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**Datasheet for the decision
of 17 March 2011**

Case Number: T 1801/07 - 3.4.03

Application Number: 97103669.4

Publication Number: 0794555

IPC: H01J 61/32

Language of the proceedings: EN

Title of invention:

Circular fluorescent lamp unit and lighting apparatus

Patentee:

Toshiba Lighting & Technology

Opponent:

OSRAM Gesellschaft mit beschränkter Haftung

Headword:

-

Relevant legal provisions:

EPC Art. 54(2)

Relevant legal provisions (EPC 1973):

EPC Art. 56

Keyword:

"Inventive step: no"

"Brochure belonging to the state of the art: yes (reasons 2.1)"

"Burden of proof (reasons 2.6)"

Decisions cited:

-

Catchword:

-



Case Number: T 1801/07 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 17 March 2011

Appellant: OSRAM Gesellschaft mit beschränkter Haftung
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Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office posted
28 August 2007 concerning maintenance of
European patent No. 0794555 in amended form.

Composition of the Board:

Chairman: G. Eliasson
Members: V. L. P. Frank
P. Mühlens
E. Wolff
T. Karamanli

Summary of Facts and Submissions

- I. This is an appeal by the opponent against the interlocutory decision of the opposition division to maintain the patent EP 0 794 555 as amended during the opposition proceedings (Article 102(3) EPC 1973).

The patent was opposed in its totality. Grounds of opposition were lack of novelty and inventive step, insufficiency of disclosure and unallowable extension of the subject-matter of the patent (Articles 100(a), (b) and (c), 54 and 56 EPC 1973).

On appeal the objections of lack of inventive step, insufficiency of disclosure and unallowable extension of the subject-matter of the patent were pursued.

- II. At oral proceedings before the board, the appellant opponent requested that the decision under appeal be set aside and that the patent be revoked.

The respondent proprietor requested that the appeal be dismissed.

- III. The independent patent claim 1 maintained by the opposition division and defended by the respondent proprietor on appeal reads as follows:

"1. A circular fluorescent lamp unit (2a, 2b, 2c, 31a, 31b, 31c) comprising:
a circular glass bulb (3, 32, 42, 52) having two end portions, a circular outer diameter (D1) set within a range of about 210 to 390 mm, a tube outer diameter (d) set within a range of about 15

to 18 mm, and an inner surface onto which a fluorescent substance is applied;
a base (4, 41, 51) arranged between the two end portions of the glass bulb;
a discharge medium including a rare gas and mercury sealed up in the circular glass bulb (3, 32, 42, 52); and
a pair of electrode means fitted in both end portions of the circular glass bulb so as to be sealed therein;
a discharge occurring (*sic*) in the circular glass bulb (3, 32, 42, 52) by providing the pair of electrodes means with a lamp power so that the circular glass bulb lights, and said lamp power having a high frequency which is not less than 10 kHz,
characterized in that
said circular glass (*sic*) bulb is a single circular glass (*sic*) bulb (3, 32, 42, 52) and said base is arranged between its end portions only,
the circular glass bulb (3, 32, 42, 52) having a wall thickness in the range of 0.8 mm to 1.2 mm, and
said circular outer diameter (D1) is set within a range of
(i) 365 to 390 mm for said lamp power within a range of 28 to 50 W, or
(ii) 285 to 310 mm for said lamp power within a range of 20 to 40 W."

IV. The following documents are cited in this decision:

A5= Catalogue of NEC "THE LAMP", dated LA-93

A6= Catalogue of TOSHIBA, dated '95 > '96

A7= Catalogue of TOSHIBA, dated '92-9

A9= Catalogue of HITACHI, dated '95-05

Alla: a subset of the pages of A21 relevant to circular fluorescent lamps.

A21: copy of the complete information material entitled "Produktunterlagen zur Arbeitstagung für Leuchtenhersteller" distributed during the meeting arranged by OSRAM from 15-18 January 1996 at the OSRAM-Haus in München.

