Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GARY R. ALLEN, ROCCO T. GIORDANO, GARY O. JACOBS, KENNETH S. KING and TIMOTHY P. DEVER

Appeal No. 1999-1925
Application No. 08/649,887

ON BRIEF

Before LALL, GROSS, and LEVY, Administrative Patent Judges.
GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 9, 11 through 18, and 20, which are all of the claims pending in this application.

Appellants' invention relates to an arc discharge lamp with various dimensions balanced for long life and a brightness level exceeding 40,000 lumens/cm^2 of arc gap unit area. Specifically, the lamp includes an elongated arc tube with an arc gap less than 4 mm, a convection stability value less than 750 mg^2/cm^3, a

convected power less than 200 mg^2/cm^2, and a wall loading factor of no greater than 25 $watts/cm^2$. Claim 1 is illustrative of the claimed invention, and it reads as follows:

1. A low wattage arc discharge light source exhibiting high brightness properties comprising:

an arc tube having an arc chamber formed therein;

said arc tube having an elongated portion;

a fill disposed in said arc chamber and energizable to a discharge condition, said fill including a dose of mercury;

at least two electrodes extending from generally opposite vertical directions into a region of said arc chamber, said region being surrounded by said elongated portion of said arc tube, said electrodes being separated by an arc gap of less than 4 mm and wherein, upon energization of said light source, an operating voltage is developed across said at least two electrodes resulting in an arc;

said arc chamber having a size dimension selected so that, in association with a selected fill density, results in a convection stability value less than 750 milligrams squared per cubic centimeter for improving thermal uniformity, and a convected power of less than 200 milligrams squared per squared centimeter;

said arc tube has arc tube dimension values including a wall thickness that are balanced to achieve a wall loading

factor of no greater than 25 watts per centimeter squared of arc tube surface area; and,

said light source achieves a brightness level in excess of 40,000 lumens per centimeter squared of arc gap unit area.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

de Vrijer[1]	4,594,529	Jun. 10, 1986
Mathews et al. (Mathews)	5,239,230	Aug. 24, 1993
Parham et al. (Parham)	5,552,671	Sep. 03, 1996
	(filed Feb. 14, 1995)	

Claims 1 through 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mathews in view of de Vrijer.

Claims 8, 9, 11 through 18, and 20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mathews in view of de Vrijer and Parham.

Reference is made to the Examiner's Answer (Paper No. 13, mailed March 4, 1999) for the examiner's complete reasoning in support of the rejections, and to appellants' Brief (Paper

[1] Although de Vrijer was not included in the examiner's statement of the rejection, the examiner relied upon the reference in the explanation of the rejection, and appellants refer to de Vrijer as if it were part of the rejections. Accordingly, we will treat the rejections as including de Vrijer.

No. 12, filed December 28, 1998) for appellants' arguments thereagainst.

OPINION

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellants and the examiner. As a consequence of our review, we will reverse the obviousness rejection of claims 1 through 8 and affirm the obviousness rejection of claims 9, 11 through 18,
and 20.

Regarding the rejection of claims 1 through 7, appellants argue (Brief, pages 3-4) that Mathews is directed to a horizontally aligned lamp rather than a vertically aligned lamp as recited in the claims. Specifically, appellants contend (Brief, page 4) that Mathews states that the available space for the lamp is 2 inches, or about 50 mm, in height and that the length of Mathews' lamp is disclosed as 40-100 mm, which would not fit vertically in the available space when the length is 100 mm. However, it does fit vertically when the length is 40-50 mm. Further, Mathews discloses that one goal is to fit in a 2 inch space, but does not indicate that they

achieved that goal. More importantly, though, appellants discuss Mathews in the specification and at least imply that Mathews' arc lamp is operated in a vertical orientation. (See specification, page 2, lines 17-25, and page 6, lines 15-30.) Therefore, we find that Mathews is directed to a vertically aligned arc lamp.

Appellants further argue that de Vrijer discloses a horizontally aligned lamp tube which is elongated to improve the headlight beam when light is reflected from a conventional reflector, whereas Mathews is for use with an optical fiber and

therefore does not have the same problems associated with the reflector. Thus, appellants assert that there is no reason to apply the shape of de Vrijer's arc lamp with Mathews' lamp.

We agree with appellants that de Vrijer does not suggest a reason to use an elongated arc tube in the vertically aligned lamp of Mathews, as the problems solved by de Vrijer

do not exist with the optical fiber of Mathews. However, Mathews states (column 7, lines 27-31) that other configurations other than an ellipsoidal configuration are within the scope of the invention. Further, Mathews states (column 2, lines 29-36) that Davenport discloses that the light source can have a cylindrical, ellipsoidal, or tubular shape. Thus, we find that Mathews alone suggests that an elongated tube may be substituted for the ellipsoidal one.

