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**Datasheet for the decision
of 16 January 2026**

Case Number: T 0384/24 - 3.4.02

Application Number: 16812628.2

Publication Number: 3310518

IPC: B23K26/02, B23K26/082,
B23K26/14, B23K26/24,
G02B26/10, G02B27/09,
G02B27/30, G02B27/40

Language of the proceedings: EN

Title of invention:

Laser Welding System with a Laser Welding Head Having with
[sic] Dual Movable Mirrors Providing Beam Movement with
Limited Field of View

Patent Proprietor:

IPG Photonics Corporation

Opponent:

Becker, Bernhard

Headword:

Laser Welding Head with Limited Field of View/IGP PHOTONOICS

Relevant legal provisions:

EPC Art. 100(a), 54, 56

Keyword:

Grounds for opposition - lack of novelty (yes)

Auxiliary requests 1 to 4 - Inventive step - (no)

Decisions cited:

G 0001/24



Beschwerdekammern

Boards of Appeal

Chambres de recours

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Case Number: T 0384/24 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 16 January 2026

Appellant: IPG Photonics Corporation
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
12 January 2024 concerning maintenance of the
European Patent No. 3310518 in amended form.**

Composition of the Board:

Chairman R. Bekkering
Members: F. Giesen
P. Guntz

Summary of Facts and Submissions

I. The appeals of the patent proprietor and of the opponent are directed against the interlocutory decision of the opposition division finding that European patent No. 3 310 518 in amended form on the basis of auxiliary request 1, filed on 4 August 2022, met the requirements of the Convention.

II. The following documents will be referred to:

- D1 US 2011/0297654 A1
- D7 Kraetzsch M., et al.: "*Laser Beam Welding With High-Frequency Beam Oscillation: Welding of Dissimilar Materials With Brilliant Fiber Lasers*", In: ICALEO 2011, 169 (2011), doi: 10.2351/1.5062231
- D7a SCANLAB webpage relating to "intelliSCAN® 7/10/14, intelliSCAN®20/25/30"; webpage capture of April 18, 2009
- D7b data sheet linked on the bottom right of D7a relating to intelliSCAN® 10 of SCANLAB; capture date of October 9, 2006 (prior to the publication of D7; https://web.archive.org/web/20061009175600/http://www.scanlab.de/frontend/media/produkte/intelliSCAN_EN.pdf)
- D7c product brochure of the intelliSCAN system, English version (https://www.scanlab.de/sites/default/files/2020-08/03_intelliSCAN_scan%20head%20series.pdt)
- D9 JP 2012-024808 A
- D12 JP 2012-024774 A

Translations of documents D9 and D12 are taken from Espacenet.

III. Oral proceedings before the board took place on 16 January 2026.

The final requests of the parties were as follows:

The patent proprietor requested

that the decision under appeal be set aside and that the patent be maintained as granted or,

in the alternative, that the patent be maintained as amended on the basis of the claims of one of auxiliary requests 1 and 2 as filed with letter dated 4 August 2022 or of one of auxiliary requests 3 and 4 as filed with the letter dated 9 October 2023.

The opponent requested

that the decision under appeal be set aside and that the patent be revoked.

IV. Claim 1 of the main request (i.e. as granted) reads:

F1 *"A laser welding system (100) comprising:*
F2 *a fiber laser (112) including an output fiber;*
F3 *a laser welding head (110) comprising:*
F4 *a collimator (122) coupled to the output fiber of the fiber laser (112);*

- F5 *at least first and second movable mirrors (132, 134) configured to receive a collimated laser beam (116) from the collimator (122);*
- F6 *and a focus lens (142) configured to focus the laser beam relative to a workpiece while the beam is moved;*
- F7 *a control system (160) for controlling at least the fiber laser and positions of the mirrors, the control system (160) comprising a controller; characterized in that*
- F8 *the control system (160) includes control software to allow the at least first and second movable mirrors (132, 134) to move the beam (118) in first and second axes within only a limited field of view defined by a scan angle of about 1-2°."*

V. Claim 1 of auxiliary request 1 contains features F1 to F8 of claim 1 as granted and, in addition, the following feature:

F9 *"wherein the movable mirrors are approximately the same size"*

VI. Claim 1 of auxiliary request 2 comprises features F1 to F8 of claim 1 as granted and, in addition, the following feature:

F10 *"wherein the focus lens (142) is not a scanning lens"*

VII. Claim 1 of auxiliary request 3 comprises features F1 to F8 of claim 1 as granted and, in addition, the following features:

