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Datasheet for the decision of 13 December 2023

Case Number: T 1957/19 - 3.2.02

Application Number: 06770376.9

Publication Number: 1895905

IPC: A61B6/00, G02B21/00, A61B5/00

Language of the proceedings: EN

Title of invention:
CONFOCAL SCANNING MICROSCOPE HAVING OPTICAL AND SCANNING SYSTEMS WHICH PROVIDE A HANDHELD IMAGING HEAD

Applicant:
LUCID, INC.

Headword:

Relevant legal provisions:
EPC Art. 56, 84
EPC R. 43(2)

Keyword:
Inventive step - (yes)
Claims - clarity after amendment (yes)

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 1957/19 - 3.2.02

D E C I S I O N
of Technical Board of Appeal 3.2.02
of 13 December 2023

Appellant: (Applicant)	LUCID, INC. 2320 Brighton-Henrietta Townline Road Rochester, NY 14623 (US)
Representative:	Schwarz, Claudia Schwarz + Kollegen Patentanwälte Heilmannstraße 19 81479 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 7 February 2019 refusing European patent application No. 06770376.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	S. Böttcher
	N. Obrovski

Summary of Facts and Submissions

I. The applicant appealed against the Examining Division's decision to refuse European patent application No. 06770376.9, since the main request did not comply with Rule 43(2) EPC and since all the requests on file were found to lack an inventive step starting from

D1 US 2002/041439 A1 or
D2 US 2002/048025 A1.

II. The Board summoned the appellant to oral proceedings and conveyed its preliminary opinion in a communication that the main request did not comply with Rule 43(2) EPC and that claims 1 and 11 of the main request lacked clarity. It was further stated that an amended request overcoming these objections could in the Board's preliminary opinion meet the requirement of inventive step under Article 56 EPC.

III. On 15 November 2023, the appellant filed an amended main request addressing the objections raised.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims according to the main request.

IV. The Board cancelled the oral proceedings.

V. Claim 1 of the main request reads as follows.

An optical assembly for imaging a section of a specimen by illuminating said section with a scanning beam and receiving returned light from said section, said assembly comprising

a laser (122) adapted to provide a linearly polarized illumination beam (123);

an objective (138) via which said scanning beam is incident on said specimen and on which said return beam is incident, and

oscillating mirrors (128a, 130a) which translate the illumination beam into said scanning beam and receiving said return beam for descanning said beam, said illuminating and return beams transiting along a path between said mirrors, said path extending to an entrance aperture of said objective (138) which defines an entrance pupil (202) thereof, characterized by

optics (132, 134) having magnification providing a focus in said path between said oscillating mirrors (128a, 130a), said optics is a telescope lens disposed with its optical axis along said path, said objective (138) has an optical axis coincident with said optical axis of said telescope lens, said telescope lens has at least two lenses (132, 134) with a first lens (132) closest to said scanning mirrors (128a, 130a) and a second lens (134) closest to said objective (138), said magnification of said optics (132, 134) being sufficient to overfill said entrance pupil (202) with said illumination beam such that said entrance pupil (202) is filled with said illumination beam over the full deflection of said scanning beam over said entrance pupil (202), wherein said first lens (132) having a focal length less than said second lens (134), said focal lengths of said telescope lenses (132, 134) being in a ratio to provide said magnification to enable filling of said entrance pupil (202) across the

entire length of said scanning beam."

VI. The appellant's arguments relevant to the decision may be summarised as follows.

Neither D1 nor D2 mentioned the problem that light beams vary slightly in space due to oscillating mirrors. Consequently, under the premise of the could-would approach, the person skilled in the art would not provide an optics having a magnification being sufficient to overfill the entrance pupil with the illumination beam such that the entrance pupil is filled with the illumination beam over the full deflection of the scanning beam over the entrance pupil.

Further, it was mentioned in document D2 that when a beam diameter was larger than the pupil, light utilization efficiency was reduced undesirably. Consequently, document D2 directed completely in an opposite direction.

Therefore, the technical feature of an optics having a magnification being sufficient to overfill the entrance pupil with the illumination beam such that the entrance pupil was filled with the illumination beam over the full deflection of the scanning beam over the entrance pupil was not rendered obvious by any of D1 or D2. Neither document D1 nor document D2 alone nor a combination thereof nor general knowledge would have prompted the person skilled in the art to provide this measure.

Consequently, the invention as claimed in the main request was based on an inventive step.

Reasons for the Decision

1. Subject-matter of the application

The present application relates to confocal microscopes for the imaging of selected locations on the body of a patient by incorporating the imaging head in a hand piece adapted to be placed at such locations by manipulation thereof (Figure 13, page 9, last paragraph, to page 11, third paragraph).