Appellants contend (Brief, page 6) that Mathews disclose that ellipsoidal is the preferred shape for their arc tube, and, therefore, teaches away from an elongate shape. However, a preferred embodiment does not constitute a teaching away. In fact, as explained above, Mathews discloses that other shapes such as cylindrical or tubular may be used instead of ellipsoidal.

Lastly, appellants assert (Brief, pages 4-5) that Mathews fails to disclose a convected power of less than 200 mg^2/cm^2 or how such a convected power could be achieved. The examiner contends (Answer, pages 4-5) that Mathews discloses a

convected power of 240 mg^2/cm^2 and that it would have been obvious to achieve 200 mg^2/cm^2 because "discovering an optimum value of a result effective variable involves only routine skill in the art." However, the examiner uses appellants' achievement of a brightness level of over 60,000 lumens per centimeter for a low convected power as an indication that convected power is a result effective variable. As it is well settled that appellants' disclosure of the invention may not be used to establish a *prima facie* case of obviousness, and the examiner has provided no evidence that convected power was known in the art to be a result effective variable, optimization of such would not have been obvious. Accordingly, the examiner has failed to establish a *prima facie* case of obviousness, and we cannot sustain the rejection of claims 1 through 7.

The examiner rejects claim 8 over Mathews in view of de Vrijer and Parham. However, as claim 8 depends from claim 1,

and Parham fails to cure the deficiency of the primary combination of Mathews and de Vrijer, we cannot sustain the rejection of claim 8.

Claims 9, 11 through 18, and 20 do not include the limitation of convected power found lacking from the combination of Mathews and de Vrijer. Instead, claims 9, 11 through 18, and 20 recite a multi-layer coating on the exterior surface of the arc tube. The examiner combines Parham with Mathews and de Vrijer to meet the additional limitation.

Appellants argue (Brief, page 8) that Parham teaches a coating to eliminate problems due to the convection hot spot of a horizontally aligned lamp, which "would have little bearing on a vertically-aligned lamp." Therefore, appellants conclude that there is no motivation to combine Parham with Mathews.

However, Parham discloses (column 1, lines 7-16) that metal halide lamps emit UV radiation which is harmful to human eyes and skin and that a need exists to block such radiation. Parham further discloses (column 1, lines 17-27) that conventionally a glass outer jacket is used to eliminate the

emission of UV radiation, but that automotive lamps encounter size constraints which prohibit the use of outer jackets. Instead of an outer

jacket, doped quartz may be used. (See column 1, lines 28-29.) However, Parham suggests (column 3, lines 58-63) that dopants may interfere with light transmission whereas in automobile uses it is necessary to achieve high light output. Parham solves the
above problems by using a multi-layer coating where one layer absorbs deep UV and another layer reflects near UV causing further vaporization of the liquid metal halide dose within the arc tube, thereby enhancing lamp performance. (See column 3, lines 24-52.) Thus, Parham suggests the use of a multi-layer coating regardless of whether the tube is horizontally or vertically oriented, or, rather, it would have been obvious to use the multi-layer coating of Parham even in a vertically aligned arc tube to eliminate the emission of UV light while causing further vaporization of the liquid metal halide.

Appellants further contend (Brief, page 9) that Mathews fails to disclose or suggest a convection stability value less than 750 mg^2/cm^3. Appellants assert that Mathews merely discloses a value less than 1400 mg^2/cm^3. However, Table 1 of Mathews shows one embodiment of the invention in which Gr/c (i.e., the convection stability) is equal to 780 mg^2/cm^3, which is close to

though still above 750 mg^2/cm^3. Nonetheless, Mathews discloses (column 8, lines 9-12) that the total fill density may range between 52 and 72 mg/cm^3 to satisfy both the operating voltage and convective stability constraints simultaneously. Further, $Gr/c = B^2 \times R^3 \times (\text{total density})^2$. Filling in the lower limit of 52 for the total density and a value of 3 mm for R (from Table 2), the
lower limit for Gr/c where the two constraints are satisfied is 720 mg^2/cm^3, which is less than 750 mg^2/cm^3. In other words, Mathews discloses a range for the convection stability which

overlaps the claimed range and, therefore, renders the claimed range obvious. See *In re Malagari*, 499 F.2d 1297, 182 USPQ 549 (CCPA 1974).

Lastly, appellants argue (Brief, page 10) that de Vrijer provides no motivation for using an elongated arc tube. We have already determined above that Mathews suggests such shape with de Vrijer merely being cumulative. Accordingly, as we are unpersuaded of any error in the examiner's rejection of claims 9, 11 through 18, and 20, we will sustain the rejection thereof.

CONCLUSION

The decision of the examiner rejecting claims 1 through 9, 11 through 18, and 20 under 35 U.S.C. § 103 is reversed as to claims 1 through 8 and affirmed as to claims 9, 11 through 18, and 20.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

PARSHOTAM S. LALL Administrative Patent Judge	)
ANITA PELLMAN GROSS Administrative Patent Judge	) BOARD OF PATENT) APPEALS) AND) INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)

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