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**Datasheet for the decision
of 17 March 2009**

Case Number: T 0946/07 - 3.2.02

Application Number: 04255028.5

Publication Number: 1508302

IPC: A61B 5/103

Language of the proceedings: EN

Title of invention:

A system for determining relative distance(s) and/or angle(s)
between as least two points

Applicant:

Alfred E. Mann Foundation for Scientific Research

Opponent:

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Headword:

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Relevant legal provisions:

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Relevant legal provisions (EPC 1973):

EPC Art. 52(1), 56

Keyword:

"Inventive step (no, all requests)"

Decisions cited:

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Catchword:

-



Case Number: T 0946/07 - 3.2.02

D E C I S I O N
of the Technical Board of Appeal 3.2.02
of 17 March 2009

Appellant: Alfred E. Mann Foundation for Scientific
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 28 December 2006
refusing European application No. 04255028.5
pursuant to Article 97(1) EPC 1973.

Composition of the Board:

Chairman: M. Noel
Members: S. Chowdhury
A. Pignatelli

Summary of Facts and Submissions

- I. This appeal is against the decision of the examining division dated 28 December 2006 to refuse European patent application No. 04 255 028.5.

The application was refused on the grounds that the subject-matter of claims 1 and 22 then on file lacked an inventive step having regard, inter alia, to:

D1: US-A-2002/0198604

D7: Aravamudhan et al., Getting to Know Wireless Networks and Technology, Internet article, 4 July 2003.

D8: US-A-6 261 247.

- II. On 2 March 2007 the appellant lodged an appeal against the decision and paid the prescribed fee on the same day. On 4 May 2007 a statement of grounds of appeal was filed.

Oral proceedings were held on 17 March 2009. On the eve of the oral proceedings the appellant's representative informed the office of his intention of not attending.

In the written procedure the appellant requested that the decision be set aside and a patent be granted on the basis of the following sets of claims:

Main request: claims 1 to 16 (part) filed with letter dated 1 August 2005. Claims 16 (remainder) to 19 filed with letter dated 24 April 2006.

Auxiliary request I: claims 1 to 21 filed with the grounds of appeal.

Auxiliary request II: claims 1 to 15 filed with the grounds of appeal.

III. Independent claims 1 and 22 of the main request read as follows:

"1. A system (100) for determining relative positions of two points, the system comprising: a first microelectronic device (110) adapted to emit magnetic signals;
a second microelectronic device (112) adapted to receive the magnetic signals; and
a controller (124) in communication with the first and second microelectronic devices (110,112);
characterised in that the second microelectronic device (112) or the controller (124) determines the distance between the first and second microelectronic devices (110, 112) based on the strength of the magnetic signals received at the second microcontroller (112) and a predetermined correlation table providing a correlation between measured magnetic signal strength and distance between the first and second microelectronic devices (110, 112).

22. A method for determining relative positions of two points, comprising: providing a first microelectronic device (110) adapted to emit magnetic signals;
providing a second microelectronic device (112) adapted to receive the magnetic signals; communicating with the first and second microelectronic devices (110,112);
measuring the strength of the magnetic signals received

by the second microelectronic device (112); determining the distance between the first microelectronic device (110) and the second microelectronic device (112) based on the strength of the magnetic signals received; characterised in that said determination of the distance is made with reference to a predetermined correlation table providing a correlation between measured magnetic signal strength and distance between the first and second microelectronic devices (110,112)".

Claims 2 to 21 are dependent claims.

Claims 1 and 21 of the first auxiliary request specify that the first and second microelectronic devices are implantable.

Claim 1 of the second auxiliary request reads as follows:

"A system (100) for determining relative positions of body parts, the system comprising:
a first microelectronic device (210, 310) adapted to emit magnetic signals having a first frequency;
a plurality of second microelectronic devices (212-220, 312-320) adapted to receive the magnetic signals having the first frequency; and
a controller (224, 324) in communication with the first microelectronic device (210, 310) and the plurality of second microelectronic devices (212-220, 312-320);
wherein each second microelectronic device (212-220, 312-320) or the controller (224, 324) determines the distance between the first microelectronic device (210, 310) and each second microelectronic device (212-220, 312-320) based on the strength of the magnetic signals

received at each second microcontroller (212-220, 312-320), and the first and second microelectronic devices (210, 310; 212-220) are implantable in a living body, the system being characterised in that it further comprises:

a first subsystem (301), comprising:

the first microelectronic device (210, 310); and
said plurality of second microelectronic devices (212-220, 312-320); and,

a second subsystem (302), comprising:

a third microelectronic device (330) adapted to emit magnetic signals having a second frequency; and
a plurality of fourth microelectronic devices (332-340) adapted to receive the magnetic signals having the second frequency;

said controller (224, 324) being in communication with the first microelectronic device (210, 310), the plurality of second microelectronic devices (212-220, 312-320), the third microelectronic device (330) and the plurality of fourth microelectronic devices (332-340); and

a predetermined correlation table that provides correlations between measured magnetic signal strength of each of the second microelectronic devices (212-220, 312-320) and the distance between said devices and the first microelectronic device (210, 310), and correlations between measured magnetic signal strength at each of the fourth microelectronic devices (332-340) and the distance between said devices (332-340) and the third microelectronic device (330)."

IV. The appellant argued that in order to approach the present invention the skilled reader of D1 must first have to decide to determine distance using magnetic

signals rather than RF or ultrasonic signals, and then, in order to solve the objective problem of how to convert the data concerning the strength of received magnetic signals into distance, he would search in relevant teaching in the field of distance measuring using magnetic signals, but not in the separate and remote field of distance measuring using RF signals.

