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Anmeldenummer / Filing No / N° de la demande : 83 300 141.5

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Bezeichnung der Erfindung: Improvements in discharge lamps

Title of invention:

Titre de l'invention :

Klassifikation / Classification / Classement : H 01 J 61/54

ENTSCHEIDUNG / DECISION

vom / of / du 8 February 1988

Anmelder / Applicant / Demandeur : THORN EMI plc

Patentinhaber / Proprietor of the patent /

Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56, Rule 29(1) EPC

Kennwort / Keyword / Mot clé : "Inventive step (yes), one-part form claim (yes) "

Leitsatz / Headnote / Sommaire



Case Number : T 137/86

**Interlocutory
D E C I S I O N**
of the Technical Board of Appeal 3.4.1
of 8 February 1988

Appellant : THORN EMI plc
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Decision under appeal : Decision of Examining Division 047
of the European Patent Office
dated 13 January 1986 refusing European
patent application No. 83 300 141.5
pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : K. Lederer
Member : E. Turrini
Member : R. Schulte

Summary of Facts and Submissions

- I. European patent application 83 300 141.5 (publication number 0 085 487) was refused by decision of the Examining Division of the European Patent Office. The invention relates to a discharge lamp.
- II. The decision under appeal was based on Claim 1 filed on 24 May 1985 and on Claims 2 to 10 as originally filed.
- III. After exchange of argumentations between Examining Division and Appellant, the latter asked for a decision based on the state of the file. The reason for the refusal was that the subject-matter of Claim 1 did not involve an inventive step within the meaning of Article 56 EPC and the claim was thus not allowable under Article 52(1) EPC.
- IV. An appeal was lodged against the decision. The Appellant subsequently submitted the Statement of Grounds together with a primary request consisting in a new main Claim 1 and four auxiliary requests consisting each in a corresponding auxiliary main Claim 1. Owing to the lack of payment of the appeal fee, the notice of appeal was deemed not to have been filed.
- V. The Appellant requested that the appeal be reinstated in accordance with Article 122 EPC, and paid the appeal fee and the fee for the restitutio in integrum.
- VI. The application of re-establishment of rights concerning the payment of the appeal fee was granted by the Board of Appeal.
- VII. The Appellant requested that the impugned decision be cancelled. He argued that the subject-matter of Claim 1 of

the main request involves an inventive step, because the closest prior art documents FR-A-2 256 530 or GB-A-1 493 270 or JP-A-5 345 074 referred to respectively as document A, C and D belonging to the same family, do not refer to the presence of a spark gap designed to breakdown at predetermined voltages to allow the lamp to start. Thus, the spark gap of the invention "comprising an envelope of insulating material defining a container" utilises a structure which is completely different from that of the prior art, even in view of GB-A-804 319, referred to as document B whereby the spark gap is in free air. The claim should therefore be allowed.

As far as the main claims of the auxiliary requests are concerned, these contain additional features in respect to Claim 1 of the main request, so that their subject-matter involves "a fortiori" an inventive step.

VIII. Following a communication of the Board and a phone conversation with the Appellant, he filed a letter requesting that the decision of the Examining Division be set aside and a European patent granted on the basis of a new set of Claims 1 to 8 as main request and on the basis of a new set of Claims 1 to 8 as auxiliary request.

IX. Current Claim 1 of the main request reads as follows:

"A discharge lamp (10) having an arc discharge tube (13) including first electrodes (22, 24) for supporting a discharge therebetween, inleads (19, 26) connected to said first electrodes (22, 24), a starting aid including a conductor (41) co-operating with the first electrodes (22, 24) and a spark gap element (38) connected between the conductor (41) and one (26) of said inleads, said spark gap element (38) comprising an envelope (43; 50) of insulating material defining a container enclosing a fill

of gas or being evacuated and two further electrodes (46, 47; 52, 53) connected respectively with the conductor (41) and said one inlead (26) and being hermetically sealed to and projecting within the envelope (43; 50) to define a spark gap between the two further electrodes (46, 47; 52, 53), the spark gap element (38) being adapted to electrically isolate the lamp during normal running of the lamp (10) and breakdown under high voltage pulses applied to start the lamp (10) and being shielded (56; 57) from photo emission taking place between the first electrodes (22, 24) when the lamp is running."

Claims 2 to 8 are dependent on Claim 1.

- X. Current Claim 1 of the auxiliary request reads as follows:

"A discharge lamp (10) having an arc discharge tube (13) including first electrodes (22, 24) for supporting a discharge therebetween, inleads (19, 26) connected to said first electrodes (22, 24), a starting aid including a conductor (41) co-operating with the first electrodes (22, 24) and an element (38) connected between the conductor (41) and one (26) of said inleads, said element (38) defining a gap between two further electrodes (46, 47; 52, 53) connected respectively with the conductor (41) and said one inlead (26), characterised in that said gap element is a spark gap element (38) comprising an envelope (43; 50) of insulating material defining a container enclosing a fill of gas or being evacuated, the two further electrodes (46, 47; 52, 53) being hermetically sealed to and projecting within the envelope (43; 50) to define the spark gap, the spark gap element (38) being adapted to electrically isolate the lamp during normal running of the lamp (10) and breakdown under high voltage pulses applied to start the lamp (10) and being shielded

(56; 57) from photo emission taking place between the first electrodes (22, 24) when the lamp is running."

