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**Datasheet for the decision  
of 8 August 2017**

**Case Number:** T 2484/12 - 3.5.02

**Application Number:** 10153583.9

**Publication Number:** 2222136

**IPC:** H05B37/03, H05B41/04,  
H05B41/292

**Language of the proceedings:** EN

**Title of invention:**

Device and method for driving discharge lamp, light source device, and projector

**Applicant:**

Seiko Epson Corporation

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no) - main request and auxiliary requests I to VII



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Case Number: T 2484/12 - 3.5.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.5.02**  
**of 8 August 2017**

**Appellant:** Seiko Epson Corporation  
(Applicant) 4-1, Nishi-Shinjuku 2-chome  
Shinjuku-ku  
Tokyo (JP)

**Representative:** Hoffmann Eitle  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 4 July 2012  
refusing European patent application No.  
10153583.9 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** R. Lord  
**Members:** H. Bronold  
R. Cramer

## **Summary of Facts and Submissions**

- I. The appeal lies from the decision of the examining division refusing European patent application No. 10 153 583.9 for lack of inventive step of the subject-matter of the main request and of the first to third auxiliary requests then on file.
- II. Oral proceedings before the board took place on 8 August 2017. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of the main request or on the basis of the claims of one of the auxiliary requests I to III filed with the statement of grounds of appeal, or on the basis of the claims of one of the auxiliary requests IV to VII filed with letter of 7 July 2017.
- III. The following documents cited by the examining division are relevant for this decision:

D4: GB 2 417 148 A

D5: WO 2008/061562 A1

Moreover, the appellant filed the following document in support of an argument raised in the letter of 7 July 2017:

A1: "WAGO-I/O-SYSTEM 750", Version 1.2.0, WAGO Kontakttechnik GmbH & Co. KG, 2011

IV. Claim 1 of the main request reads:

"A lamp driving device (600) for managing the operation life of the lamp driving device that drives a discharge lamp (500), comprising:

- a) a start-up circuit (750) configured to apply a start-up pulse for starting an operation of the discharge lamp;
- b) a non-volatile memory (788) configured to store data therein;
- c) a history recording unit (820) configured to record a history of the applying of the start-up pulse that is performed by the start-up circuit (750), during the operating life of the lamp driving device (600), in the non-volatile memory (788); and
- d) a start-up suppressing unit (830) configured
  - d1) to determine if the accumulated number of start-up pulses or start-up operations of the lamp driving circuit recorded in the non-volatile memory exceeds a reference threshold value or not; and
  - d2) to suppress the applying of the start-up pulse that is performed by the start-up circuit (750) when the accumulated number of start-up pulses or start-up operations of the lamp driving circuit recorded in the non-volatile memory exceeds the reference threshold value."

Independent claim 9 relates to a corresponding driving method.

V. Claim 1 of auxiliary request I introduces a feature "a) a ballast unit" which comprises features "a)" to "d)" and "d2)" of claim 1 according to the main request, with former features "a)" to "c)" renumbered as features "a1)" to "a3)" and former features "d)" and

"d2)" combined in feature "a4)". Feature "d1)" is omitted. The claim also comprises the following additional features:

"b) a driving control unit (610) adapted to control the operation of the ballast unit (620), comprising:  
b1) a computer including a Central Processing Unit."

VI. Claim 1 of auxiliary request II is directed to a projector for projecting video comprising the lamp driving device according to claim 1 of the main request and the following additional features:

"a light source device (20) having a discharge lamp (500);  
a projection optical system (30) for generating projection light by using light supplied from the light source device (20);  
a transmission optical system (40) for transmitting the projected light;"

Independent claim 7 relates to a corresponding driving method.

VII. Claim 1 of auxiliary request III combines the amendments according to auxiliary request I with those according to auxiliary request II.

VIII. Auxiliary requests IV to VII are identical to the main request and auxiliary requests I to III, respectively, except that the alternative "start-up operations" is excluded.

