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**D E C I S I O N**  
**of 21 September 2004**

**Case Number:** T 0798/02 - 3.2.6

**Application Number:** 95920246.6

**Publication Number:** 0712346

**IPC:** B23K 26/14

**Language of the proceedings:** EN

**Title of invention:**

Method and apparatus for supplying gaseous nitrogen to a laser beam machine

**Patentee:**

AMADA COMPANY, LIMITED

**Opponent:**

L'AIR LIQUIDE, Société Anonyme pour L'étude et L'exploitation des procédés Georges Claude

**Headword:**

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**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Novelty (yes)"

"Inventive step (main request: no; auxiliary request: yes)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0798/02 - 3.2.6

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.6  
of 21 September 2004

**Appellant:**  
(Opponent)

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**Respondent:**  
(Proprietor of the patent)

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**Decision under appeal:**

Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
15 July 2002 concerning maintenance of European  
patent No. 0712346 in amended form.

**Composition of the Board:**

**Chairman:** P. Alting van Geusau  
**Members:** H. Meinders  
J. H. van Moer

## Summary of Facts and Submissions

- I. By decision dated 15 July 2002 the Opposition Division maintained European Patent 0 712 346 in amended form.

The Opposition Division considered that the main request was not allowable, but that in respect of the first auxiliary request the amendments carried out in the patent as granted complied with Article 123(2) and (3) EPC, that the claims fulfilled the requirements of Article 84 EPC and that the subject-matter of claim 1 as amended was considered novel and inventive in particular over the prior art disclosed in:

D1: JP-A-5 084 590 with English translation

and

D7: JP-A-3 221 290 with English translation.

(In the following, the references to these documents relate to the page numbers and columns as available from the English translations).

- II. Against this decision the Appellant (Opponent) filed an appeal on 30 July 2002, paying the appeal fee on that same date. The statement of grounds of appeal was filed on 1 August 2002.

- III. Oral proceedings were held on 21 September 2004.

The Appellant requested setting aside of the decision under appeal and revocation of the patent.

The Respondent (patentee) requested maintenance of the patent on the basis of a main request (maintenance in the amended form as upheld by the Opposition Division or according to a first auxiliary request with the following documents:

Claims 1 to 4 as filed during the oral proceedings,

Description, columns 1 to 12 as filed during the oral proceedings,

Drawings, figures 1, 2A and 2B as granted.

IV. The wording of independent claim 1 according to the Appellant's **main request** is as follows:

"Laser beam machine, comprising:  
a laser beam oscillator (3) for generating a laser beam, a laser beam head (7) for machining a workpiece, and an optical path system (13) connecting said laser beam oscillator (3) and said laser beam head (7), said optical path system (13) being enclosed by an optical path cover (11), and said optical path cover (11) is connecting said laser beam machine head (7) with said laser oscillator (3), and  
an apparatus for supplying nitrogen-rich gas comprising:  
an air separator (15) for separating oxygen and nitrogen from compressing air;  
a first conduit means for supplying nitrogen-rich gas from said air separator (15) to said laser beam machine head (7) of the laser beam machine as an assist gas to be used in a machine process;  
characterized by

a second conduit means for supplying nitrogen-rich gas from said air separator (15) to said optical path cover (11) as a protective gas for an optical path system (13) comprising said optical path cover (11). "

Claim 1 of the **auxiliary request** comprises the features of claim 1 of the main request, with the following further limitation in the characterizing part:

"wherein said first conduit means is a conduit (39) connecting said optical path cover with said laser beam head (7), for introducing the nitrogen-rich gas in said optical path cover (11) into said laser beam head (7) as the assist gas."

V. The arguments of the Appellant can be summarised as follows:

Amendments to the claims as granted (main request):

There was an inconsistency between claim 1 on the one hand and each of dependent claims 3 and 4. According to claim 1 the first conduit means started at the air separator and ended at the laser beam head, whereas according to claim 3 it started at the optical path cover and according to claim 4 it started as a branch conduit from the second conduit means. This was an inconsistency according to Article 84 EPC, resulting from the amendments to the claims and thus the claim set of this request was not allowable.