Claims 2 to 8 are dependent on Claim 1.

Reasons for the Decision

1. The appeal is admissible.
2. Main request.
 - 2.1. Article 123(2) EPC.

There is no objection to the current set of claims or description as far as Article 123(2) EPC is concerned, since both are adequately supported by the original disclosure. In particular, actual Claim 1 includes the features of Claims 1, 2, 6 and some of the features of Claim 9 as originally filed. Moreover, the feature concerning the shielding is disclosed by the originally filed description, page 7, lines 22 to 33.

- 2.2. Novelty.

- 2.2.1. Document A (Figures 1, 2 and 4; description, page 4, line 38 to page 5, line 16) describes a discharge lamp having an arc discharge tube (1) including first electrodes (7, 8) for supporting a discharge therebetween, inleads (9, 10) connected to said first electrodes (7, 8), a starting aid (14 to 17) including a conductor (14) co-operating with the first electrodes (7, 8) and an element (15) connected between the conductor (14) and one (10) of said inleads, said element (15) defining a gap between two further electrodes (16, 17) connected respectively with the conductor (14) and said one inlead (10).

Contrary to the subject-matter of Claim 1, document A does not mention that the gap is a spark gap element and that the gap is shielded from photo emission taking place between the first electrodes when the lamp is running.

2.2.2. Documents C and D belong to the same family of document A and are close to it. The considerations made above with regard to document A are still valid here. It should be added for the sake of completion that according to document C the gap (15) and the two electrodes (16 and 17) act as a capacitive coupling (page 2, lines 6 to 32).

2.2.3. Document B (Figures 1 and 2; page 2, lines 40 to 119) refers to a discharge lamp having an arc discharge tube (2) including first electrodes (3, 4) for supporting a discharge therebetween, inleads (5, 10) connected to the first electrodes (3, 4), a starting aid (16 to 22) including a conductor (15) co-operating with the first electrodes (3, 4) and a spark gap element (22) (page 2, line 81) between two further electrodes, one of them being connected with the conductor (15).

Contrary to the subject-matter of Claim 1, according to document B the spark gap is an air gap (page 2, line 77) without envelope enclosing a fill of gas or being evacuated, the other further electrode (21) is connected with a further inlead (19, 20) co-operating with one (10) of the inleads through a multi-vibrator circuit (28) so as to provide a series of pulses applied to the discharge tube via the conductor (15) causing tube flashing.

Moreover, the spark gap according to document B is not shielded from photo emission taking place between the first electrodes when the lamp is running.

- 2.2.4. The other cited documents of the prior art are not relevant with respect to the present invention.
- 2.2.5. For the above reasons the subject-matter of Claim 1 and consequently of the dependents Claims 2 to 8, is deemed to be novel within the meaning of Article 54 EPC.
- 2.3. Inventive step.
- 2.3.1. Starting from the disclosure of document A (or likewise C or D), which is, in the Board's opinion, one of the two nearest prior art documents (the other being document B), the problem to be solved is to improve the efficiency of the gap element acting as a current switch, i.e. to reduce as much as possible current leakage through it during normal operation of the lamp, and to improve its accuracy, i.e. to reduce the variation margin of the threshold voltage value defining the passage from current flow to current breakdown and vice versa.
- 2.3.2. This problem is solved by the features of Claim 1 according to which the gap element is a spark gap element comprising an envelope of insulating material defining a container enclosing a fill of gas or being evacuated, the two further electrodes being hermetically sealed to and projecting within the envelope to define the spark gap, the spark gap element being adapted to electrically isolate the lamp during normal running of the lamp and breakdown under high voltage pulses applied to start the lamp and being shielded from photo emission taking place between the first electrodes when the lamp is running.
- 2.3.3. The man skilled in the art wishing to solve the problem of improving the efficiency and the accuracy of the gap component disclosed in document A, would indeed be expected to consider document B which also deals with a

discharge lamp including an arc discharge tube and a starting aid. He would realise that the gap element according to document B is a spark gap element, which provides insulation when the voltage is dropped, while breaking down during the voltage pulse. The skilled man would appreciate that with such a spark gap, the leakage current at low voltage would be at least strongly reduced (page 1, line 77) and he would therefore apply this kind of gap element to the discharge lamp according to document A.

He would then try to improve the accuracy of the gap element and he would therefore continue in his efforts of taking care of the teachings of the state of the art.

