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**Datasheet for the decision  
of 28 May 2021**

**Case Number:** T 0243/18 - 3.4.02

**Application Number:** 10013894.0

**Publication Number:** 2317363

**IPC:** G02B21/24, G02B21/36, G02B21/00

**Language of the proceedings:** EN

**Title of invention:**  
Microscope connecting unit and microscope system

**Patent Proprietor:**  
Olympus Corporation

**Opponent:**  
Carl Zeiss Microscopy GmbH

**Headword:**

**Relevant legal provisions:**  
EPC Art. 123(2), 123(3), 56  
RPBA 2020 Art. 13(1)

**Keyword:**

Late-filed objection - admitted (no)  
Amendments - extension of the protection (no)  
Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**

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Case Number: T 0243/18 - 3.4.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.02**  
**of 28 May 2021**

**Appellant:** Carl Zeiss Microscopy GmbH  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
26 October 2017 concerning maintenance of the  
European Patent No. 2317363 in amended form.**

**Composition of the Board:**

**Chairman** R. Bekkering  
**Members:** A. Hornung  
G. Decker

## **Summary of Facts and Submissions**

- I. The opponent appealed against the interlocutory decision of the opposition division maintaining European patent No. 2317363 in amended form.

Opposition had been filed against the patent as a whole and based on the grounds for opposition of Article 100(a) EPC, together with Article 56 EPC, Article 100(b) EPC, together with Article 83 EPC, and Article 100(c) EPC, together with Article 123(2) EPC.

The opposition division had found that the patent as amended according to a fourth auxiliary request then on file and the invention to which it related met the requirements of the EPC.

- II. Oral proceedings before the board were held on 28 May 2021.
- III. The opponent (appellant) requested that the decision of the opposition division be set aside and that the patent be revoked.
- IV. The patent proprietor (respondent) requested as a main request that the appeal be dismissed or, alternatively, that the patent be maintained on the basis of the claims according to one of auxiliary requests 1 to 5 filed with the letters dated 15 January 2020 (auxiliary requests 1 to 3) and 29 January 2021 (auxiliary requests 4 and 5).
- V. The following documents relied on in the first-instance opposition proceedings will be referred to in the present decision:

Z1: US 2007/0205378 A1

Z2: JP H06-347703(A)

Z5: Zeiss brochure "Axioplan 2 Imaging - The Universal Microscope System", 40-086 e/02.01, published in 2001,

Z10: JP 2004-318181

Z11: Zeiss brochure "LSM 710 - Die Kraft der Empfindlichkeit", 60-1-0001/d, published in 2008.

VI. The opponent's written submissions are designated O1 to O3 as follows:

O1: statement of grounds of appeal,

O2: letter dated 4 October 2019,

O3: letter dated 8 March 2021.

The patentee's written submissions are designated P1 to P3 as follows:

P1: letter dated 27 June 2018,

P2: letter dated 15 January 2020,

P3: letter dated 29 January 2021.

VII. Claim 1 according to the patentee's main request reads as follows (the features of claim 1 are preceded by the numbering M1 to M20, as defined in the opponent's statement of grounds of appeal, filed with the letter of 5 March 2018, point 2):

**(M1)** A microscope system (100) comprising

**(M2)** a microscope (10) configured to visually observe a sample (S), and comprising an external connection port (43),

**(M3)** a laser light source (140) configured to generate laser light,

**(M4)** a confocal observation unit (50) configured to two-dimensionally scan laser light from the laser light source (140) for confocal observation of the sample (S), and

**(M5)** a microscope connecting unit (120) configured to connect the microscope (10) to the confocal observation unit (50), wherein

the microscope connecting unit (120) comprises:

**(M6)** a microscope connector (121) that is configured to be connected to the external connection port (43) of the microscope (10);

**(M7)** three or more connection ports (123A, 123B, 123C) at least one of which is configured to be connected to the confocal observation unit (50);

