochemistry*" (see description of the application page 18, fourth paragraph) only referred to the lack of available literature on the subject.

The appellant further argued that no exact explanation for the phenomenon had been given in the application because the exact origin and reason were not modeled at the time of filing of the application. Nevertheless, the phenomenon was measurable and the application showed numerous examples that were illustrative of the types of signals that could be captured with the invention, including differences in the type of sample tested and the low frequency spectral reactions when these samples were subjected to specific types of physical, biological or electromagnetic treatment.

In conclusion, based on the explanations and documents provided, the appellant disagreed with the examining division's conclusion that the subject-matter contradicted the established laws of physics.

Reasons for the Decision

1. The invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The application therefore does not satisfy the requirements of Article 83 EPC.

A low frequency signal inherent to only biological systems is not known in the art and contravenes established laws of physics. Although it is known in the art to obtain a low frequency electromagnetic signal of a sample located in a weak magnetic field (see e.g. D1, where an NMR signal is generated in the earth's magnetic field), such a signal is directly linked to the chemical nature of the substance under investigation, in particular to the nature of the nuclei in the sample. This is however in contradiction to the allegation made in the application that the phenomenon in question *"is not of a directly chemical nature but part of a global and coherent electrical field"* and that *"the invention allows the detection, identification and measurement of structured extremely low frequency (XLF) electric field waves that are inherent in all biological systems"* (see originally filed description, page 14, first paragraph).

The onus of proof with respect to the sufficient disclosure of a not generally accepted and unexplained phenomenon is on the applicant.

In order to sufficiently disclose a phenomenon which appears to contravene generally accepted laws of physics, which is not generally recognised and has been observed only by a very limited number of research

groups and for which hitherto no explanation exists in the scientific community, a high level of proof is required (see also T 1329/07, T 1796/07, T 541/96 and T 1023/00).

2. In order to support its arguments and to confirm scientific facts around the field of the invention, the appellant referred to the following documents:

- Documents A1, A4 and A5 show measurements of electrical properties of aqueous solutions made with a so-called "*Bioscope*" of the inventor of the present application but fail to provide an explanation for the underlying phenomenon. These documents neither explain nor provide sufficient independent proof for the alleged phenomenon.
- Document A3 also shows measurements of electrical properties of aqueous solutions made with a so-called "*Bioscope*". It explains the measurement results by changes in the chemistry and physics of the aqueous solutions (see page 374, *Discussion*) and states that the "*derivation of a theoretical model is considered of importance*" (see page 375). It does therefore neither explain nor proof the alleged phenomenon of a low frequency signal inherent to only biological systems.
- Documents A6 and A8 concern phonons in biological materials. As phonons generally refer to vibrational motions in a lattice, i.e. mechanical oscillations, these documents are not relevant in the field of low frequency electromagnetic signals.

- Documents AA1 and AA2 relate to the Fröhlich-effect which involves electromagnetic radiation with frequencies in the order of GHz and higher. These documents are therefore not suited to proof an effect involving a low frequency electromagnetic radiation.
- Documents A2 and AA5 concern brain oscillations caused by neural activity. Document A7 describes the effect of low frequency electromagnetic radiation on matter. Document AA3 shows measurements of human electromagnetic emission in the ELF band without providing an explanation for the origin of the radiation. Document AA4 relates to the effect of electromagnetic fields on biomaterial. Document AA9 is a patent relating to the detection of extremely low frequency signals emitted from the human body. None of these documents is suited to proof or explain the existence of a low frequency signal inherent to only biological systems in general.
- Documents AA6, AA7 and AA10 relate to general technical knowledge with regard to low and very low frequency radio waves and bioimpedance but are silent about the alleged phenomenon of a low frequency signal inherent to only biological systems in general.
- Document AA8 relates to the measurement of electromagnetic fields around plants. The document states that *"many distant interactions cannot be explained by traditional biophysics and bioelectromagnetics"* (see chapter I. Introduction) and fails to provide details on the experimental set-up. Therefore, document AA8 is also not suited

to proof or explain the alleged existence of a low frequency signal inherent to only biological systems in general.

In conclusion, none of the documents referred to by the appellant mentions or explains a *"bioharmonic signal"* as referred to in the claims or defined in the description.

Furthermore, the documents fail to convincingly proof the existence of the claimed *"dynamic low frequency electrical field that surrounds biological systems, liquids, and bioactive materials"* (see claim 1) or a phenomenon creating *"an active frequency, or harmonically related series of frequencies, that are a result of a dynamic interplay of natural processes including physical, chemical and electromagnetic interactions"* (see originally filed description, page 1, first paragraph), which the invention intends to detect via the claimed detection system.

With respect to the appellant's argument that *"the graphs in the patent application are illustrative of the types of signals that can be captured with the invention, including differences in the type of sample tested and the low frequency spectral reactions when these samples have been subjected to specific types of physical, biological or electromagnetic treatment"* (see grounds of appeal, page 9, second paragraph), the board is of the opinion that neither the description nor the graphs provided in the figures of the application are sufficient to demonstrate the existence of the alleged phenomenon.

3. The board is therefore of the opinion that the documents and arguments provided by the appellant do not meet the high level of proof which is required to sufficiently disclose a phenomenon which appears to contravene generally accepted laws of physics.

In conclusion, the board is of the opinion that the appellant failed to provide convincing arguments or evidence that would support the existence and measurement of a *"bioharmonic signal"* as referred to in the claims or as defined in the application and that therefore the invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

The application therefore does not satisfy the requirements of Article 83 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



M. Kiehl

R. Bekkering

Decision electronically authenticated