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**Datasheet for the decision
of 16 January 2007**

Case Number: T 1171/04 - 3.2.05

Application Number: 94916593.0

Publication Number: 0696907

IPC: A61F 2/14

Language of the proceedings: EN

Title of invention:

Independent photoelectric artificial retina device

Patentee:

Optobionics Corporation

Opponent:

Eberhard-Karls-Universität Tübingen

Headword:

-

Relevant legal provisions:

EPC Art. 123(2), 83, 54, 56

Keyword:

"Allowability of amendments (yes)"

"Sufficiency of disclosure (yes)"

"Novelty (yes)"

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1171/04 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 16 January 2007

Appellant: Eberhard-Karls-Universität Tübingen
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Representative: Otten, Hajo
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Respondent: Optobionics Corporation
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 12 August 2004
rejecting the opposition filed against European
patent No. 0696907 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: W. Zellhuber
Members: P. Michel
D. Rogers

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal against the decision of the Opposition Division rejecting the opposition filed against European Patent No. 0 696 907. The Opposition Division held that the patent in suit as granted satisfied the requirements of Articles 123(2), 83, 54 and 56 EPC.
- II. Oral proceedings were held before the Board of Appeal on 16 January 2007.
- III. The appellant requested that the decision under appeal be set aside and that the European Patent No. 0 696 907 be revoked in its entirety.

The respondent (patentee) requested that:

- 1) The appeal be dismissed; or,
 - 2) That the decision under appeal be set aside and that the patent in suit be maintained on the basis of:
 - (a) claim 1 filed as auxiliary main claim I on 7 April 2005 and claims 3 to 18 as granted; or
 - (b) claim 1 filed as auxiliary main claim II on 7 April 2005, and claims 3 to 18 as granted.
- IV. The following document is referred to in the present decision:

D1: US-A-5,024,223

V. Claim 1 as granted reads as follows:

"A light powered artificial subretinal implant device comprising a plurality of discrete photoelectric devices (10), wherein each photoelectric device comprises a photo-active surface and a corresponding first electrode (12) disposed on the photoelectric device, and a second electrode (18) disposed on the photoelectric device spaced from the first electrode, characterized in that each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate."

VI. The appellant has argued substantially as follows in the written and oral proceedings:

The feature of claim 1, according to which "each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate", is not disclosed in the application as filed. In particular, the term "separate" may have many different meanings.

According to the second paragraph of page 3 of the application as filed, the device according to the invention includes a common liquid vehicle as an essential aspect.

The subject-matter of the patent in suit thus extends beyond the content of the application as filed.

There is no disclosure of photoelectric devices other than discrete independent surface electrode microphotodiodes.

A single example is not sufficient to enable the person skilled in the art to carry out the invention.

The invention is thus not disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

Since the patent in suit refers to the alternative of the devices being surrounded by a mesh, it is clear that claim 1 includes devices which are electrically separated, but mechanically connected. As stated in document D1 at column 3, lines 48 and 49, multiple devices, that is, more than three, may be used. The devices are joined together by an inert adhesive (column 3, lines 52 and 53). They thus comprise separate substrates.

Claim 1 thus lacks novelty in view of the disclosure of document D1.

Even if the subject-matter of claim 1 were to be regarded as being novel, it would nevertheless not involve an inventive step.

The closest prior art is the arrangement disclosed at column 3, lines 43 to 53 of document D1, in which openings are provided as well as multiple, separate sub-devices.

In order to optimize transport of oxygen and nutrients through the device, the only available solution is to enlarge the openings and the gaps between the sub-devices.

VII. The respondent has argued substantially as follows in the written and oral proceedings:

The feature of claim 1, according to which "each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate", is disclosed in the application as filed.

In the first paragraph on page 3 of the application as filed, the drawbacks of the prior art, in which the devices are formed on a common substrate, are described. As described in the last paragraph on page 21 of the application as filed, separation of the devices allows oxygen and nutrients to flow between the outer and inner retinal layers. In addition, the person skilled in the art understands from the description from the last paragraph on page 6 to the first paragraph on page 11, disclosing the method of manufacture of the devices, that each of the devices comprises a separate semiconductor substrate.

The subject-matter of the patent in suit thus does not extend beyond the content of the application as filed.

It is disclosed in the paragraph at page 6, lines 6 to 16, of the application as filed that photoelectric devices other than ISEMCPs may be used. The person skilled in the art would be aware of the existence of suitable photoelectric devices other than ISEMCPs.

The disclosure of the invention is thus sufficient to enable the person skilled in the art to carry out the invention.

Document D1 does not disclose a subretinal implant device wherein each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate.

The subject-matter of claim 1 is thus novel.

Document D1 represents the closest prior art for the purpose of assessing inventive step. The problem to be solved is, as stated in the patent in suit in paragraph [0004], to allow an optimal permeation of oxygen and biological substances.

The solution according to the invention is not suggested in the prior art. Document D1 merely suggests the provision of openings drilled in the substrate.

The subject-matter of claim 1 thus involves an inventive step.