B10 = GB 2 137 017 A

V. In the decision under appeal, the opposition division found on inventive step that:

- The closest prior art was represented by the circular fluorescent lamps disclosed in A21/Alla. The claimed lamp differed from this disclosure at least in that the circular glass bulb had a wall thickness in the range from 0.8 to 1.2 mm.
- The problem solved by this feature was regarded as providing a suitable wall thickness for a circular lamp. However, the public availability of circular fluorescent lamps with a tube outer diameter of about 15 to 18 mm (ie T5 lamps) and with a wall thickness of 0.9 to 1.05 mm before the oldest priority date of the patent had not been proven. For

these reason, the circular fluorescent lamp unit of claim 1 was found to involve an inventive step. A discussion of the further distinguishing features was therefore not necessary.

VI. The appellant opponent argued on inventive step essentially as follows:

- The opposition division had found that document A21/A11a represented the closest prior art, as it was made available to the public at the meeting held in January 1996 in Munich. This finding was based on the testimony of several witnesses heard in the course of oral proceedings before the opposition division. The claimed fluorescent lamp differed from the lamp disclosed in A21/A11a *inter alia* in the glass tube's wall thickness. However, the skilled person had to choose a wall thickness when designing the lamp and made the choice by consulting prior art, his experience and standard knowledge.
- Document B10 disclosed a bent fluorescent lamp with even stronger bending than circular lamps. The glass tube had an outer diameter of 18.2 to 18.6 mm with a wall thickness of 1.0 mm. Thus wall thicknesses in the range claimed were in common use in straight and bent fluorescent lamps.
- The glass bulb's outer diameter and the lamp power specified in the claim merely reflected the standard dimensions and power rating of the conventional fluorescent lamps available in the Japanese market. This was shown by the Japanese catalogues of conventional fluorescent lamps.

- The specification that the lamp was formed by a single circular glass bulb and that the base was arranged only between its end portions defined a standard circular fluorescent lamp in contradistinction to certain double-tube lamp types in which a single tube is bent back on itself to form two concentric circular tube sections. Without any further contrary information, the skilled person would think of nothing other than the aforementioned standard circular fluorescent lamp.

- The alleged invention implemented in circular lamps the step of reducing the tube size from T9 (ie glass tubes with an outer diameter of 29 mm) to T5 (ie glass tubes with an outer diameter of 16 mm) which in the case of straight fluorescent lamps had been taken years before the priority date. Circular lamps differed from straight lamps merely by their bent form and it was obvious for the skilled person to reduce the glass tube's outer diameter also in circular fluorescent lamps.

VII. The respondent proprietor argued on inventive step essentially as follows:

- The publication of document A21/A11a was still contested. None of the witnesses could positively confirm that A21 had been distributed in 1996. Moreover, the witnesses presented contradictory testimony to where and when A21 had been handed out to them (either at their seating or at the reception desk). As it was impossible for the respondent proprietor to positively prove non-distribution or

non-publication, the burden of proof had to lie with the appellant opponent.

- Document B10 related to lamps with non-circular geometries, a square shape with bent corners, and did not disclose a circular outer diameter falling within the ranges specified in claim 1. Moreover, all indications of tube outer diameter and wall thickness related to the straight part of the structure.

- Manufacturing circular lamps from straight lamp tubes required bending the same. Bending a tube having a circular cross section resulted in at least a very significant collapse of the walls at the bend, unless countermeasures were taken. The usual countermeasure was to apply a counter force. For bending glass tubes a gas under pressure was inserted into the glass pipe in order to achieve two effects, namely preventing collapse of the wall and compensating wrinkles. As glass tubes were softened to be bent, the overpressure basically resulted in an expansion of the tube. So for example B10, although not relating to circular shapes in general and to the specific combination of dimensions claimed in claim 1 in particular, clearly mentioned the necessity to apply pressurized gas such as a suitable inert gas to the tube in order "to prevent the softened tube collapsing at the bends".

- The patent claimed a wall thickness of the circular glass bulb, not of the straight glass tube before bending. It was not difficult to understand that the radially outer walls were significantly stretched

and thus reduced in thickness, notwithstanding the application of pressurized gas and the pulling force used at the ends of the originally straight tube. Thus, the claimed range was not the result of using the allegedly present "standard wall thicknesses" of straight tubes and to simply bend the same to end up at the claimed combination.

- Even after filing more than 20 documents in the opposition and another 17 documents in the appeal proceedings, a significant number of steps was required for the skilled person to arrive at the combination of features claimed in claim 1, in particular the combination of circular outer diameters in combination with lamp powers, the tubes' outer diameters and their wall thicknesses.
- The technical problem underlying the present patent was thus to find a compromise of a significant number of different requirements when designing a circular fluorescent lamp.