- F11 *"the laser welding system (100) further comprising:
a collimator module (120) including the collimator (122);*
- F12 *a wobbler module (130) coupled to the collimator module (120), the wobbler module (130) including the at least first and second movable mirrors (132, 134); and*
- F13 *a core block module (140) coupled to the wobbler module (130), the core block module (140) including at least the focus lens (142),*
- F14 *wherein the collimator module includes a fiber interlock connector for connecting to a mating interlock connector on an output fiber connector such that a safety interlock condition is provided when the output fiber connector is not connected to the collimator module, and*
- F15 *wherein the collimator module and the wobbler module include fiber interlock connections configured to provide the safety interlock condition in response sensors [sic!] within the wobbler module."*

VIII. Claim 1 of auxiliary request 4 comprises features F1 to F8 of claim 1 as granted, followed by features F11 to F13, and in addition the following feature:

- F16 *"and a fixed mirror configured to reflect the laser beam from the movable mirrors to the focus lens."*

Reasons for the Decision

1. Admissibility of the appeals

The appeals of the patent proprietor and the opponent comply with Articles 106 to 108 EPC and Rule 99 EPC. They are therefore admissible.

2. Main request (patent as granted) - lack of novelty over D7

2.1 The subject-matter of claim 1 of the main request lacks novelty over document D7 within the meaning of Article 54(2) EPC.

2.2 The only disputed issue was whether D7 discloses feature F8.

Feature F8 reads as follows:

"the control system (160) includes control software to allow the at least first and second movable mirrors (132, 134) to move the beam (118) in first and second axes within only a limited field of view defined by a scan angle of about 1-2°".

2.3 D7 discloses a focal length of 245 mm and a scan field of $10 \times 10 \text{ mm}^2$ (page 173, right column). Basic geometry shows that this corresponds to a maximum scan angle of $\arctan(5/245) = 1.169^\circ$. This lies within the claimed range of "about 1-2°". The value 5 mm reflects that the zero position is at the centre of the scan field.

2.4 The patent proprietor argued that feature F8, read in the light of the description, implied a physical limitation of the scan angle resulting from the design of the laser welding head. According to the patent proprietor, the background section showed that the inventors started from simple laser welding heads, not from complex systems such as D7. The claimed scan angle therefore had to be construed as resulting from physical constraints. D7 used a SCANLAB intelliSCAN 20 FC scan head, which was capable of scan angles of $\pm 20^\circ$, as shown by documents D7a to D7c. The patent proprietor further argued that paragraph [0028] of the patent, which defined wobbling within a scan angle of less than 10° , was merely a generalisation due to patent drafting practice and did not contradict this interpretation.

2.5 The opponent submitted that the patent proprietor's interpretation relied on unproven assertions, partly taken from the patent itself. Such assertions could not establish novelty. The alleged development path of the invention was irrelevant. Paragraph [0028] of the patent explicitly defined wobbling as movement within a field of view of less than 10° , which contradicted the patent proprietor's interpretation. The claimed system was therefore not excluded from being capable of larger scan angles.

2.6 The board agrees with the opponent. The wording of the claim defines a limitation imposed by software control, not by physical constraints of the laser welding system. The wording does not exclude that the control software also allows operation with wider scan angles. The claim does not define any structural feature implying a physical limitation of the scan field. This is consistent with paragraph [0027] of the patent, which states that the control system may include

software known for controlling fibre lasers and galvo-mirrors. Consulting other parts of the description does not change this conclusion. The subjective starting point of the inventors, even if it were reflected in the background section, cannot limit the technical meaning of the claim beyond its wording, even when read in the light of the description. It is undisputed that D7 can operate at larger scan angles. The discussion of documents D7a to D7c is therefore irrelevant for novelty.

The patent proprietor's approach is inconsistent. The board is asked to rely on the description when it allegedly supports a restrictive claim interpretation, but to disregard paragraph [0028], which clearly envisages operation at scan angles of up to 10°, as an overgeneralisation owed to patent drafting practice.

- 2.7 The subject-matter of claim 1 as granted is therefore not new over D7.

- 3. Auxiliary request 1 - lack of inventive step in view of D7
 - 3.1 The subject-matter of claim 1 of auxiliary request 1 does not involve an inventive step within the meaning of Article 56 EPC in view of D7.
 - 3.2 Claim 1 of auxiliary request 1 includes features F1 to F8 of claim 1 as granted and the following additional feature:
 - F9: "*wherein the movable mirrors are approximately the same size*".

