

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

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Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte ROMANO G. PAPPALARDO

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Appeal No. 96-2138  
Application 07/967,607<sup>1</sup>

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ON BRIEF

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Before HAIRSTON, KRASS, and BARRETT, Administrative Patent Judges.  
BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1-20, all of the claims pending in the application. We reverse.

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<sup>1</sup> Application for patent filed October 28, 1992, entitled "Fluorescent Lamp With Improved CRI And Brightness."

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The disclosed invention is directed to a fluorescent lamp having a coating comprising a blend of halophosphate phosphors and a quad-phosphor blend for economically elevating color rendering while retaining high light flux.

Claim 1 is reproduced below.

1. A fluorescent lamp comprising a glass envelope having electrodes at its ends, a mercury and inert gas filling within said envelope which produces ultraviolet radiation, a coating on the interior surface of the glass envelope comprising a blend of alkaline earth metal halophosphate phosphors and a quad-phosphor blend for converting a substantial portion of said ultraviolet radiation to visible illumination having a white color wherein the combination of phosphors result in a predetermined color point from about 2700 to about 4200 K on or near the Planckian locus, said quad-phosphor blend comprising a red color emitting phosphor component having a visible emission spectrum principally in the 590 to 630 nm wavelength range, blue color emitting phosphor component having an emission spectrum principally in the 430 to 490 nm wavelength range, and a green color emitting phosphor component having an emission spectrum principally in the 500 to 570 nm wavelength range, said quad-phosphor blend additionally includes an europium activated aluminate green emitting phosphor component wherein both the quad-blend and said blend of alkaline earth metal halophosphate phosphors substantially match the desired predetermined color point.

The examiner relies on the following references:

|                            |   |                       |
|----------------------------|---|-----------------------|
| Konings et al. (Konings)   | 5,105,122                               | April 14, 1992        |
| Northrop et al. (Northrop) | 5,122,710                               | June 16, 1992         |
| Taubner et al. (Taubner)   | 5,196,234                               | March 23, 1993        |
|                            | (effective filing date August 29, 1986) |                       |
| McSweeney                  | 5,232,626                               | August 3, 1993        |
|                            |   | (filed June 22, 1992) |

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Claims 1-9 and 12-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over McSweeney, Northrop, and Konings. The examiner finds that "McSweeney discloses a fluorescent lamp comprising: a blend of an alkaline earth halophosphate with a mixture of phosphor (col. 1, lines 61-col. 2, lines 9, see also abstract)" (Final Rejection, page 2). The examiner finds that Northrop discloses a quad-phosphor blend having red, green, and blue emission spectrums within the recited ranges and an europium activated blue/green emitting phosphor (Final Rejection, pages 2-3). The examiner concludes (Final Rejection, page 3):

Therefor, it would have been obvious to combine the teachings of coating the interior surface of fluorescent lamp with a blend of alkaline earth metal halophosphate phosphors as taught by McSweeney with the teachings of the use of a blend of quad-phosphor for fluorescent lamp as taught by Northrop, since the blending of these two phosphors will provide McSweeney's fluorescent lamp to obtain an ultraviolet energy of wide spectrum of radiated energy.

The examiner finds that Konings teaches locating the color point of the emitted radiation near the Planckian locus (Final Rejection, page 3).

Claims 10 and 11 stand rejected under 35 U.S.C. § 103 as being unpatentable over McSweeney, Northrop, Konings, and Taubner. The examiner applies Taubner as teaching that a green phosphor can be a zinc orthosilicate phosphor (Final Rejection, pages 4-5).

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The examiner's statement of the rejection is contained in the Final Rejection (Paper No. 7) and the Examiner's Answer (Paper No. 11). Appellant's position is set forth in the Brief (Paper No. 10) and the Reply Brief (Paper No. 12).

OPINION

Appellant argues "that there is no teaching, suggestion, or motivation for modifying the cited references in the manner proposed by the Examiner" (Brief, page 4). We agree.

McSweeney relates to a method for minimizing the brightness decrease which occurs in processing due to firing and milling alkaline earth metal halophosphors having an antimony content greater than about 0.70 weight percent. In one embodiment, McSweeney discloses refiring the phosphor in a furnace having an inert gas atmosphere such as nitrogen and having a separate vessel containing an unfired blend of raw materials of the same type of phosphor. Volatile components produced by the mixture of raw materials "create a mildly reducing atmosphere which reduces the presence of deleterious oxides in the refired phosphor" (col. 2, line 48, to col. 3, line 2). Typical volatile species include  $H_2O$ ,  $CO_2$ ,  $Sb_2O_4$ , and  $SbCl_3$ . In another embodiment, McSweeney theorizes that the defects which degrade phosphor brightness involve halogen vacancies and removal of these vacancies is believed to result in improved performance of the resulting refired phosphor (col. 3, lines 28-31). Additional volatile components are added which have a high halogen content or activity, such as  $NH_4Cl$ ,  $CaF_2$ ,  $CaCl_2$ , and mixtures thereof.