Reasons for the Decision

1. The appeal is admissible.
2. *Documents A11a and A21*
 - 2.1 Document A21 is a copy of the original brochure allegedly distributed to the participants of the meeting "Arbeitstagung für Leuchtenhersteller" in January 1996. All the witnesses heard by the opposition division confirmed that these meetings were held

annually by OSRAM, were attended by about 50 participants and that no secrecy agreement was involved. The meeting was held twice on two consecutive days (ie 15-16 and 17-18 January) in which substantially the same subject-matter was presented to different audiences, once in German and once in English. At these meetings the new lamps developed so far were presented so that manufacturers of lighting fixtures could adapt their products to the new lamps to be introduced in the market. Two witnesses (Mr D. and Mr W.) declared that the brochure was placed on the participant's chair in the meeting room while the two other witnesses (Mr H. and Mr M.) stated that it had been distributed at the meeting's reception desk. Mr M. and Mr D. confirmed that the brochure was a bound volume ("Tagungsband") and contained copies of the overhead transparencies presented at the meeting, although it could not be ruled out that more specific information could have been presented orally at each workshop (minutes of the witnesses' testimony; page 4, 2nd paragraph; page 13, last paragraph; page 16, 3rd and 5th paragraph; page 23, last paragraph; page 32, 1st paragraph).

The front page of A21 identifies the meeting's audience: the manufacturers of lighting fixtures ("Arbeitstagung für Leuchtenhersteller"), the meeting's dates (15./16.01.1996 and 17./18.01.1996) and the meeting's location ("OSRAM-HAUS, München"). The board considers therefore that the questions of "when", "what" and "under which circumstances" can be answered satisfactorily based on the witnesses' testimony and document A21. The board is aware that these questions are usually posed in the context of public prior use (although in those cases they take often the form of

the four W questions, ie "when", "where", "what" and "by whom"). They are however also relevant when assessing written state of the art, although in the majority of those cases these questions do not need to be explicitly posed, since they can be answered in a self evident manner from the document itself (a published patent or patent application or an article from a technical journal or encyclopaedia).

Document A11a is a copy of the front page and the pages corresponding to the T5 FH (Fluorescent High Efficiency), T5 FQ (Fluorescent Quintron) and T5 FC (Fluorescent Circline) lamps of document A21. In the following discussion on inventive step document A11a will be used for ease of reference.

- 2.2 The respondent proprietor objected that none of the witnesses could positively confirm that document A21 had been distributed in 1996. He pointed out, in particular, that the witnesses contradicted each other with reference to where and when the brochure had been made available to them (ie at the reception desk or on the seats of the meeting's room).
- 2.3 This, however, is not the issue. It would be very unusual that a witness could recall after more than ten years the exact circumstances of an event, unless something special made it remarkable. That some of the witnesses recalled obtaining the brochure at the reception desk while others remembered finding them on their seats is something that can reasonably be expected. It does not shed doubts on that they received the brochure, since both ways of distribution are usual at conferences and meetings.

2.4 The witnesses also declared that the meetings were structured the same way each year and that a brochure that contained copies of the material presented at the different workshop sessions was always distributed to the participants without any agreement, implicit or explicit, of secrecy. According to the minutes of the witnesses' testimony, Mr W. presented at the oral proceedings before the opposition division an original of document A21 on which the dates, audience and location of the meeting were indicated (minutes of the witnesses' testimony; page 31, 3rd paragraph). According to the minutes of the oral proceedings before the opposition division, the opponent brought forward a copy of the original brochure the next day of the hearing. This copy was compared with the original by the opposition division and introduced into the proceedings under Article 114(2) EPC as document A21 (minutes of the oral proceedings; page 4, 5th paragraph and point 7.2, "Facts and submissions" of the contested decision). These facts were not contested in the appeal proceedings.

2.5 The appellant opponent thus has a credible case that copies of document A21 were distributed to the participants of the meeting in January 1996. The burden of proof therefore shifts to the respondent proprietor who has to show counterevidence for eg that the brochure was only available at a later date than the date shown on the document, that the content of document A21 was not that of the brochure distributed at the meeting or that a secrecy agreement existed.