3.3 Starting point

- 3.3.1 The 2D scanning system of D7 is a suitable starting point. Like claim 1, it concerns a laser welding system using movable mirrors to steer a beam (D7, page 172, section 2, first paragraph, "scanning mirrors" and figure 4). It also discloses operation with a small scan angle and high scan frequency of 2 kHz. (D7, page 173, right column, fourth dash). It is therefore a system with the same purpose and effect as the claimed system.
- 3.3.2 The proprietor argued that the inventors did not start from a complex laser welding head such as that of D7, but from simpler systems such as D1, referenced in paragraph [0003] of the opposed patent, or those described in paragraph [0002] of the patent.
- 3.3.3 The Boards of Appeal use the problem-solution approach, in order to ensure a predictable and objective assessment of inventive step (Case Law of the Boards of Appeal, July 2025, 11th edition, ["CLBA"] I.D.2.1, I.D.3.1). The step of determining the starting point is an objective, not a subjective exercise. (CLBA, I.D.3.2) The subjective starting point of an inventor is irrelevant. The patent proprietor has not explained why D7 would fail to meet the established criteria for a suitable starting point.

3.4 Distinguishing feature

It could be questioned whether feature F9 can establish a difference over D7 due to the vague term "approximately the same size". However, this question can be left open, since even if feature F9 is accepted as a distinguishing feature, the board arrives at the conclusion that the subject-matter of claim 1 lacks an inventive step.

For the sake of argument, the board therefore accepts that figure 4 of D7 schematically depicts the wobble mirrors from a side view and that it does not directly and unambiguously disclose their relative size. The board also accepts, for the sake of the argument, that it follows that D7 also does not disclose mirrors that are "approximately" the same size.

3.5 Technical effect

3.5.1 The patent proprietor relied on paragraph [0017] of the opposed patent, arguing that a smaller second mirror allowed higher speeds. The opponent countered that claim 1 did not define small mirrors, only mirrors of approximately the same size. The alleged effect therefore did not occur over the whole scope of the claim.

3.5.2 The board agrees with the opponent.

The advantages of a higher scan rate are described in paragraphs [0016] and [0017] of the opposed patent. A skilled person would understand that a higher scan rate depends on the mirrors being lightweight, not merely small, let alone of the same size. Even if "small" were

accepted as an imprecise proxy for "lightweight", the claim does not exclude large and/or heavy mirrors.

According to the headnote of decision G 1/24, the claims are the starting point and the basis for assessing the patentability of an invention under Articles 52 to 57 EPC. The Enlarged Board of Appeal accepts that claims have to be interpreted for the purpose of the assessment of patentability (reasons 4 of G 1/24) but does not explain what purpose the interpretation of the claims serves. The Enlarged Board of Appeal also left open what the consequences of any discrepancy between the description and drawings on the one hand and the claim on the other hand are.

The present board is of the opinion that the purpose of interpreting the claim must be to arrive at an objective and correct interpretation of the subject matter for which protection is sought by the chosen claim wording. In the present case, a consultation of the description merely confirms that the claim does not reflect the disclosure of the description on which the patent proprietor's argument relies. Given the purpose of claim interpretation, it cannot be the consequence of such a finding to ignore the claim wording and to read additional features into the claim that are not reflected by its wording.

The alleged technical effect is therefore not achieved across the whole scope of the claim.

3.6 Objective technical problem

In the absence of a specific technical effect, the objective technical problem is the provision of an alternative.

3.7 Assessment of the solution

3.7.1 The patent proprietor argued that it would not have been obvious to start from a sophisticated system and then limit its capabilities. This was also said not to reflect the inventors' approach, since they allegedly started from simple systems without scanning capabilities.

3.7.2 The opponent replied that no specific prompt was required when merely providing an alternative. Using mirrors of the same size was advantageous because it allowed identical parts.

3.7.3 The board disagrees with the patent proprietor. D7 discloses a useful mode of operation for a laser welding system with a limited scan angle of about 1 to 2°. Realising that a prior art system can be simplified by limiting its capabilities to one known mode of operation and subsequently replacing components that are not needed for those limited capabilities by known simpler components is obvious from a technical point of view. It may be an insight from an entrepreneurial or marketing perspective that there is a market for a system with only limited known capabilities. In the present case, that is, however, irrelevant for the assessment of inventive step. A skilled person would have recognised, based on ordinary skill and a basic understanding of the function of the components, that the size of the mirrors must be large enough to

accommodate the maximum scan angle. It is therefore immediately apparent that their size, in particular that of the second mirror can be reduced if one chooses to limit the scan angle.