Reasons for the Decision

Main Request

1. *Amendments (Article 123(2) EPC)*

It is alleged on behalf of the appellant that the feature of claim 1, according to which "each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate", is not disclosed in the application as filed.

In the first paragraph on page 3 of the application as filed (published version), there is a discussion of a subretinal photoelectric device which had been disclosed by the inventor of the patent in suit. In this device, a plurality of surface electrode microphotodiodes (SEMCPs) is deposited on "a single common silicon crystal substrate". This device is described as being disadvantageous in that blockage of nutrients from the choroid to the inner retina occurs.

In the summary of the invention presented in the following paragraph, it is stated that the device of the present invention is composed of "a plurality of independent surface electrode microphotodiodes (ISEMCP)". Further, at page 6, lines 9 to 14, it is stated that photoelectric devices other than ISEMCPs may be used.

It is thus disclosed in the application as filed that the photoelectric devices utilised in the subretinal implant device according to the invention are independent of one another and do not possess a single common substrate, but have each a separate semiconductor substrate. By virtue of this structure, permeation of oxygen and nutrients through the device to the inner retina is permitted.

The term "discrete" is used in connection with the photoelectric devices of both the known device and the device according to the invention (cf. claim 1). The term should thus be construed as meaning that the individual devices are each capable of generating an electric current in response to incident light.

This is consistent with the disclosure of the application as filed taken as a whole, which refers to the ISEMCPs being either surrounded by a liquid vehicle, embedded in a transparent flexible substance fabricated from non-dissolvable hydrophilic and nutrient-permeable substances (page 4, lines 16 to 20), or surrounded by a mesh made of an inert substance (page 4, lines 24 to 26). Whilst such a flexible substance or mesh can be made permeable to oxygen and nutrients, this is not possible in a satisfactory manner in the case of a semiconductor substrate.

The person skilled in the art would not understand the liquid vehicle, disclosed at page 3, line 22 of the application as filed as being an essential feature. As stated in the first complete paragraph on page 4, alternatives include the devices being embedded in a transparent flexible substance, and a fine mesh of an inert substance.

Claim 1 of the patent in suit as granted thus does not include any matter which was not present in the application as filed.

2. *Sufficiency of disclosure (Article 83 EPC)*

In the device of the patent in suit, it is necessary for the discrete devices to be capable of generating electrical energy from incident light by means of the photo-voltaic effect. Photoelectric devices other than ISEMCPs would therefore be suitable for this purpose. In the opinion of the Board, the person skilled in the art is capable of identifying such devices, even in the

absence of any disclosure of particular devices other than ISEMCPs.

The invention is thus disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

3. *Novelty (Article 54 EPC)*

Document D1, as acknowledged in the patent in suit at paragraph [0004], discloses a device comprising a plurality of discrete photoelectric devices deposited on a single common substrate. This feature is specified in each of the independent claims of document D1. Moreover, it is stated at column 4, lines 49 to 51, that the device is a "large array of photovoltaic microphotodiodes".

In document D1, at column 3, lines 48 to 57, and in Figure 1D, there is disclosed a device which consists of a number of smaller devices joined together at their edges. These smaller devices are, however, not individual, discrete photoelectric devices. Rather, each of the smaller devices comprises a plurality of discrete photoelectric devices disposed on one surface of a single common substrate.

Document D1 thus does not disclose a subretinal implant device wherein each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate.

The subject-matter of claim 1 is thus new.

4. *Inventive step (Article 56 EPC)*

4.1 The closest prior art is represented by document D1, whose disclosure is discussed in point 3 above.

A problem associated with the device disclosed in document D1 is that, by virtue of the presence of an extensive solid substrate, blockage of nutrients from the choroid to the inner retina occurs (patent in suit, paragraph [0004]).

Document D1 itself offers a solution to this problem by the provision of openings in the substrate, as disclosed at column 3, lines 43 to 47. However, as also stated in the patent in suit in paragraph [0004], such openings do not allow an optimal permeation of oxygen and biological substances.

This problem is solved, according to claim 1 of the patent in suit, by the feature according to which "each of the plurality of discrete photoelectric devices comprises a separate semiconductor substrate."

This feature is not suggested in the prior art.

Whilst document D1 suggests the provision of openings through the substrate of the device, there is no suggestion of departing from the concept of providing a plurality of photoelectric elements as an array on one surface of a substrate.

Document D1 also proposes a device comprising multiple smaller devices, each of which has a plurality of photoelectric elements on one surface of a substrate,

these smaller devices being joined together at their edges (see column 3, lines 48 to 53). By virtue of this construction, the size of the implant can be increased whilst conforming to the curved retina. There is no suggestion that a device comprising multiple, smaller sub-devices could contribute to solving the problem of allowing an optimal permeation of oxygen and biological substances.

The subject-matter of claim 1 thus involves an inventive step. Claims 2 to 18 are directly or indirectly appendant to claim 1 and relate to preferred aspects of the device of claim 1. The subject-matter of these claims thus also involves an inventive step.

5. In view of the allowability of the main request, it is not necessary to consider the auxiliary requests of the respondent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

D. Meyfarth

W. Zellhuber