Inventive step (main request):

The subject-matter of claim 1 was obvious to the skilled person starting from D1 as closest prior art disclosing all features of the preamble, in view of the teaching of D7 disclosing the use of nitrogen gas as a protective gas for the optical path system. According to D7 this system could be used in any kind of laser machining technology (page 7, left column) and in particular the advantages of nitrogen for not adversely affecting the process are mentioned in this document (page 6, right column).

Inventive step (auxiliary request):

The Appellant stated he had no objection of lack of inventive step to make against claim 1 of this request.

VI. The Respondent argued as follows:

Amendments:

The amendments did not lead to an inconsistency between claims 1 and 3 and 4 of the main request, as according to the wording of claim 1 the first conduit means did not necessarily start at the air separator. The reference to the air separator should be read as included in the "for" statement relating to the first conduit means: "first conduit means for supplying nitrogen-rich gas from said air separator", i.e. it meant to indicate where the nitrogen-rich gas was coming from.

Main request:

Closest prior art was constituted by D1, which disclosed all features except those of the characterizing part of claim 1. It was not obvious to apply the teaching of D7 to the laser beam machine as disclosed in D1, as D7 related to laser groove cutting in ceramics and suggested using a compressor to supply the gas. A skilled person would not think of using the arrangement of D7 in a laser beam machine as disclosed in D1.

Auxiliary request:

The further limitation of claim 1 according to this request could not be derived in an obvious way from any of the available documents. Nobody had come up with the idea of using the protecting gas in the optical path cover as a supply of assist gas to the laser beam head.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Amendments (main request)*

The Appellant objected to the wording of claim 1 according to the main request as being inconsistent with the wording of claims 3 and 4, both dependent on claim 1. The first conduit means could not at the same time find its origin at the air separator (claim 1) and have its origin at the optical path cover (claim 3) or the second conduit means (claim 4).

This objection need not be discussed further as the main request fails for lack of inventive step (see below), taking account of the Appellant's interpretation of claim 1.

3. *Inventive step (Article 56 EPC) - main request*

3.1 Together with the parties the Board considers that closest prior art for the discussion of inventive step is D1, which discloses a laser beam machine with the features of the preamble of claim 1. The first conduit means is connected directly to the air separator, in conformity with the appellant's interpretation of claim 1 for the purpose of the discussion of consistency under Article 84 EPC (see points V and 2 above).

Such a machine has the disadvantage that the laser optical path is exposed to the ambient air of the location where the laser beam machine is operating, which is usually not clean air in view of the operations carried out by laser beam machines: cutting, welding, grooving, etc. This produces a negative effect in the form of oxidation or moisture on the optical path components (see patent in suit, column 2, lines 17 to 20).

This problem is solved by providing the optical path cover with a supply of nitrogen-rich gas as a protective gas, as per the features of the characterizing part of claim 1.



3.2 This same problem is addressed for a laser beam machine in D7, page 3, right column, first paragraph. D7 also provides the solution in the form of supplying clean air or gas like nitrogen (which does not affect the process), at a pressure higher than atmospheric pressure, to the optical path cover. According to D7 its teaching is applicable to any machining or assembly technology using a laser beam machine (page 7, left column, first and second paragraph). The introduction of D7 indicating the field of application also mentions laser machining (page 1, right column, second paragraph).

3.3 The skilled person working in the field of laser beam machines is thus provided by D7 with a teaching which can be applied to the laser beam machine of D1. In view of the advantages expressed in D7 he also will apply that teaching. As in the laser beam machine disclosed in D1 there is already a source of nitrogen-rich gas (the air separator), used as an assist gas in the laser beam head, the skilled person (of whom one can expect that he strives for the most efficient solution) will use that same source for providing the nitrogen-rich gas for the optical path cover. Thus he will arrive at the machine as claimed in claim 1 of the main request, i.e. with the second conduit connected to the air separator.