**(M8)** two or more light-path combining units (127A, 127B) that are disposed between the microscope connector (121) and the connection ports (123A, 123B, 123C) and that are configured to combine light paths optically connecting the microscope connector (121) with each of the connection ports (123A, 123B, 123C); and

**(M9)** a relay optical system (125) that is configured to form the light paths and relay a primary image of the sample formed by the microscope (10) to form a secondary image via the connection ports (123A, 123B, 123C) at points equidistant from the connection ports (123A, 123B, 123C) respectively, wherein

**(M10)** the microscope connecting unit (120) further comprises a switching unit (128A, 128B) configured to

switch the light-path combining units (127A, 127B) on the light path,

characterized in that

**(M11)** the relay optical system (125) comprises

**(M12)** a first relay lens (129A) provided between the microscope connector (121) and the light-path combining units (127A, 127B), and configured to shape light entering from the primary image into substantially parallel light beams, and

**(M13)** three or more second relay lenses (129B, 129C, 129D), one of the three or more second relay lenses (129B, 129C, 129D) being provided between the each of the connection ports (123A, 123B, 123C) and the light-path combining units (127A, 127B), and configured to focus the substantially parallel light beams via each of the connection ports (123A, 123B, 123C), wherein

**(M14)** the light-path combining units (127A, 127B) of the microscope connecting unit (120) are disposed in a path of substantially parallel light beams formed by the relay optical system (125),

**(M15)** the confocal observation unit (50) having a scanning unit (57) that scans laser beams two-dimensionally is connected to at least one of the connection ports (123A, 123B, 123C), and

**(M16)** the scanning unit (57) is configured to two-dimensionally scan the laser beams over the sample (S) of the microscope (10) via the microscope connecting unit (120), wherein

**(M17)** the confocal observation unit (50) includes:

**(M18)** a unit connector that is connected to one of the connection ports (123A, 123B, 123C);

**(M19)** a confocal pinhole that is configured to partially pass observation light emitted from the sample irradiated with the scanned laser light and returning via the scanning unit (57); and

**(M20)** a detection optical system that is configured to detect the observation light having passed through the confocal pinhole".

## **Reasons for the Decision**

### 1. Amendments - Article 123(2) EPC

The objection of added subject-matter is not admitted into the proceedings (Article 13(1) RPBA 2020).

1.1 The opponent raised for the first time in its letter O2 an objection of added subject-matter for the reason that the microscope of claim 1 did not comprise a control unit, which represented an inadmissible intermediate generalisation (see letter O2, point 2.1).

1.2 The board agrees with the patentee that this objection could and should have been raised during the first-instance opposition proceedings (Article 13(1) RPBA 2020). Moreover, the board follows the patentee's view according to which the control unit is not inextricably linked with the remaining features and claim 1 as amended does not represent an inadmissible intermediate generalisation. Therefore, claim 1 does not comprise subject-matter



extending beyond the content of the application as filed (Article 123(2) EPC).

2. Amendments - Article 123(3) EPC

Claim 1 is not amended in such a way as to extend its scope of protection.

2.1 Feature **M9** of granted claim 1 comprises the wording "to form a secondary image **to** the connection ports". The corresponding feature **M9** of present claim 1 has been amended to read "to form a secondary image **via** the connection ports at points equidistant from the connection ports".

Feature **M13** of granted claim comprises the wording "to focus the substantially parallel light beams or the non-parallel light beams **to** each of the connection ports". The corresponding feature **M13** of present claim 1 has been amended to read "to focus the substantially parallel light beams **via** each of the connection ports".

2.2 According to the opponent, the replacement of the word "to" by the word "via" extends the protection conferred by the amended patent essentially for the following reason:

The word "to" in the context of features **M9** and **M13** of granted claim 1 had to be interpreted in the sense of forming or focusing an image "in a range around the connection ports", wherein the range had a limited extension around the connection ports, thereby excluding that images were formed very far away from the connection ports. In support of its contention, the opponent referred to various passages in the description as originally filed, e.g. page 16, lines 12 and 13; page 17, lines 10 and 11; page 31, lines 6 and 7.