In this context, it is considered normal practice for the average technician to seek information in the generic technical field including his specific one (T 176/84, OJ 2/1986), in the present case in the field of electrical discharges in a gas. It is common knowledge in said field that, how and when a spark between two electrodes occurs, depends on various factors including the nature of the gas and its pressure.

From this information, the skilled man would deduce without inventive ingenuity that a predefined exact value of the gas pressure around the gap would improve the accuracy of the sparking point and he would therefore, as a matter of course, surround the spark gap element known from document B and applied to the lamp according to document A, with an envelope of insulating material (this follows necessarily from the fact that the material contacts the two further electrodes) defining a container enclosing a fill of gas, the two further electrodes being hermetically sealed to and projecting within the envelope to define the spark gap, so as to maintain in the envelope

a constant gas pressure, the spark gap element being adapted to electrically isolate the lamp during normal running of the lamp and breakdown under high voltage pulses applied to start the lamp.

However, none of the cited documents refers to the feature of Claim 1 concerning the shielding of the gap element from photo emission taking place between the first electrodes when the lamp is running, nor does it give any hint at this possibility. On the contrary, e.g. document B would even deter the skilled man to seek other means reducing the current leakage, because the therein proposed spark gap element is described as being such that the "leakage current is eliminated" (page 1, line 77) or in other words that it "provides complete insulation" (page 1, line 82).

The above-mentioned feature concerning the shielding strongly reduces the current leakage due to the photo emission phenomenon and improves therefore the gap element efficiency.

Reference is also made to the fact that, during the examination procedure, the Examining Division has argued that features concerning the shielding "are, neither known from, nor rendered obvious by, the available prior art."

- 2.3.4. Starting from the disclosure of document B, which is, in the Board's opinion, as mentioned in paragraph 2.3.1. hereabove, one of the two nearest prior art, the skilled man would neither be able to attain the invention without inventive ingenuity, due to the fact that the argumentation concerning the shielding of the gap element remains unchanged.

2.3.5. Thus, the subject-matter of Claim 1 is considered to involve an inventive step within the meaning of Article 56 EPC and Claim 1 is, therefore, allowable under Article 52(1) EPC.

2.3.6. Since Claims 2 to 8, depending on Claim 1, correspond to particular embodiments of the invention, they too are allowable under Article 52(1) EPC.

2.4. Rule 29(1) EPC.

Although it would be theoretically possible to have Claim 1 in the two-part form, whether with a preamble based on document A or with a preamble based on document B, the Board of Appeal is of the opinion that in the present case the one-part form of the claim is appropriate, due to the following reasons:

- Both documents refer (see paragraphs 2.2.1. and 2.2.3.), in agreement with the subject-matter of Claim 1, to a discharge lamp including a starting aid having an element defining a gap between two electrodes. Moreover, while in the discharge lamp according to document A the electrical connections correspond to those of the discharge lamp of Claim 1 but the gap is not defined as a spark gap, in the discharge lamp according to document B the gap is a spark gap but the electrical connections do not correspond to those of the discharge lamp of Claim 1. Both documents can therefore equally be considered nearest prior art and it seems unsuitable to consider one of them more relevant than the other. Thus, a claim in the two-part form "would give a distorted or misleading picture of the invention" (Guidelines: C-III, 2.3.), insofar as the two documents A and B are both likewise relevant in judging the inventive step.

- The introductory part of the description of the patent-in-suit contains a clear disclosure of the relevant prior art, so that it allows the reader to clearly distinguish the subject-matter of Claim 1 from the prior art.

3. Auxiliary request.

Owing to the fact that the main request has been accepted by the Board of Appeal, the auxiliary request of the Appellant need not be considered.

4. The request of the Appellant concerning the acceptance that it is legitimate to consult a prior art patent granted in the language of the priority application and originating from the priority application to reconcile inconsistencies between alternative foreign equivalents and the further request concerning the acceptance that, document C being the text in the language of the proceedings, is the authentic text for prior art teaching, do not need to be answered by the Board of Appeal, said two last requests having no relevance in the argumentation of the present decision. According to Article 110(1) EPC the Board of Appeal has only the obligation to examine whether an admissible appeal is allowable or not. The Appellant is not entitled to ask for further decisions upon questions which might be of interest to him but, as becomes clear from paragraphs 2.2 and 2.3, have no bearing on the allowability of the appeal.

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 grant a European patent on the basis of the following documents:
 - 2.1. Description of the main request:
 - pages 1, 2, 5 to 7 and 9 filed on 30 November 1987;
 - pages 3, 4 and 8 filed on 7 January 1988.
 - 2.2. Claims of the main request:
 - Claims 1 to 6, 7 (first part on page 10) filed on 30 November 1987;
 - Claims 7 (second part on page 11) and 8 filed on 7 January 1988.
 - 2.3. Drawings: sheets 1/2 and 2/2 as originally filed.

The Registrar:

The Chairman:

F. Klein

K. Lederer