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Aktenzeichen: T 59/82  
Case Number:  
N° du recours :

**ENTSCHEIDUNG / DECISION**

vom / of / du 24 May 1982

Anmelder:

Applicant: Xerox Corporation

Demandeur :

Stichwort:

Headword:

Référence :

EPÜ/EPC/CBE Article 52(1), 56

"Inventive step"

Leitsatz / Headnote / Sommaire

Europäisches  
Patentamt

Technische  
Beschwerdekammern

European Patent  
Office

Technical Boards  
of Appeal

Office européen  
des brevets

Chambres de  
recours techniques



File No: T 59/82

DECISION

of the Technical Board of Appeal 3.4.1

dated 24 May 1982

Appellant:

Xerox Corporation  
Xerox Square  
Rochester New York 14644  
USA

Representative:

I.R. Goode  
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Decision under appeal:

Decision of Examining Division 047  
dated 20 November 1981 refusing  
European patent application  
No. 79 300 361.7 pursuant to  
Article 97(1) EPC

Composition of the Board:

- |                      |          |
|----------------------|----------|
| - R. Kaiser          | Chairman |
| - O. Huber           | Member   |
| - L. Gotti Porcinari | Member   |

I. SUMMARY OF FACTS AND SUBMISSIONS

- 1) European patent application No. 79 300 361.7 entitled "A gas laser", filed on 9 March 1979 and published on 19 September 1979 (publication No. 0 004 190) and claiming priority of 13 March 1978 from a previous application in the USA, was refused by decision of Examining Division 047 of the European Patent Office dated 20 November 1981. That decision was based on claims 1-6 received on 3 June 1981.

The grounds for refusal were that the laser according to claim 1 consists merely in the combination of measures known from DE-A-2 030 421, US-A-3 614 658 and US-A-3 876 957 functioning in their normal way and not producing any non-obvious working inter-relationship, and for that reason no inventive step was seen in the combination.

- 2) On 20 January 1982 the appellant lodged an appeal against the decision by telex and paid the appeal fee. A document reproducing the contents of the telex was filed on 25 January 1982. A Statement of Grounds containing some minor amendments to claim 1 was submitted on 27 March 1982.

The present claim 1, with the characterising portion divided into parts (a), (b) and (c), reads as follows:

A gas laser wherein the active gaseous medium comprises a metal vapor and a gas, the laser including heating means to vaporise the metal, and vapor-pressure-sensitive means comprising means responsive to the voltage drop across the laser electrodes to energise the heating means and maintain the metal vapor pressure above a predetermined vapor pressure, characterised by (a) a controllable source of gas for releasing the gas into the laser,

(b) gas-pressure-sensitive means for generating a signal when the pressure of the gas in the laser falls below a predetermined pressure, and (c) means responsive to the signal to release gas from the source into the laser to increase the gas pressure in the laser, and thereby maintain the gas pressure above the predetermined gas pressure.

The dependent claims 2-6 were received on 3 June 1981.

3) The appellant submitted the following arguments:

The replenishment of helium in the case of the gas laser described in DE-A-2 030 421 is imprecise because it is only dependent on the pressure difference between the helium in the high pressure reservoir and the helium in the laser cavity, whereas in the present invention the He-pressure is actively controlled. Thus, combining the teachings of DE-A-2 030 421 with those of US-A-3 614 658 (a laser with the features of the first part of claim 1) does not produce the subject-matter of this application.

Furthermore, it seems far from obvious to apply the teachings of US-A-3 876 957 to the combination of DE-A-2 030 421 and US-A-3 614 658 because the voltage drop is used to control the gas pressure in the single component gas laser according to US-A-3 614 658 in contrast to the invention in which the metal vapor pressure is controlled by this technique. In the present invention two independent control systems are used with separate sensing devices for the metal vapor pressure and for the gas pressure.

4) The appellant has requested that the patent be granted on the basis of the 6 claims mentioned above.

## II. REASONS FOR THE DECISION

1) The appeal complies with Articles 106 - 108 and Rule 64 EPC. It is therefore admissible.

- 2) There is no formal objection to the current claims, since they are adequately supported by the original documents.

The minor amendments to claim 1 requested by the appellant in the Grounds of Appeal are only of a clarifying nature and do not constitute any limitation of claim 1 effective at the time of refusal.