In comparison, the word "via" in the context of features **M9** and **M13** of present claim 1 did not confer any limitation about the extension of the range. The images in the microscope of present claim 1 could be formed or focused not only within a range having a limited extension around the connection ports, but also at very large distances away from the connection ports. Therefore, the scope of protection of present claim 1 was extended as compared to the scope of protection of granted claim 1.

- 2.3 The board agrees with the patentee that the opponent's interpretation of the claim wording is too narrow and that "the wording 'to' used in the context of features **M9** and **M13** is used to express that the primary image is relayed toward the connection port (...) in order to form a secondary image by focusing the parallel light beams toward the respective connection port (...), without limiting the distance of the secondary image to the respective connection port" (see P2, point III.1.2.2). Feature **M9** restricts the distance of forming the secondary image "at points", thereby excluding that the secondary image is formed at very large distances, such as at infinity. Moreover, the board agrees with the patentee that, in view of claim 1 specifying that the secondary image is formed at points at a certain distance from connection ports and that at least one of the units connected to the connecting ports is a confocal observation unit comprising a confocal pinhole, the skilled person would understand that features **M9** and **M13** of present claim 1 refer to a secondary image which is focused in the region behind the connection ports.

In replacing "to" by "via", the scope of protection of claim 1 has been limited in that the secondary image is focused *after* the connection ports at points at a distance

which remains undefined in the claim. Therefore, amended claim 1 does not infringe the requirement of Article 123(3) EPC.

3. Inventive step

The subject-matter of claim 1 involves an inventive step over the disclosure of Z1 and the available prior art documents (Article 56 EPC).

3.1 Both the opposition division and the parties considered document Z1 to be the closest prior art and used this document as a starting point for examining inventive step.

3.2 Distinguishing features of claim 1

The microscope system of claim 1 differs from the laser scanning microscope of Z1 at least in that it defines a plurality of concrete connecting structures (43; 121; 123A, 123B, 123C) for connecting various sub-systems of the claimed microscope system, in particular, for connecting a microscope to at least three optical units (50, 70, 110) via a microscope connecting unit (120).

More precisely, the plurality of connecting structures (45; 121; 123A, 123B, 123C) of claim 1 correspond to the following features of claim 1:

- **(M2)** an external connection port (43) of the microscope (10),
- **(M5)** a microscope connecting unit (120) to connect the microscope (10) to the confocal observation unit (50)
- **(M6)** a microscope connector (121) of the microscope connecting unit (120) to be connected to the external connection port (43),

- **(M7)** three connection ports (123A, 123B, 123C) of the microscope connecting unit (120) to be connected to the optical units, one of which being a confocal observation unit (50),
- **(M18)** a unit connector of the confocal observation unit (50) to be connected to one of the connection ports (123A, 123B, 123C) of the microscope connecting unit (120).

Claim 1, therefore, differs from the device of Z1 at least in that it comprises the connecting structures defined in features **M2**, **M5** to **M7** and **M18**.

It is to be noted that since the connecting structures of features **M2**, **M5** to **M7** and **M18** of claim 1 are not disclosed in Z1, features **M8**, **M9**, **M12**, **M13**, **M15** and **M16** referring to at least one of these connecting structures are also novel over the disclosure of Z1.

In addition, Z1 does not disclose a switching unit as defined in feature **M10**.

3.3 The technical effect provided by the distinguishing features **M2**, **M5** to **M7** and **M18** of claim 1 corresponds to the connection of three optical units to a microscope, thereby implying a modular structure of the resulting microscope system.

