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D E C I S I O N
of 15 December 2004

Case Number: T 0569/03 - 3.4.1

Application Number: 95933733.8

Publication Number: 0781154

IPC: A61N 5/06

Language of the proceedings: EN

Title of invention:
Phototherapeutic apparatus

Applicant:
Cardiofocus, Inc.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - no"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0569/03 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 15 December 2004

Appellant: Cardiofocus, Inc.
126B Mid-Tech Drive
West Yarmouth, MA 02673 (US)

Representative: Strehl Schübel-Hopf & Partner
Maximilianstrasse 54
D-80538 München (DE)

Decision under appeal: **Decision of the Examining Division of the European Patent Office posted 9 December 2002 refusing European application No. 95933733.8 pursuant to Article 97(1) EPC.**

Composition of the Board:

Chairman: G. Assi
Members: M. G. L. Rognoni
J. H. P. Willems

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division, dispatched on 9 December 2002, refusing the European Patent application No. 95 933 733.8. The notice of appeal was received on 14 February 2003 and the appeal fee was paid on the same day. The statement setting out the grounds of appeal was received on 22 April 2003.

II. In the contested decision, the examining division held, *inter alia*, that the subject-matter of claim 1 then on file lacked novelty with respect to the following document:

D11: EP-A-0 437 181.

III. In a communication accompanying the summons to oral proceedings, the Board drew the appellant's attention, *inter alia*, to the following prior art:

D7: WO-A-93 / 25 155

IV. Oral proceedings were held on 15 December 2004.

V. The appellant requested that the decision of the first instance be set aside and that a patent be granted on the basis of the following documents:

Claims: 1 as filed in the oral proceedings,
2 to 17 as filed with a letter dated 15 October 2002,
Description: as published;
Drawings: as published.

VI. Claim 1 of the appellant's request reads as follows:

"1. A diffusive tip apparatus (10) for use with an optical fiber for diffusion of radiation propagating through the fiber, the tip apparatus comprising

a light transmissive diffuser housing (20) having a first end adapted to receive a light transmitting optical fiber (12),

a light scattering medium (22) containing light scattering particles (24) uniformly dispersed therein, and

a reflective end surface (28) disposed within the housing,

wherein radiation propagating through the fiber (12) enters the scattering medium within the housing (20), a portion of the radiation is emitted outward through said housing during an initial path, and another portion is reflected by the end surface (28) for transmission through said scattering medium and is also scattered outward during the reflected path,

***characterised** in that the concentration of the scattering particles (24) in the scattering medium (22) and the position of the reflective end surface (28) within the housing (20) are selected such that the light portions emitted during the initial and reflected paths are complementary to one another and result in a substantially uniform axial distribution of radiation over the length of the tip apparatus."*

VII. The appellant argued essentially as follows:

Though document D11 showed a diffusive tip apparatus according to the preamble of claim 1, this document was

not concerned with obtaining a uniform axial distribution of radiation. On the contrary, it explicitly taught to increase the radiation emitted in the regions close to the end of the light fibre and to the reflective end surface by providing a scattering medium with higher concentration of scattering particles at both ends. Moreover, all the solutions to the problem of providing a tip apparatus with a uniform axial distribution of radiation shown in the prior art relied solely on a non-uniform distribution of scattering particles, and none of them included a reflective end surface.

D7 addressed the problem of providing a uniform axial distribution and mentioned that a scattering medium with a uniform distribution of scattering particles produced a linear axial distribution of radiation. However, this document did not suggest that a homogeneous scattering medium could be used in combination with a mirror to obtain a uniform distribution of light along its axis. On the contrary, all the embodiments of a diffusive tip apparatus with uniform axial distribution of scattered light shown in D7 comprised a scattering medium with a concentration gradient of scattering particles along the axis.

In the light of the cited prior art, the person skilled in the art would not have realised that a diffusive tip apparatus as shown in D11 could have provided a uniform axial distribution of scattered radiation and that this result could have been achieved simply by adjusting the concentration of scattering particles and the position of the mirror, as specified in claim 1 of the only request. Thus, despite its apparent simplicity, the claimed invention involved an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2.1 Document D11 (see the only figure) shows a diffusive tip apparatus 1 comprising all the features recited in the preamble of claim 1 according to the appellant's request.