Claim 1 of the main request relates to an optical assembly (for use in such a hand piece) comprising

- a laser (122) adapted to provide a linearly polarized illumination beam,

- an objective via which a scanning beam is incident on said specimen and on which the return beam is incident (Figures 15 and 16),

- oscillating mirrors (128a, 130a) for translating the illumination beam into the scanning beam, and

- magnifying optics (132, 134) being a telescope lens arranged between the mirrors and the objective.

The optical path through the mirrors extends to an entrance aperture of the objective. This entrance aperture defines an entrance pupil (202) (Figure 19). The magnification of the telescope lens is sufficient to overfill the entrance pupil with the illumination beam (Figures 20A and 20B). This ensures that the beam, which "walks" or "wobbles" over the entrance pupil during scanning, is always collected by the objective,

and even at the maximum scan angle, the entrance pupil stays filled.

2. Main request - Article 84 EPC in conjunction with Rule 43(2) EPC

The main request includes only one independent claim and therefore complies with Rule 43(2) EPC.

3. Main request - clarity

Claim 1 defines the magnification of the telescope lens (132, 134) by reference to the diameter of the illumination beam, which has to be larger than the entrance pupil of the objective. It is noted that the diameter of the beam after passing through the telescope lens depends on the beam diameter before passing through it. Since the claimed optical assembly includes a laser providing the illumination beam, the claim complies with the requirements of Article 84 EPC.

4. Main request - inventive step starting from D1

In the appealed decision, the Examining Division held that the subject-matter of claim 1 of the then main request lacked an inventive step in view of D1 in combination with the common general knowledge or D2 (points 4.1.4.1 and 4.1.4.2 of the decision).

The Board does not share this view.

The Board agrees with the Examining Division that D1 discloses in Figure 6 an objective (51), oscillating mirrors (93,95) and magnification optics (55,57). The magnification property of the lenses 55 and 57 is not mentioned in D1. However, it can be derived from

Figure 6 that the beam diameter is enlarged after passing through the optical system 57.

However, the Board does not agree that the two arrows above objective 51 indicate the entrance pupil of an entrance aperture of the objective. In the Board's view, these arrows rather indicate the beam diameter.

Hence, D1 does not disclose an entrance pupil of the objective and, consequently, D1 does not disclose that the magnification is sufficient to overfill the entrance pupil with said illumination beam such that the entrance pupil is filled with said illumination beam over the full deflection of the scanning beam over the entrance pupil.

Furthermore, D1 does not disclose that the magnification optics provide a focus in the path between the oscillating mirrors.

Thus, the Examining Division's reasoning is based on an incorrect evaluation of the distinguishing features and cannot be followed.

The Board rather concurs with the appellant pointing out that D1 does not mention the problem that light beams vary slightly in space due to the oscillating mirrors (point 2.1 of the statement of grounds of appeal). Hence, D1, also considering the common general knowledge or D2, would not have prompted the person skilled in the art to solve the problem above and provide an optics having a magnification as claimed.

The feature "that the magnification optics provide a focus in the path between the mirrors" has the effect that the amount of walking of the beam at the entrance

pupil is minimized (page 11, third paragraph). This, together with the overfilling (page 11, second paragraph), ensures that the entrance pupil stays filled even at the maximum scan angle.

Consequently, the subject-matter of claim 1 does not lack an inventive step in view of D1.

5. Main request - inventive step starting from D2

The Examining Division also held that the subject-matter of claim 1 of the then main request lacked an inventive step in view of D2 in combination with the common general knowledge (point 4.1.4.3 of the decision).

D2 discloses (Figure 4, paragraph [0077]) an objective (35) with an entrance pupil (13), oscillating mirrors (32, 33) and optics (11) having magnification (the beam diameter is larger after the pupil relay optical system 11). It is noted that the optics does not provide a focus in the path between the mirrors. Rather, the focus is provided on the mirror 33.

However, as acknowledged by the Examining Division, D2 does not disclose that the magnification is sufficient to overfill the entrance pupil with said illumination beam such that the entrance pupil is filled with said illumination beam over the full deflection of the scanning beam over the entrance pupil.

Like D1, D2 does not relate to any problems occurring in connection with scanning the beam over the entrance pupil. D2 rather deals with adjusting the beam diameter to different objectives. Hence, D2, also in combination with the common general knowledge, would not have

prompted the person skilled in the art to provide an optics having a magnification as claimed either.

Consequently, the subject-matter of claim 1 does not lack an inventive step in view of D2.

6. In conclusion, the claims of the main request meet the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division with the order to grant a patent on the basis of the following documents:

claims 1 to 7 filed with the letter of 15 November 2023

description pages 1 and 2 filed with the letter of 16 October 2023

description page 2a filed with the letter of 31 October 2014

description pages 3-25 as published, and

drawing sheets 1/19 - 19/19 as published.

The Registrar: The Chairman:

A. Chavinier-Tomsic M. Alvazzi Delfrate

Decision electronically authenticated