According to the patentee, the objective technical problem to be solved by the connecting structures is "to provide a microscope system to which a plurality of irradiating/detecting units can be connected without increasing the size of the microscope or degrading the working efficiency of the microscope" (see P1, point III.2.15). However, the patentee's formulation of the problem is not completely

appropriate since it contains a pointer to the connecting structures forming part of the solution to the problem.

Therefore, a more suitable formulation of the objective technical problem is how to provide a microscope system comprising a microscope to which at least three optical units, or modules, are added to.

3.4 Z1 is not a suitable starting point to arrive in an obvious manner at a modular system as defined in claim 1.

As submitted by the patentee, "[d]ocument Z1 does not provide any hint at all towards a modular solution (...). By contrast, document Z1 even teaches away from amending the laser scanning microscope of Figure 2 so as to arrive at a modular solution, since one of the advantages that shall be achieved with the laser scanning microscope of Z1 is that replacement of any optical elements become unnecessary (cf. e.g. abstract of Z1). Thus document Z1 aims at providing a 'static' solution" (see P1, point III. 2.16).

Z1 does not even disclose a microscope for visually observing the sample by using, for instance, an ocular lens.

Z1 does not disclose or suggest connecting structures for connecting optical modules to a microscope, either. Z1 remains silent about how the light emitting (2, 3) and detecting (8) portions of the laser scanning microscope are mechanically mounted with respect to the objective lens (7). As submitted by the opponent, the most likely way of mounting the optical components of the microscope system of Z1 in a stable manner relative to each other is by way of a common base plate. However, such a common base plate does not fall under the wording of claim 1, since it

does not comprise connecting ports to connect a conventional microscope via its external connection port and to connect three or more optical subsystems via their corresponding unit ports.

Since the goal of Z1 is to provide a laser scanning microscope in which "replacement of any optical element becomes unnecessary" (abstract of Z1), the skilled person would have no obvious incentive to construct the laser scanning microscope of Z1 in a way such as to comprise optical modules being connected via cooperating connecting structures to each other.

The fact that microscope systems having a modular structure are generally known in the art, for instance in the prior art documents Z2, Z5, Z10 or Z11 referred to by the opponent, is not a sufficient incentive for the skilled person to consult any of these prior art documents. Indeed, Z1 discloses a self-contained and complete laser scanning microscope device. Providing additional connectors within this finished device, at the locations as defined in claim 1, is not technically directly feasible and therefore would make no technical sense for the skilled person. Thus, the subject-matter of claim 1 is also not rendered obvious in view of the available prior art documents.

It follows that the subject-matter of claim 1 does not involve an inventive step for the sole reason that already features **M2**, **M5** to **M7** and **M18** are neither disclosed nor suggested by Z1.

### 3.5 Opponent's counter-arguments

3.5.1 The opponent argued that claim 1 did not define a *modular* microscope system. Claim 1 merely defined some vague

cooperating connecting structures. The terms "microscope connector", "connection port" or "unit connector" in claim 1 merely corresponded to any kind of stable mechanical or optical connection between respective components of the microscope system. In particular, claim 1 did not define that the connecting structures of claim 1 were detachable. They could, for instance, be formed by welded joints. Such cooperating connecting structures for connecting optical components in a stable manner are necessarily present in Z1. See the opponent's letters O1, point 3 and O3, points 2.1, 2.2.1 and 3.4.

The board is not convinced by this argument. Claim 1 defines three distinct subsystems, or modules, namely a microscope, a confocal observation unit and a microscope connecting unit comprising at least three connection ports. The three distinct modules of claim 1 are connected together via connectors or ports, thereby defining a modular structure of the microscope system, irrespective of whether the modules are connected detachably or not. The board acknowledges that some mechanical structure must be present in Z1 to maintain the optical components of the laser scanning microscope in a stable position relative to each other. However, while claim 1 leaves open the exact constitution of the connectors and ports, the skilled person would not consider that welded joints for welding optical components on a base plate corresponded to connectors or to connection ports as claimed.