- 3) The preamble of claim 1 is based on the prior art as disclosed in Fig. 2 of US-A-3 614 658. In this document a gas laser is described in which the active gaseous medium is a mixture of cadmium (Cd)- vapor and helium (He), see column 1, lines 51/52, and which includes heating means (13) to vaporise the metal (Cd,12), and vapor-pressure-sensitive means (20 etc) responsive to the voltage drop across the laser electrodes (3,4, see Fig.1) to energise the heating means (13) and control the gas mixture ratio and thereby maintain the metal (Cd) vapor pressure above a predetermined (reference source 23) vapor pressure.

In metal vapor gas laser discharge tubes, e.g. He-Cd-lasers, a depletion of the gas (He) supply occurs as a result of permeation through the tube seals and glassware and trapping by the metal (Cd) condensate. This depletion of gas causes a degradation of the radiant output, see description in the application, original page 1, third and fourth paragraphs. According to the original page 3 of the description, second and third paragraphs, the aim of the application is to overcome this degradation problem and to provide an economical, compact gas metal vapor laser (He-Cd-laser) which has a relatively long operating and shelf life.

The problems arising from gas depletion in gas lasers are generally known, see US-A-3 876 957 (He-laser, see column 2, line 15), FR-A-1 527 988 and DE-A-2 030 421 (He-Cd-laser, see page 2, line 8). This problem is obviously independent of

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whether a gas metal vapor laser (He-Cd-laser) is provided with a control system for the metal vapor (Cd) - partial pressure (US-A-3 614 658). When operating lasers according to US-A-3 614 658 a skilled person will undoubtedly discover that there is a deficiency due to the loss of He. Therefore, the aim of the present application cannot be regarded as inventive.

If a person skilled in the art working on the development of lasers does not possess the technical knowledge to overcome the gas depletion, he can be expected to search the prior art for appropriate measures. Indeed, the documents cited above already offer economical and compact solutions to the problem. DE-A-2 030 421 already provides the basic solution in connection with a He-Cd-laser, namely a source of He (reservoir 4) for (uncontrolled) release of the gas (He) into the laser in order to increase the gas pressure in the laser (parts of feature (a) and (c)). This solution is very simple but not precise because the He-replenishment is only controlled by the permeability of the membrane. However, the state of the art discloses solutions with a high degree of precision in the form of a complete active control system for the gas (He) pressure, comprising all features of the characterising portion of claim 1, see US-A-3 876 957, Fig. 4: controllable He-source (80), (b) means (70) for generating a signal proportional to the He-pressure, (c) means (57,62) responsive to the signal to release He from the source (80) into the laser (24). A similar active control system for the gas pressure is described in FR-A-1 527 988: (a) gas reservoir (12,13), (b) pressure signal generator (19), (c) gas releasing means (electric heater in the graphite chamber 12,13).

Having regard to this extensive state of the art, the addition of a well-known gas (He) pressure control system to a metal vapor gas laser (He-Cd-laser) with an active control device for the metal (Cd) vapor partial pressure (US-A-3 614 658), in order to make use of the readily apparent technical advantages of such a system, must therefore be regarded as an

obvious step for a skilled man. The question which sort of control system (active or passive) is to be used depends only on the need and cost factors.

It is true, as the appellant submits, that in the case of the Cd-partial pressure control system according to US-A-3 614 658 an electrode (20) picking up the voltage drop across the laser electrodes is used as partial pressure signal generator, and therefore, this signal is no longer available for controlling the He-pressure, if an active gas pressure control system according to US-A-3 876 957 is added. But this is no serious handicap, since other equivalent devices for generating a gas pressure signal are well-known, e.g. a Pirani gauge, see FR-A-1 527 988, reference number 19 and page 15, lines 8/9, of the present application.

Thus, the gas laser according to claim 1 does not involve an inventive step (Article 56 EPC). Claim 1 therefore cannot be allowed under Article 52(1) EPC.

- 4) The dependent claims 2-6 related to claim 1 are not allowable either, since their existence is conditional on the allowability of claim 1. Furthermore, in view of the prior art, the Board cannot find any patentable features in the sub-claims.

### III. Order

For these reasons,

it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman: