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D E C I S I O N
of 19 November 2003

Case Number: T 0303/02 - 3.2.2

Application Number: 96110142.5

Publication Number: 0738496

IPC: A61B 5/00

Language of the proceedings: EN

Title of invention:
Monitor and method for acquiring and processing electrical signals to bodily functions

Applicant:
Aspect Medical Systems, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 52(1), 54, 56, 84

Keyword:
"Clarity (yes)"
"Novelty (yes)"
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0303/02 - 3.2.2

D E C I S I O N
of the Technical Board of Appeal 3.2.2
of 19 November 2003

Appellant: Aspect Medical Systems, Inc.
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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 23 October 2001 refusing European application No. 96110142.5 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: W. D. Weiß
Members: S. S. Chowdhury
U. J. Tronser

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division dated 23 October 2001 to refuse European patent application No. 96 110 142.5.

The ground of refusal was that the claim 1 was not clear. A consequence of the lack of clarity was that the claim could be broadly interpreted, which meant that the claimed subject-matter also lacked novelty. The dependent claims were also found not to meet the requirements of Article 52(1) EPC.

The following documents were considered by the Board:

D1: BE-A-904 825

D3: US-A-4 681 111

The examining division argued that "data" and "power" define entities that overlap to a large extent, and that transmission of data entails the transmission of power, so that the expression "signals carrying both data and power" in claim 1 was ambiguous.

II. On 21 December 2001 the appellant (applicant) lodged an appeal against the decision and paid the prescribed fee. On 25 February 2002 a statement of grounds of appeal was filed.

III. The appellant requests that the decision under appeal be set aside and that a patent be granted on the basis of claims 1 to 3 filed as the "main request" submitted at the oral proceedings which took place on 19 November 2003.

IV. Claim 1 of the main request reads as follows:

"A monitor (10) for receiving electrical signals from a living body and processing such signals to obtain information relating to a bodily function or organ, said monitor (10) comprising a power supply (34), a processing module (12) and data acquisition circuits (14) for acquiring electrical signals through one or more electrodes connected to the body, characterized by one pair of conductive wires (82) transmitting data between said processing module (12) and said data acquisition circuits (14), one of said conductive wires being configured to transmit data and the other of said conductive wires being configured to be a ground return, wherein sufficient power to operate said data acquisition circuits (14) is obtained from said wire that transmits data, wherein means for generating power from the signals transmitted on said wire and means for decoding the control data are permanently connected to a transformer which is connected to the pair of conducting wires.".

Claims 2 and 3 are dependent on claim 1.

V. The appellant argued as follows:

In D1 the means for transmitting data and power comprised a link of three conductors, one for the data,

one for the power, and the third being a common return path (ground) as well as a shield. The application, by contrast, transmitted both data and power on one pair of wires and the shield was not used as the return path, it was used purely as an electromagnetic interference shield.

The essence of the invention could be summarised as follows: Whereas the signals to be detected were of the order of microamps in amplitude, the power required to energise the components of the data acquisition circuits was about a watt, so the situation was akin to tiny ripples being carried on a large wave, and the problem was how to best carry the control data together with power.

The application did this by transmitting both power and data together on a single pair of wires, as indicated by the application at column 6, lines 27 to 29 and column 7, lines 16 to 18 [of the A1 publication]. This was illustrated in Figure 4, which showed that both data and power from the line 82 were applied, at the same time, to both the power rectifier 112 as well as the control data receiver 116.

By contrast, D3 used a time-sharing mode in which power and data were sent at different times, and a switch 55 was set accordingly to the one or the other position, depending on whether data or power was to be received. Even if power and data were sent simultaneously to the coil 52, each was accepted only intermittently in the implanted device.

Reasons for the Decision

1. The appeal is admissible since it complies with the provisions mentioned in Articles 106 to 108 EPC.

2. *Clarity of claim 1*

The decision under appeal relies on the argument that "data" and "power" define entities that overlap to a large extent, and that transmission of data entails the transmission of power, so that the expression "signals carrying both data and power" in claim 1 is ambiguous. This conclusion is not correct since the person skilled in the art would recognise that data and power differ considerably in various characteristics, particularly, energy level, frequency, and form.

Data in the present context are handled by microprocessors and their energy levels are comparatively small as is appropriate for TTL circuits. Control signals are also generally of low power and in the present application the control signal at the output of the transformer 74 in Figure 4 is brought to TTL levels by the control data receiver 116 (column 6, lines 34 to 42). The energy carried by data would not be enough to energise the various circuits of the module 14 (see column 5, lines 36 to 46), and data are typically digital signals of high frequency. By contrast a power signal has much greater energy levels, enough to drive the various circuits (about one watt, see column 9, lines 37 to 40).

For the above reasons there would be no noticeable overlap between data and power components in the present context, and no confusion arises in the use of these terms to define separate entities for transmission over common wires, accordingly.