The prior art would lead the person skilled in the art to the conclusion that RF signals were not suitable where accurate and reliable measurement of distances was required. It was easy, using hindsight, to look back at the prior art and piece together selected parts of the disclosures of D1 and D8 to arrive at the invention, but, given the technological differences between RF and magnetic fields, the skilled person would be discouraged from looking in the RF field for solutions, given unavoidable deficiencies associated with RF signals.

The person skilled in the art would understand that RF signals were emphatically not suitable for measuring the positions of implantable devices (first auxiliary request) because of the attenuating effect of human tissue on RF signals. RF signals were also not suitable where accurate and reliable measurement of small distances was required.

The objective technical problem, as regards the second auxiliary request, was how to adapt the system of D1 so that it could be used to determine the positions of body parts of first and second parts of the body. There was no suggestion in D1 that the system could be used for this purpose. D7 taught FDMA (Frequency Division

Multiple Access) for RF signals, not for magnetic signals, and was in the remote field of mobile telephony.

An expert in the field, Dr J. G. Deak, came to the clear conclusion that there would have been no reason for the skilled reader of D1 to search in the field of RF distance measurement when considering the use of magnetic signals to measure distance as proposed in the present invention.

Reasons for the Decision

1. The appeal is admissible.
2. *Inventive step - main request*

The closest prior art document, D1, discloses the features of the preamble of claim 1 of the patent in suit. This analysis was accepted by the appellant.

The device of claim 1 is characterised by the features: "the second microelectronic device (112) or the controller (124) determines the distance between the first and second microelectronic devices (110, 112) based on the strength of the magnetic signals received at the second microcontroller (112) and a predetermined correlation table providing a correlation between measured magnetic signal strength and distance between the first and second microelectronic devices (110, 112)".

These features are for performing a calibration procedure and storing the calibration as a table. In use, the first microelectronic device emits magnetic signals to be received by the second microelectronic device. Upon receiving the magnetic signals from the first device, the second device measures the strength of the magnetic signal and based on the correlation table can calculate the distance between the two devices and correspondingly the distance between the two parts of the body, such as the biceps and the forearm. As a result of the distance measurement, the position and the angle of the forearm relative to the biceps is determined, for example, whether the arm is fully extended or bent.

In D1 the manner in which the attenuation of the signal is converted into the distance between the microelectronic devices is not given. Therefore, starting from D1 the problem underlying the claimed subject-matter is to provide means for converting the attenuation of the magnetic or RF signals described therein into a distance value.

Such a calibration procedure and its subsequent use in a device for measuring the distance between body parts is known from D8, however (column 5, lines 28-43). The use of the corresponding features of D8 in the D1 device in an analogous manner is not considered to involve an inventive step.

Appellant's main argument against the above conclusion is that the person skilled in the art and working with magnetic signals would not consider developments in the

separate and remote field of distance measurement using RF signals, and that doing so involves hindsight.

These arguments are not convincing. There are only two possibilities for converting the received signal values into distance values: i) by calculation, and ii) by calibration. Calculation is very complicated and unreliable whereas calibration is commonplace and would occur to the person skilled in the art. Indeed, this is exemplified by D8.

D8 gives an example of a calibration of the distance/signal strength curve using RF signals. The skilled person would appreciate that the principle of calibration described in D8 would apply to all systems regardless of whether they were RF, magnetic, acoustic, etc., because all signals decay as a function of distance, and the principle is applicable whatever the decay mode, ie linear, inverse square, inverse cube, etc. The fact that RF and magnetic signals have different natures, modes of propagation, behaviour, etc. is irrelevant to the fact that the signal strength/distance curve may be empirically determined. D8 is, therefore, relevant to the present problem and would be consulted by the skilled person.

The same considerations apply to the method of claim 22.

3. Inventive step - first auxiliary request

Claim 1 includes the feature that the first and second microelectronic devices are implantable. The first and second microelectronic devices of D1 are also implantable (see Fig.1), so that the claim is still

characterised by the same features as the main request, and these new features do not change the above conclusion on inventive step, accordingly.

Appellant's argument that RF signals are emphatically not suitable for measuring the positions of implantable devices is not relevant, as in the case of the main request, since the teaching of D8 which is being invoked in the above analysis is not that RF signals should be used, but how the signal strength is to be converted into a distance value.

4. *Inventive step - second auxiliary request*

Claim 1 of this request includes the following further features:

- a) a plurality of second microelectronic devices is used to receive the magnetic signals
- b1) a second subsystem having the same structure as the first subsystem is used
- b2) the first and second subsystem operates at first and second frequencies, respectively.

These features relate to different partial problems. D1 discloses (Figures 6 and 7) the use of a plurality of second microelectronic devices on one damaged hand of a person to receive the magnetic signals. The use of two identical subsystems is merely the duplication of the same means and would be obvious to the skilled person should both hands be damaged, for example.

The use of two separate and independent subsystems, each operating at a frequency different to the other

one, is to avoid interference between the two subsystems. However, it is well known in the field of communications (see D7) that interference between two independent systems may be avoided by using different frequencies in the two systems.

The problem here is one of interference, so the person skilled in the art would look in the field of signalling for solutions to problems of interference between two systems. In such a situation the solutions for different problems may be sought for separately in the prior art, and it is permitted to combine different documents in the same or neighbouring technical fields, with the closest prior art document.

Therefore, the subject-matter of claim does not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

D. Sauter

M. Noel