IX. The arguments of the appellant which are relevant for this decision can be summarised as follows:

### Main request

The appellant argued that the German term "Vorschaltgerät" had to be understood as any device connected upstream of a lamp and not just as electronic ballast for discharge lamps. Since document D5 was silent about the type of lamp, it did not disclose discharge lamps. Moreover, document D5 related to a lamp for lighting purposes compatible with the DALI standard, in which context the teaching of document A1 was relevant. As was evident from a lamp the appellant brought with them to the oral proceedings, the lamps according to document D5 comprised incandescent lamps. Moreover, document D5 did not disclose an ignition sequence of a discharge lamp. Document D5 was not concerned with the number of switching operations, but rather with the number of operating hours, in order to estimate the remaining lifetime of a switching device. Although the IPC class assigned to document D5 related to discharge lamps, this did not provide any indication as to the technical field of the invention since the IPC class was not assigned by a person skilled in the art.

The appellant further argued that the subject-matter of claim 1 according to the main request solved the technical problem of avoiding insulation breakdown and increasing safety as well as providing a prolonged lifetime of the driving device. Since documents D4 and D5 did not address this problem, the subject-matter of claim 1 was not rendered obvious by the prior art. Moreover, none of the prior art documents disclosed the last feature d2) of claim 1 according to the main request.

### Auxiliary requests

The appellant argued that document D5 would not be considered by the person skilled in the art with respect to auxiliary requests I to VII since it was not directed to discharge lamps, did not disclose an ignition sequence of a discharge lamp and moreover was not concerned with video projectors, but rather with lamps for lighting purposes compatible with the DALI standard. The DALI standard concerned the driving of incandescent lamps and not the driving of discharge lamps, as claimed.

The documents of the prior art dealing with video projectors did not disclose the inventive solution regarding operation of the ballast.

### **Reasons for the Decision**

1. The appeal is admissible
2. Main request (Article 56 EPC)
  - 2.1 The appellant argues that document D5 is not pertinent since it does not relate to discharge lamps. In more detail, D5 related to ceiling lamps and the present application related to a projector.

However, with the exception of claim 8, the claims of the main request do not reflect the latter difference.

Also, although D5 appears to be concerned primarily with discharge lamps for illumination, the board sees no reasons why it should be considered to be restricted to ceiling lamps. Moreover, the board is of the opinion that the person skilled in the art is identical for the field of driving of discharge lamps for illumination and driving of discharge lamps in projectors.

Regarding the question as to whether D5 concerns discharge lamps, the board notes that the IPC class H05B41 assigned to document D5 clearly relates to operation and ignition of discharge lamps. Since the class is assigned by technical experts in the respective field, it can be considered to be reliable information about the technical field of the respective document. Moreover, the board understands that the German term "Vorschaltgerät" used in D5 corresponds to the English term "ballast", which is conventionally used for a driving circuit specifically adapted for driving discharge lamps. Furthermore, the document A1 explicitly teaches (see for instance section 2.1.1.2) that the DALI interface is suitable for controlling ballasts, so that, contrary to what was argued by the appellant, the reference in D5 to the "DALI-bus" does not suggest that this document only relates to incandescent lamps. Finally, the board sees no reason why it should be assumed that the lamp presented by the appellant during the oral proceedings is a lamp according D5. Thus, the board regards document D5 as pertinent.

2.2 The appellant further contests the finding of the examining division that the subject-matter of claims 1 and 9 of the main request lacks an inventive step over the disclosure of document D5 in combination with



common general knowledge of the person skilled in the art.

In more detail, the appellant argues that the last feature of claim 1 is neither disclosed in D5 nor rendered obvious in combination with the common general knowledge. This last feature reads as follows:

"to suppress the applying of the start-up pulse that is performed by the start-up circuit (750) when the accumulated number of start-up pulses or start-up operations of the lamp driving circuit recorded in the non-volatile memory exceeds the reference threshold value."