3.8 The subject-matter of claim 1 of auxiliary request 1 therefore does not involve an inventive step.

4. Auxiliary request 2 - lack of inventive step in view of D7

4.1 The subject-matter of claim 1 of auxiliary request 2 does not involve an inventive step within the meaning of Article 56 EPC in view of D7.

4.2 Claim 1 includes features F1 to F8 and the following additional feature:

F10: "*wherein the focus lens (142) is not a scanning lens*"

4.3 Distinguishing feature

4.3.1 Feature F10 is the sole distinguishing feature.

4.3.2 The patent proprietor argued, based on documents D7a to D7c, that D7 used a scanning lens. The opponent argued that figure 4 of D7 showed a conventional convex focusing lens.

4.3.3 The board is not persuaded by either party's argument. D7 does not directly and unambiguously disclose the type of focusing lens. Figure 4 is schematic and does not exclude a schematic depiction of a scanning lens. Figure 5 of D7 also does not allow a clear conclusion

as to whether the visible glass element is a protective window or a focusing lens, and if so, what type of focusing lens. The arguments based on D7a to D7c are likewise inconclusive. It could not be established that the scan heads according to these documents corresponded exactly to that used in D7.

4.4 Technical effect

4.4.1 The patent proprietor argued that excluding a scanning lens allowed a simpler, lighter and less expensive construction. In fact, a whole class of multi-element lenses was excluded by feature F10. The opponent argued that the claim merely excluded one class of lenses without defining the alternative.

4.4.2 The board agrees with the opponent. The claim is formulated as a disclaimer and does not define the lens used instead. It clearly does not exclude complicated, expensive and large multi-element lenses as long as they are not scanning lenses. Therefore, no specific technical effect can be attributed across the whole scope of the claim.

4.5 Objective technical problem

The objective technical problem is therefore the provision of an alternative.

4.6 Assessment of the solution

4.6.1 The patent proprietor repeated the argument that a skilled person would not limit the capabilities of D7. The opponent argued that the only relevant question was whether a skilled person would consider using a non-scanning lens.

4.6.2 The board refers to its reasoning for auxiliary request 1. Once the skilled person decides to use D7 exclusively in its known small-angle mode, it is obvious to simplify components, which are only needed for a wider angle mode. A scanning lens is such a component. This modification requires only ordinary skill, namely being familiar with the functions of the optical components.

4.7 The subject-matter of claim 1 of auxiliary request 2 therefore lacks an inventive step.

5. Auxiliary request 3 - lack of inventive step in view of D7

5.1 Claim 1 of auxiliary request 3 includes features F1 to F8 and the following additional features:

F11 *"the laser welding system (100) further comprising:
a collimator module (120) including the collimator (122);*

F12 *a wobbler module (130) coupled to the collimator module (120), the wobbler module (130) including the at least first and second movable mirrors (132, 134); and*

F13 *a core block module (140) coupled to the wobbler module (130), the core block module (140) including at least the focus lens (142),*

F14 *wherein the collimator module includes a fiber interlock connector for connecting to a mating interlock connector on an output fiber connector such that a safety interlock condition is provided when the output fiber connector is not connected to the collimator module, and*

F15 *wherein the collimator module and the wobbler module include fiber interlock connections configured to provide the safety interlock condition in response sensors [sic!] within the wobbler module."*

5.2 The board informed the parties in its communication under Article 15(1) RPBA that it was inclined to take the opponent's objection of lack of inventive step based on D7, D9 and D12 into account. The patent proprietor objected that this objection had not previously been raised in this form by the opponent.

Even if one accepted that the objection was modified by the board, it remains entirely within the factual and evidentiary framework presented by the opponent. The proprietor addressed it in substance in writing before the board issued its preliminary opinion, again in writing in response to it and at the oral proceedings before the board. Deciding on it is not unfair to the patent proprietor.

As to the irritation voiced by the patent proprietor concerning not being provided with translations of the Japanese documents D10 to D12, the opponent indicated in the statement of grounds of appeal that machine translations could be obtained via Espacenet or be provided on request. The board fails to see any procedural or substantive relevance of the patent proprietor's remark.

5.3 Distinguishing features

The board accepts in the patent proprietor's favour that features F11 to F15 are distinguishing features.

5.4 Technical effects

5.4.1 A modular structure provides a more flexible construction. This is a generally recognised advantage of modularity, therefore the board can accept it, even if the patent application and patent are silent as to the technical advantage of the modular structure claimed. The patent does not show any specific effect arising from the particular subdivision into collimation, wobblers and core block module either.