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The examiner's finding that McSweeney discloses "a blend of an alkaline earth halophosphate with a mixture of phosphor" (Final Rejection, page 2) is not clear. If the examiner intends the "mixture of phosphors" to refer to phosphors other than the halophosphate phosphors, as appears evident from the reference to McSweeney, column 1, line 61, to column 2, line 9, the examiner's finding is in error. The impression we get from the examiner's rejections is that the examiner is interpreting the sentence "[i]n accordance with other preferred embodiments, the blend [of halophosphors] may include  $\text{NH}_4\text{Cl}$ ,  $\text{CaF}_2$ ,  $\text{CaCl}_2$  and mixtures thereof" (col. 2, lines 6-8), as suggesting a blend of halophosphors with other phosphors. However, this is incorrect since the halogen-containing constituents  $\text{NH}_4\text{Cl}$ ,  $\text{CaF}_2$ ,  $\text{CaCl}_2$  are not phosphors. If the examiner intends the "mixture of phosphor" to refer to the mixture of halophosphate phosphors, the examiner's finding is correct. However, in such case there is no motivation in McSweeney or Northrop for adding a quad-phosphor blend to an alkaline earth halophosphate phosphor blend. Since McSweeney is interested in filling halogen vacancies there is no motivation for substituting the quad-phosphor blend of Northrop for the halogen-containing constituents. The examiner states that "blending of these two phosphors will provide McSweeney's fluorescent lamp to obtain an ultraviolet energy of wide spectrum

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of radiated energy" (Examiner's Answer, page 3). However, we agree with appellant that the examiner provides no factual support for this statement. Motivation for a modification may come from what is known to the person of ordinary skill or from a specific teaching in the reference. See In re Oetiker, 977 F.2d 1443, 1447-48, 24 USPQ2d 1443, 1446-47 (Fed. Cir. 1992) (Nies, C.J., concurring). However, there must be some evidence in the record that the examiner can point to as motivation, not merely any made-up reason. Because the examiner provides no convincing reasons for adding a quad-phosphor blend to the alkaline earth metal halophosphor blend in McSweeney, we conclude that the examiner has failed to set forth a prima facie case of obviousness with respect to independent claim 1.

It is noted that appellant's admitted prior art of a first base layer of a halophosphate phosphor blend and a second layer or skin coat of a tri-phosphor blend (specification, page 1) is a closer reference than McSweeney because it has two blends. However, there still needs to be some reason for substituting a quad-phosphor blend in combination with the halophosphor blend.

Appellant further argues that the resulting proposed combination does not meet all of the limitations recited in independent claim 1, specifically, "[t]he quad-blend of Northrop et al contains europium activated strontium borophosphate and not

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the particular europium activated aluminate green emitting phosphor component recited in claim 1" (Brief, page 5).

We agree. The examiner apparently considers the europium activated blue/green europium component in Northrop to be the "europium activated aluminate green emitting phosphor component." While we agree that blue/green encompasses green, the examiner fails to address the material limitation. Northrop discloses the fourth phosphor to be europium activated strontium borophosphate, not europium activated aluminate, as claimed. Every limitation must be considered in addressing obviousness. In re Wilder, 429 F.2d 447, 450, 166 USPQ 545, 548 (CCPA 1970) ("every limitation positively recited in a claim must be given effect in order to determine what subject matter that claim defines"). Accordingly, for this additional reason we conclude that the examiner has failed to establish a prima facie case of obviousness with respect to independent claim 1.

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For the reasons stated above, we reverse the rejection of claim 1. Because dependent claims 2-20 depend directly or indirectly from claim 1 and incorporate all of the limitations thereof, the rejections of claims 2-20 are also reversed.

REVERSED

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|-----------------------------|---|-----------------|
| KENNETH W. HAIRSTON         | ) |                 |
| Administrative Patent Judge | ) |                 |
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|                             | ) | BOARD OF PATENT |
| ERROL A. KRASS              | ) | APPEALS         |
| Administrative Patent Judge | ) | AND             |
|                             | ) | INTERFERENCES   |
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| LEE E. BARRETT              | ) |                 |
| Administrative Patent Judge | ) |                 |

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