3.4 The Board cannot agree with the Respondent's argument that because the laser beam machine in D7 is a special machine used only for machining ceramics the teaching of this document could not be applied to the general laser beam machine as disclosed in D1.

The specific example discussed in D7 relates to the machine as indicated by the Respondent; however, D7 also generally suggests the use of this system for any other kind of laser beam machine.

- 3.5 The Board neither follows the Respondent in its contention that in applying the teaching of D7 the skilled person would supply the nitrogen-rich gas by a separate source, such as a gas bottle, and thus would not arrive at the subject-matter claimed, where the nitrogen-rich gas for the optical path cover originated from the air separator.

As already stated above, in a situation where there is already a source of nitrogen gas available, it would go against technical logic to provide a further source. It can be expected of the skilled person that he strives for the most efficient solution when applying a technical teaching made available to him, therefore in the present case he would have chosen the air separator as source for the nitrogen gas supplied to the optical path cover.

- 3.6 Finally the Respondent argued that it was technically complicated to adapt the laser beam machine disclosed in D1 to accommodate the teaching of D7, in particular the control of the supply of nitrogen-rich gas.

The Board cannot follow this argument in view of the fact that claim 1 according to the main request does not mention any further technical features of the design of the first and second conduit means nor of the necessary control means implemented therein, which would support this contention.

3.7 Therefore the Board concludes that the subject-matter of claim 1 according to the main request does not involve inventive step (Article 56 EPC).

4. *Amendments - auxiliary request*

4.1 Claim 1 according to the auxiliary request consists of claim 1 according to the main request with the further limiting feature of the first conduit means being a conduit connecting the optical path cover with the laser beam head, as claimed in granted claim 6, which was dependent on either claim 4 or claim 5 and which was originally filed as claim 7.

Dependent claim 2 according to this request is derivable from the originally filed description, page 10, second paragraph and the paragraph bridging pages 11 and 12.

Dependent claim 3 is identical to granted claim 8, dependent claim 4 is derivable from granted claim 3 and originally filed claim 1.

4.2 The amendments to the description bring it into line with the set of claims and explicitly exclude a laser beam machine where the first conduit means is a branch conduit of the second conduit from being an embodiment of the invention.

These amendments neither give rise to objections pursuant to Article 84 and 123 EPC.

4.3 In this request claim 1 consists of the combination of claims 1 and 3 of the main request. Claim 4 of the main request has not been maintained. The objection pursuant to Article 84 EPC (see points V and 2 above) made by the Appellant is thus no longer applicable to claim 1 of the auxiliary request.

5. *Inventive step (Article 56 EPC) - auxiliary request*

The Appellant stated it had no objections of lack of inventive step against claim 1 according to this request.

The Board has considered the prior art documents available in the file and has come to the conclusion that none of these documents give the skilled person an indication to use the nitrogen-rich gas supplied to the optical path cover of a laser beam machine as an assist gas by providing the first conduit means as a conduit between the optical path cover and the laser beam head as claimed in claim 1 of the auxiliary request.

Hence, the Board comes to the conclusion that the subject-matter of claim 1 of this request cannot be derived in an obvious manner from the prior art and accordingly involves an inventive step (Article 56 EPC).

The subject-matter of claims 2 to 4 relate to preferred embodiments of the laser beam machine of claim 1, thus their subject-matter also is novel and involves inventive step.

The patent can therefore be maintained according to the request of the Respondent.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
  
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the following documents:

Claims 1 to 4 as filed during the oral proceedings,

Description, columns 1 to 12 as filed during the oral proceedings,

Drawings, figures 1, 2A and 2B as granted.

The Registrar:

The Chairman

M. Patin

P. Alting van Geusau