3.5.2 The opponent argued that Z1 actually did disclose the connectors and connection ports defined in features **M2**, **M5** to **M7** and **M18** of claim 1:

- **M2**: A mechanical component connecting the microscope (7, 9) and the microscope connecting unit (15, 6, 13,

14) was necessarily or implicitly present in Z1 (see O1, page 8; O2, point 2.3.1; O3, page 7).

- **M5:** Z1, figure 1, disclosed a microscope connecting unit composed of the relay lens (15), the beamsplitter (6) and the first lenses of the two subsequent pairs of lenses (13, 14) (see O1, page 8).
- **M6:** The tube lens (9) and the relay lens (15) were necessarily mechanically fixed in a stable manner relative to each other, for instance, via a common base plate which, therefore, represented a microscope connector (see O1, page 8; O3, page 7).
- **M7:** The two pairs (13, 14) of lenses of Z1, figure 1, corresponded to two connection ports. Z1 did not disclose a third connection port (see O1, page 9; O3, page 7).
- **M18:** One of the pairs (13) of lenses constituted the unit connector connecting the confocal observation unit to one of the connection ports of the microscope connecting unit (see O1, page 9).

The opponent concluded that features **M2**, **M5**, **M6**, **M7** (partially) and **M18** were anticipated by Z1.

The board cannot follow the opponent's view, based on an overly broad interpretation of the terms "connection port", "connecting unit", "microscope connector" and "unit connector" of claim 1. More precisely:

- **M2:** As submitted by the patentee during the oral proceedings, the tube lens (9) and the third relay lens (15) of Z1 form a combined relay lens, similar to the two other pairs of relay lenses (13, 14). It makes



no technical sense and it is not implicit therefore to connect the tube lens (9) and the third relay lens (15) via an external connection port as defined in feature **M2**.

- **M5**: Contrary to the opponent's submission, the objective lens (7) and the tube lens (9) of Z1, figure 1, do not form a microscope configured to visually observe a sample. Moreover, the optical components (15, 6, 13, 14) do not correspond to a connecting unit configured to connect the microscope to the confocal observation unit.
- **M6**: A common base plate is a plate but not a connector configured to be connected to the external connection port of the microscope.
- **M7**: The two pairs of lenses (13, 14) of Z1, figure 1, are lenses. They do not represent connection ports of the microscope connecting unit configured to be connected to optical units.
- **M18**: The one of two pairs of lenses (13) are lenses and do not represent a unit connector of the confocal observation unit, especially since, according to the opponent, they already play the role of a connection port of the microscope connecting unit.

The board, therefore, maintains its view that features **M2**, **M5** to **M7** and **M18** are not disclosed in Z1.

3.5.3 According to the opponent, claim 1 is merely an aggregation of a plurality of features solving unrelated partial problems in an obvious manner (see opponent's letter O1, page 7).

This argument of the opponent is not found to be relevant in view of the fact that Z1 neither discloses nor renders obvious the main aspect of the invention, i.e. a modular structure of a microscope system as defined in claim 1.

- 3.5.4 The opponent argued that Z1 disclosed a microscope configured to visually observe a sample (O3, point 2.2.2). Indeed, the detecting portion (8) of Z1 provided measurement data about the sample which implicitly was combined to an image of the sample.

The board cannot follow the opponent's argument. While an image of the sample might be provided by the detecting portion (8) of Z1, it does not correspond to an image provided by a microscope as claimed, the microscope comprising an external connection port configured to be connected to a microscope connector of a microscope connecting unit.

- 3.5.5 Thus, none of the opponent's arguments in favour of lack of inventive step of the subject-matter of claim 1 were found convincing by the board.

4. For the above reasons, the board is satisfied that the patent according to the present main request, corresponding to the patent as maintained in amended form by the opposition division according to a fourth auxiliary request then on file, and the invention to which it relates, meets the requirements of the EPC.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



L. Gabor

R. Bekkering

Decision electronically authenticated