2.6 The present circumstances therefore differ from an allegation of prior use in which all the evidence is in possession of the opponent and in which the proprietor is restricted to point out loopholes or contradictions in the chain of evidence. The board also does not share the view of the respondent proprietor that it was impossible to him to prove non-distribution or non-publication and that therefore the burden of proof lay wholly on the appellant's side. The respondent had the possibility of disproving public availability of the document in question, eg by contacting further participants of the meeting who might testify that the documents handed out had different content, were given out much later, etc.

2.7 From the foregoing considerations, the board concludes that the public availability of document A21/A11a has been sufficiently proven and agrees with the finding of the opposition division that document A21/A11a was made available to the public on the first day of the meeting, ie 15 January 1996. Since this date lies before the first priority date claimed by the patent (ie 5 March 1996), document A21/A11a is part of the state of the art under Article 54(2) EPC 1973.

3. *Claim 1 - Inventive step (Article 56 EPC 1973)*

3.1 It is undisputed that document A11a discloses the preamble of claim 1 (pages 6 and 7), namely in the words of the claim:

A circular fluorescent lamp unit comprising:
a circular glass bulb having two end portions, a
circular outer diameter set within a range of

about 210 to 390 mm (a diameter of 320 mm is given in the first line of the table on page 6), a tube outer diameter set within a range of about 15 to 18 mm (a diameter of 16.0 mm, line 6 of this table), and an inner surface onto which a fluorescent substance is applied;

a base arranged between the two end portions of the glass bulb;

a discharge medium including a rare gas and mercury sealed up in the circular glass bulb;

a pair of electrode means fitted in both end portions of the circular glass bulb so as to be sealed therein;

a discharge occurring in the circular glass bulb by providing the pair of electrodes means with a lamp power so that the circular glass bulb lights, and said lamp power having a high frequency which is not less than 10 kHz (the last line of the table on page 6 specifies an operational frequency > 20 kHz).

3.2 The lamp of claim 1 thus differs from the lamp disclosed in Alla in that:

(a) the circular glass bulb is a single circular glass bulb and the base is arranged between its end portions only,

(b) the circular glass bulb has a wall thickness in the range of 0.8 mm to 1.2 mm, and

(c) the circular outer diameter is set within a range of

(c1) 365 to 390 mm for a lamp power within a range of 28 to 50 W, or

(c2) 285 to 310 mm for a lamp power within a range of 20 to 40 W.

3.3 The appellant opponent argued that the distinguishing features did not address a single technical problem, but concerned two different, unrelated problems. The features (a) and (c) concerned the issue of replacing the conventional circular fluorescent lamps of the Japanese market, while feature (b) provided a suitable wall thickness range for the lamp's glass bulb. As both problems were unrelated, they could be addressed independently from each other.

3.4 The respondent proprietor objected that the problem of replacing conventional lamps in the Japanese market identified by the appellant opponent in relation to features (a) and (c) was not a technical problem. The board, however, considers that the issue of the lamp's compatibility with existing lightning fixtures can be seen as a technical problem which, in particular, is solved by technical means, namely the lamp's construction, its diameter and its rated power.

3.4.1 The Japanese lamp catalogues A5 to A7 and A9 disclose circular fluorescent lamps of the types named FCL32EX-D and FCL40EX-D having, respectively, a diameter of 299 mm for a rated power of 30 W and a diameter of 373 mm for a rated power of 38 W (A5, page 3, last two lines of all tables; A6, page 2, table; A7, page 2, table; A9, page 3, table). These conventional lamps are formed by a single circular glass bulb in which the base is arranged between its end portions only (A5, figures on page 3; A6 and A7, page 2, figures; A9, figures, pages 3 and 4).