According to the appellant, the technical effect following from this difference is to avoid insulation breakdown and to increase safety as well as providing a prolonged lifetime of the device.

The board does not share this view. On the one hand, it is not apparent how the subject-matter of claim 1 could have an effect on insulation properties. On the other hand, the reference threshold value is not defined at all in claim 1, so that no effect on the lifetime can be inferred from the suppression of the start-up pulses after an arbitrary number of start-up pulses has passed.

To the contrary, the board shares the view of the examining division, i.e. that the person skilled in the art, knowing about the history of start-up pulses from the disclosure of document D5 (page 4, line 16) and its effect on the remaining lifetime of the start-up circuit (page 5, lines 5 to 7), would consider blocking

further activation of a possibly defective start-up circuit in order to avoid further damage.

Consequently, the board agrees with the finding of the examining division under point 1.4 of the contested decision that the person skilled in the art would apply the teaching of document D5 in the context of safety issues or expensive equipment and thus arrive at the subject-matter of claim 1 in an obvious manner.

- 2.3 Moreover, document D4 relates to a projector including a discharge lamp, see page 5, lines 5 to 8. D4 discloses further on page 6, lines 7 to 14, that "If the ignitor voltage supplied by the ignitor circuitry is less than the specified voltage and the ignitor failure indicator is activated in step 124, then the ignitor circuitry is shut off to prevent further ignition tries". Thus, suppression of a start-up pulse of a defective start-up circuit is known from the disclosure of document D4 in the context of video projectors.

Therefore, even if it were assumed that the person skilled in the art would not arrive at the subject-matter of claim 1 based on the disclosure of document D5 in combination with common general knowledge of the person skilled in the art, a combination of the disclosures of documents D5 and D4 renders the subject-matter of claim 1 obvious.

The same applies *mutatis mutandis* to independent method claim 9.

- 2.4 Consequently, the board has arrived at the conclusion that the subject-matter of claims 1 and 9 of the main

request does not involve an inventive step in the sense of Article 56 EPC.

3. Auxiliary request II (Article 56 EPC)

The additional features of claims 1 and 7 according to auxiliary request II are standard features of a video projector which are considered to form part of the common general knowledge of the person skilled in the art. Consequently, auxiliary request II is merely directed to the application of the subject-matter of the main request to a standard video projector, which is a trivial measure for a person skilled in the art, in particular in the light of document D4.

Thus, the reasoning set out above for the main request applies *mutatis mutandis* to auxiliary request II.

4. Auxiliary requests I and III (Article 56 EPC)

A driving control unit including a central processing unit adapted to control the (unspecified) operation of the ballast unit, as added to claim 1 of auxiliary requests I and III, is already known from the disclosure of document D5, page 7, lines 25 and 26, "Das elektronische Vorschaltgerät 10 umfasst einen Mikroprozessor 16". The subject-matter of auxiliary requests I and III therefore differs from the prior art in the same features as the subject-matter of the main request and auxiliary request II, respectively.

Thus, the reasoning set out above for the main request and auxiliary request II applies *mutatis mutandis* to auxiliary requests I and III, respectively.

5. Auxiliary requests IV to VII (Article 56 EPC)

Auxiliary requests IV to VII correspond to the main request and auxiliary requests I to III, respectively, wherein the alternative "start-up operations" has been deleted.

As indicated above under point 2.2, the board considers a history of start-up pulses to be disclosed in document D5. Thus, the deletion of the trivial alternative "start-up operations" in the independent claims of auxiliary requests IV to VII has no effect on the board's assessment of these claims.

Therefore, the reasoning provided for the main request and auxiliary requests I to III applies *mutatis mutandis* to auxiliary requests IV to VII, respectively.

Consequently, the board has arrived at the conclusion, that also the subject-matter of the independent claims of the auxiliary requests IV to VII does not involve an inventive step in the sense of Article 56 EPC.

6. Since there is no allowable request on file, the appeal has to be dismissed.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



U. Bultmann

R. Lord

Decision electronically authenticated