5.4.2 Feature F14 provides a safety interlock signal when the fibre is not connected. It does not define any controller or shutdown logic of the laser.

5.4.3 Feature F15 is unclear as to the triggering conditions. The description refers to temperature sensors and connection checks, but the claim does not specify this.

5.4.4 There is no synergy between these effects. They therefore address separate partial problems.

5.5 Objective partial technical problems

The objective technical partial problems are as follows:

Feature F11 to F13: providing a more flexible construction.

Feature F14: improving safety when the fibre is not

connected.

Feature F15: providing further safety features.

5.6 Assessment of the solutions

5.6.1 A modular structure is suggested by D7 itself, which refers to adjustments made possible by a modular design, albeit in the context of a 1D-Scanning system (page 171). As mentioned, this is also a generally known advantage of a modular structure and thus an obvious design option for a skilled person. The subdivision into modules merely reflects the basic optical functions of the laser head and is therefore an obvious choice. Therefore, the provision of features F11 to F13 was obvious.

5.6.2 Document D12 discloses a safety interlock condition when the fibre connector is not connected, see paragraph [0035], according to which a fibre disconnection is detected. This corresponds to feature F14.

According to the proprietor the claim provides additional limitations, in particular the presence of a controller and an immediate shutdown of the laser as the alleged response of the controller to a safety interlock condition. However, all that feature F14 defines is that a safety interlock condition is provided, not what is done in response.

A skilled person wishing to improve safety when the fibre is not connected would have consulted document D12 and found an incentive to provide a safety interlock condition according to feature F14.

5.6.3 Document D7 discloses overheat protection in section 2, first paragraph ("elements for protection against pollution and overheating"). Paragraph [0061] of document D9 discloses a temperature interlock if the temperature of the wobbler mirror holders becomes too high. It was therefore obvious to provide a temperature safety interlock in response to sensors in the wobbler module. This falls within the generic wording of F15.

5.7 The subject-matter of claim 1 of auxiliary request 3 therefore does not involve an inventive step.

6. Auxiliary request 4 - lack of inventive step in view of D7

6.1 The subject-matter of claim 1 of auxiliary request 4 does not involve an inventive step.

6.2 Claim 1 includes features F1 to F8, F11 to F13, and the following feature:

F16: "and a fixed mirror configured to reflect the laser beam from the movable mirrors to the focus lens".

6.3 Feature F16 is a distinguishing feature, since D7 does not disclose a fixed mirror behind the wobble mirrors. This was not disputed by the opponent.

6.4 The technical effect of feature F16 is to redirect the beam. The patent proprietor argued that the additional fixed mirror made the apparatus more compact and added flexibility. This was disputed by the opponent. The board is not persuaded by the patent proprietor's argument, since they did not explain how additional

components made the welding head more compact nor why an additional mirror provided flexibility. The board notes here that claim 1 does not define any further components or features, such as that the fixed mirror might be removable.

- 6.5 There is no synergy with the effects of features F11 to F13 defined in section 5.4.1 above.
- 6.6 The objective partial technical problems are therefore to provide a flexible construction (see section 5.5 above) and to provide an alternative laser welding head.
- 6.7 The reasoning given for auxiliary request 3 applies to the first partial problem.

With respect to a constructive alternative, adding a further mirror was obvious in the absence of claim 1 reflecting any specific advantage. The alleged disadvantages of vignetting or back reflections can only be invoked if it is assumed that a skilled person would add a fixed mirror to the system of D7 that is too small for the maximum scan angle, or that the distance between the focusing lens and the mirrors is excessively long. Such an assumption is unrealistic. Moreover, claim 1 does not define the mirror size or the distance relative to the focal length. Any asserted disadvantage of the prior-art device would therefore also not be excluded by the claimed device.

Furthermore, as already explained (see section 3.7.3 above), it was obvious to restrict the system of D7 to small-angle operation and to adapt components needed only for the wide-angle operation accordingly. Any alleged disadvantage of adding a fixed mirror in the

prior art device adduced by the patent proprietor ignores this aspect which has already been decided in the context of auxiliary request 1.

6.8 Therefore, the subject-matter of claim 1 of auxiliary request 4 does not involve an inventive step.

7. For the above considerations, the ground for opposition under Article 100a in combination with Article 54 EPC prejudices the maintenance of the patent as granted and there is no allowable version of the patent as amended, which meets the requirements of the Convention (Article 101(3)(b) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



L. Gabor

R. Bekkering

Decision electronically authenticated