3. *Novelty*

Document D1 discloses a monitor 200 (Figure 1) for receiving electrical signals from a living body and processing such signals to obtain information relating to a bodily function or organ, said monitor comprising a power supply located in a housing of said monitor and means 100 for acquiring electrical signals through one or more electrodes 500, 600 connected to the body, wherein a line 300 transmits signals carrying both data and power between said housing for said power supply and said means for acquiring electrical signals (D1: page 17, lines 8 to 30). The line 300 in D1 comprises three conductors including an earthed shield, and the data are carried by one conductor and the shield while the power is carried by a second conductor and the shield (see page 17, lines 23 to 29). This arrangement is different to that of the application where only one pair of conductive wires is provided for carrying both data and power, the shield mentioned in column 6, lines 37 and 38 of the A1 document being purely an electromagnetic interference shield and not a return conductor. For this reason alone the monitor of claim 1 is novel over the monitor of D1.

Document D3 discloses a monitor for receiving electrical signals from a living body and processing such signals to obtain information relating to a bodily

function or organ (see the opening paragraph of the description), said monitor comprising a power supply located in a housing of said monitor (this is implicit from the description of Figure 17 in column 10, lines 44 to 56) and means for acquiring electrical signals through one or more electrodes connected to the body. One pair of conductive wires (the wires leading to the coil 52) transmits signals carrying both data and power between said housing for said power supply and said means for acquiring electrical signals (see column 10, lines 44 to 46, which mentions the possibility of providing power or data or both), and sufficient power to operate said data acquisition circuits (for example the transmitter 56 thereof) is obtained from said wire that transmits data.

The applicant argues that the monitor of claim 1 differs from the monitor of D3 in that in the present case the means for generating power from the signals transmitted on said wire and means for decoding the control data are permanently connected to a transformer which is connected to the pair of conducting wires.

While the use of a transformer in the present case, as opposed to a tuned circuit in D3, endows the claimed monitor with novelty over D3, it is a moot point that the power and data being "permanently connected" to it is, indeed, a distinguishing feature. The word "permanently" is not used in this context in the application, its meaning is inferred from Figure 4 and the cited passages in columns 6 and 7. This will be dealt with in detail in the next section. What is clear, however, is that data and power are both provided over one pair of wires to the coil 52 in D3,

and transferred to the coil 53, and then to a power rectifier 54. In the downward position of the switch 55 (ie the one not shown in Figure 17) the data are then passed on to the decoding means at the same time that the power is passed through the rectifier, albeit then not on to the transmitter 56.

4. *Inventive step*

Both transformers and tuned circuits belong to the class of inductive signal couplers which are well known to the person skilled in the art. In the case of D3 signals are to be transmitted transcutaneously, for which a tuning circuit is indispensable, but in the application, where there is no transcutaneous transmission of a signal, a tuned circuit is not indispensable. A tuned circuit has the disadvantages of having variable coupling and being frequency selective. Both these disadvantages are not encountered in transformers, so the person skilled in the art would replace the tuned circuit of D3 by a transformer if the transmission were not through the skin. It is also well known that both transformers and tuned circuits provide patient isolation. Thus the use of the one or other circuit depends on the circumstances and is not a question of exercising inventive ability. The applicant has not argued otherwise in this respect.

The cornerstone of the applicant's case is that in the present monitor power and data are transmitted from the processing module permanently over two wires and accepted on a permanent basis at the data acquisition module. For this reason Figure 4 shows no routing

switch corresponding to the switch 55 in Figure 17 of D3.

As stated at the end of section 3. above, the last part of claim 1, featuring the permanent connection of the means for generating power and the means for decoding the control data to a transformer, requires some examination. The applicant argues that the power available from the unit 12 is used on a permanent basis, although it is not stated in the application how the power is handled after it has been rectified at the unit 112.

The wording of the claim is intended to convey the idea that the data and power are transmitted and handled "simultaneously". In digital circuits, this means at most that power and data pulses or packets alternate or interleave with each other, they are not strictly simultaneously transmitted. This would, however, also apply in the case of D3 when both data and power pulses are transmitted via the coil 52, so that in D3 also the transmission of data and power can be said to be "simultaneous".

In D3, the data and power available at the coil 53 are used on an intermittent and alternating basis because of the nature of the apparatus. In particular, D3 concerns an implanted apparatus in which data are read in and other data are subsequently read out, and it is for the latter that the available power is utilised to energise the transmitter 56. If a permanent use of the power were considered necessary, for example to charge a battery, then the person skilled in the art would simply use a permanent circuit to utilise both the data

and power simultaneously, as in the application, no inventive step being required for designing such a circuit.

To summarise, no inventive step is involved in either appreciating that both data and power may be carried over only two wires simultaneously, since D3 already discloses this idea, or in implementing means for simultaneously and permanently utilising both these entities, this being a trivial exercise for the person skilled in the art of medical electronics.

Therefore, the monitor of claim 1 does not involve an inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

V. Commare W. D. Weiß