In particular, the diffusive tip apparatus according to D11 comprises a light transmissive diffuser housing 8, a light scattering medium 17 containing light scattering particles and a reflective end surface 6. According to a first embodiment (see column 2, lines 47 to 49 and claim 7), the concentration of scattering particles in the scattering medium is constant (*"7 Promile TiO_2*-Pulver). A constant concentration implies that the scattering particles are uniformly dispersed in the scattering medium. This particular structure of the diffusive tip apparatus, with a reflective end surface facing the end face of the light fibre, causes a portion of the radiation injected by the light fibre into the scattering medium to be emitted outward through the housing during an initial forward path and another portion to be reflected by the reflective end surface and to be scattered outward during the reflected path.

Document D11, however, neither specifies the axial distribution of radiation over the length of the tip apparatus nor does it **explicitly** teach that a particular axial distribution of radiation can be obtained by selecting the concentration of the

scattering particles **and** the position of the reflective end surface.

2.2 Hence, the subject-matter of claim 1 according to the appellant's request differs from the tip apparatus known from D11, in that:

– the **concentration of the scattering particles** in the scattering medium and the **position of the reflective end surface** within the housing are selected such that the light portions emitted during the initial and reflected paths are complementary to one another and result in a substantially uniform axial distribution of radiation over the length of the tip apparatus.

2.3 The essential question to be considered in the present appeal is whether the person skilled in the art would realise that the tip apparatus with a **uniform distribution of scattering particles** shown in D11 could be suitable to achieve *"a substantially uniform axial distribution of radiation",* and, in particular, that this result could be obtained by appropriately selecting the concentration of the scattering particles in the scattering medium and the position of the reflective end surface within the housing.

3.1 As pointed out by the appellant, D11 does not explicitly suggest that a tip apparatus comprising the features recited in the characterising portion of claim 1 of the present application could be used to provide a uniform axial distribution of scattered radiation.

However, in the opinion of the Board, it is fair to assume that the person skilled in the art, considering the importance of the distribution pattern of the emitted radiation in determining the tip apparatus's possible applications, would wish to investigate what kind of axial radiation distribution the disclosed structure could provide. For assessing this essential characteristic of the known diffusive tip apparatus, the skilled person could rely on the following general knowledge common in the field of the present invention:

– the presence of a reflective end surface produces a reflected light path so that the **total** axial distribution of radiation is the sum of the axial distributions of radiation due to the forward light path and to the reflected light path;

- a light scattering medium with a homogeneous distribution of scattering particles produces **a linear axial distribution of radiation** with negative slope (cf document D7, page 22, lines 12 to 15).

3.2 In the light of the above general knowledge, the person skilled in the art would be aware that the axial distribution of light emanating from the tip apparatus shown in D11 could be assessed by adding two linear axial distributions of light scattered during the initial and the reflected light paths. Furthermore, such a skilled person would also realise that the slope of these linear distributions would, *inter alia*, depend on the concentration of scattering particles and that it would be possible to adjust the contribution given by the forward light path and by the reflected path to

the total axial radiation distribution simply by selecting the position of the reflective end surface. It is a generally known fact that a horizontal line (*ie* a uniform distribution) can be obtained by appropriately superposing two linear functions with opposite slopes.

In summary, simply by analysing the structure of the tip apparatus known from D11 and making straightforward considerations based on general knowledge common in the field of the invention, the person skilled in the art would realise that a diffusive tip apparatus comprising a scattering medium with a uniform concentration of scattering particles and a reflective end surface would provide a uniform light distribution if the concentration of scattering particles and the position of the reflective end surface were appropriately selected. It would therefore be obvious to the person skilled in the art, starting from the diffusive tip apparatus shown in D11, to arrive at the subject-matter of claim 1 of the appellant's request.

3.3 Despite the appellant's detailed submissions concerning prior art solutions to the problem of providing a tip apparatus with a uniform axial distribution of scattered radiation, the Board sees no reason to assume that the disclosure of different solutions may be an indication of a prejudice against using a tip apparatus comprising all the structural features known from D11 in order to obtain the same result. In fact, the Board considers that the disclosure of different solutions cannot prevent a person skilled in the art from carrying out a simple analysis of the behaviour of a known diffusive tip apparatus with respect to the

scattered light distribution, the concentration of scattering particles and its length (ie the position of the reflective end surface).

4. In the result, the Board finds that the subject-matter of claim 1 according to the appellant's only request does not involve an inventive step within the meaning of Article 56 EPC. As the appellant's only request is not allowable, the application has to be refused.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

R. Schumacher G. Assi