- 3.4.2 The lamp FCL32EX-D possesses therefore features (a) and (c1) while lamp FCL40EX-D possesses features (a) and (c2), together with the features of the preamble of claim 1 excepting the circular glass tube's outer diameter which is 29 mm instead of lying within a range of about 15 to 18 mm. This last feature reflects the fact that the conventional fluorescent lamps are of the T9 type instead of the claimed T5 type lamps.
- 3.4.3 The board considers that the skilled person would adapt the shape, dimensions and power rating of the new kind of fluorescent lamp disclosed in Alla to that of the conventional fluorescent lamps of the Japanese market without exercising any inventive activity, since document Alla specifically mentions the higher efficiency of the T5 lamps over the conventional T9 lamps ("Runde Lampen mit 16 mm \varnothing ermöglichen einen deutlich höheren Leuchtenbetriebswirkungsgrad als T9 Ringlampen") and the possibility of providing these lamps in the Japanese market (page 7).
- 3.4.4 This adaptation results in a fluorescent lamp having the features of the preamble of claim 1 together with features (a) and (c) of claim 1 without recourse to an inventive step.
- 3.5 With regard to feature (b), the tube's wall thickness, the respondent proprietor argued that it was not obvious to obtain a circular glass bulb with a wall thickness in the given range due to the formation of wrinkles in the tube and the expansion/compression of the tube's walls during the bending process. To avoid the wrinkles the end portions of the tube had to be

pulled apart and/or a sufficiently high gas pressure had to be introduced into the glass tube during the bending process. However, both techniques expanded the tube and reduced its wall thickness. Moreover, the bending of the tube increased the thickness of the inner side of the wall while reducing that of the outer side. There was thus no teaching in the prior art pointing to a final wall thickness of 0.8 to 1.2 mm for a circular fluorescent lamp.

3.5.1 The board is not persuaded by this argument. Document B10 discloses a fluorescent lamp formed by a glass tube having straight and curved portions, essentially a square shape with bent corners, folded such that its end portions are bent to point to the inside of the square. The glass tube having a preferred diameter of 18.2 to 18.6 mm, preferably 18.3 mm, and about 1.0 mm wall thickness (page 3, lines 20 to 23). The side of the square is about 200 mm long (page 3, lines 25 to 26), implying a smaller radius of curvature (< 100 mm) than that of the claimed circular glass bulbs (> 140 mm). In particular, the end portions of the tube of B10 are bent into a U-shape with a radius of curvature of about 40 mm (Figure 1). Despite such small radius of curvature, wrinkles or variations in the wall's thickness between the straight and curved portions are not reported in B10 and a single value of about 1.0 mm is provided for the wall thickness.

3.5.2 The granted patent does not disclose any particular effect achieved by the selected wall's thickness range. It states, in particular, that "the wall thickness of the bulb 3 is preferable to be approximately 0.8 to 1.2 mm, but not limited to these values" (page 4,

lines 30 to 31). The patent proprietor amended this expression during the opposition proceedings to read "the wall thickness of the bulb 3 is to be 0.8 to 1.2 mm". Although this amendment restricts the range to its explicitly disclosed end points, it does not alter the relevance of the thickness range as the patent does not disclose that a specific technical effect is related to it. In particular, the avoidance of wrinkles or variations in the wall's thickness during the bending of the tube are not addressed in the contested patent.

3.5.3 That the problem alleged by the respondent proprietor, namely the avoidance of wrinkles or variations in the wall's thickness during bending, is solved by a wall thickness in the range of 0.8 mm to 1.2 mm is therefore neither derivable from the prior art nor from the contested patent.

3.5.4 The board therefore concludes from document B10 that the skilled person had no difficulties in bending glass tubes into shapes having small radii of curvature. As the skilled person has to choose a suitable wall thickness, he would choose a thickness range so that on one hand the tube's wall is sufficiently thick to resist the manufacturing and handling steps and on the other hand is sufficiently thin to reduce the lamp's weight and to save material cost. Based on document B10 the board considers that an obvious starting point in the search for an adequate wall thickness is about 1 mm.

3.5.5 The combination of the teachings of documents A11a and B10 leads thus to a fluorescent lamp having the features of the preamble of claim 1 together with a

glass bulb with a wall thickness of about 1.0 mm in an obvious manner.

3.6 Summarizing, the features of the preamble of claim 1 together with features (a) and (c) on one hand and feature (b) on the other address two different partial problems that do not combine to create a synergistic effect. The appellant opponent has convincingly shown that the solution to each one of these two unrelated problems is obvious to the skilled person.

3.7 The board judges, for these reasons, that the circular fluorescent lamp of claim 1 does not involve an inventive step.

The patent must therefore be revoked (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.

Registrar

Chair

S. Sánchez Chiquero

G. Eliasson