

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte RICHARD C. MARLOR and PAUL W. SALVI

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Appeal No. 1998-0094  
Application Serial No. 08/393,617<sup>1</sup>

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ON BRIEF

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Before MARTIN, BARRETT, and BARRY, Administrative Patent Judges.  
MARTIN, Administrative Patent Judge.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-4, all of the pending claims, under 35 U.S.C. § 103. We affirm.

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<sup>1</sup> Application for patent filed February 23, 1995.

**A. The invention**

The invention relates to solder glass compositions for forming hermetic metal-to-glass seals at operating temperatures above 400°C. Appellants' Figure 1, which is identical to the sole figure in the principal reference, Snell et al., U.S. Patent No. 4,493,944, shows one end of a prior art electrical device 10, such as a tungsten halogen lamp, including: (a) a body 11 formed of fused silica or quartz or some other high silica content glass; and (b) an electrically conductive member 12 having a proximal portion 14, an intermediate thin foil portion 16 (e.g., molybdenum) for forming a hermetic seal with the body 11, and a distal portion 18, which extends out of body 11 (Spec. at 3, lines 8-20). As noted in appellants' specification (at 3, lines 26-27) and in Snell (col. 2, lines 32-34), in order to prevent oxidation of the foil 16 at elevated temperatures a solder glass 22 is used to fill the capillary passage 20 between the distal portion 18 and the body 11. These prior art solder glasses, including Snell's, have melting points of about 350°C (Spec. at 2, lines 2-4) and thus fail to provide a satisfactory seal for higher wattage lamps having higher operating seal temperatures, i.e., above 400°C (Spec. at 2, lines 6-8).

Appellants' solder glass, which comprises by weight about 60 to 67%  $\text{Sb}_2\text{O}_3$  (antimony oxide), about 27 to 32%  $\text{B}_2\text{O}_3$  (boron oxide), and from greater than 0 to 10% ZnO (zinc oxide), has a melting point ranging from 380°C to 466°C, depending on the amount of ZnO, as shown in the graph of Figure 2. Furthermore, appellants' solder glass does not attack molybdenum (Spec. at 2, lines 18-19), as is the case with the prior art lead borate solder glass, which therefore must be used with platinum or platinum-clad lead wires (Spec. at 1, lines 28-32).

**B. The claims**

Claim 1 is representative of the appealed claims:

1. A solder glass comprising, by weight: about 60 to 67%  $\text{Sb}_2\text{O}_3$ ; about 27 to 32%  $\text{B}_2\text{O}_3$ ; and from greater than 0 to 10% ZnO.

**C. The references and ground of rejection**

The rejections are based on the following U.S. patents:

Weaver	4,342,943	Aug. 3, 1982
Snell et al. (Snell)	4,493,944	Jan. 15, 1985

The level of skill in the art is represented by the references. See In re Oelrich, 579 F.2d 86, 91, 198 USPQ 210, 214 (CCPA 1978) ("the PTO usually must evaluate both the scope and content of the prior art and the level of ordinary skill solely on the cold words of the literature"); In re GPAC Inc., 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995) (Board

did not err in adopting the approach that the level of skill in the art was best determined by the references of record).

Claims 1-4 stand rejected under § 103 for obviousness over Snell in view of Weaver.

Like appellants (Brief at 2), we will treat claims 2-4 as standing or falling with claim 1.

**D. Appellants' burden of persuasion on appeal**

The examiner's burden of proof in rejecting claims for obviousness and the appellants' burden of persuasion on appeal to show that the rejection is erroneous are explained as follows in In re Rouffet, 149 F.3d 1350, 1355 47 USPQ2d 1453, 1455 (Fed. Cir. 1998):

To reject claims in an application under section 103, an examiner must show an unrebutted prima facie case of obviousness. See In re Deuel, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995). In the absence of a proper prima facie case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). On appeal to the Board, an applicant can overcome a rejection by showing insufficient evidence of prima facie obviousness or by rebutting the prima facie case with evidence of secondary indicia of nonobviousness. See id.

Appellants contend that the evidence relied on by the examiner fails to establish a prima facie case of obviousness.

**E. The merits of the rejection**

Snell's solder glass comprises by weight about 65%  $\text{Sb}_2\text{O}_3$  (antimony trioxide), about 30%  $\text{B}_2\text{O}_3$  (boron trioxide), and about 5%  $\text{PbO}$  (lead oxide) (col. 2, lines 34-36). This amount of lead is said to be too small to affect the molybdenum seal (col. 2, lines 38-39). Snell notes that prior art lead borate solder glasses attack molybdenum because they have a lead content above 70% (col. 1, lines 41-45). Snell does not disclose the function of the lead oxide component.

The weight percents of  $\text{Sb}_2\text{O}_3$  and  $\text{B}_2\text{O}_3$  in Snell's solder glass fall within the ranges set for these components in appellants' claim 1. Consequently, the only difference between the claim and Snell is that Snell fails to disclose using  $\text{ZnO}$  in the claimed range of "from greater than 0 to 10%" by weight.

As evidence of the obviousness of replacing the lead oxide component in Snell with zinc oxide, the examiner cites Weaver, whose glass compositions can be used either as sealing (i.e., solder) glasses or as resistive coatings on the interior surfaces of cathode ray tubes (col. 2, lines 24-28). These glass compositions generally comprise by weight approximately 45-80%  $\text{V}_2\text{O}_5$  (vanadium oxide), 5-50%  $\text{P}_2\text{O}_5$  (phosphorous oxide), and 0-25% of a metal oxide, which is zinc oxide, lead oxide, or a mixture

of the two, with zinc oxide being preferred (col. 3, lines 1-10). These glass compositions have softening temperatures no higher than about 475°C (col. 2, lines 53-54), with the specific examples of sealing glass compositions given in Table B having softening temperatures no higher than about 450°C (col. 7, lines 14-16). While Weaver explains why zinc oxide is preferred over lead oxide in glass compositions used as resistive coatings (col. 5, lines 38-39; col. 6, lines 11-18), he does not explain the role of zinc oxide and lead oxide in glass compositions used as solder glasses or describe zinc oxide as being preferable to lead oxide in solder glasses. However, Weaver discloses that his glass compositions may additionally include other oxides, including the oxides of boron and antimony, which are the two principal components in Snell's solder glass. Specifically, Weaver states:

Other oxides which may be added to vary the glass properties or which may be present from other sources include the oxides of barium, antimony, lithium, manganese, silicon, boron, molybdenum, and mixtures thereof. As a rule, such additional components may be present in amounts from 0% up to about 15% by weight of the glass. [Col. 3, lines 31-34.]

The examiner states the case for obviousness as follows (Final Rej. at 3-4; Answer at 4-5):

Weaver shows that ZnO is equivalent to PbO for use in solder glass. See in particular the abstract, lines 7 and 8, column 2 lines 31 and 32, column 2 lines 57 and 58, and column 3 lines 9 and 10 in Weaver. Therefore, because these two components were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute ZnO for PbO in the solder glass 22 of Snell et al '944. For example, one reason for substituting ZnO for PbO might be the known safety hazards associated with lead use.

Appellants argue that

the fact zinc or lead oxides, when included, may be equally compatible in [Weaver's] phosphorous-vanadium system is no suggestion to one skilled in the art that zinc oxide can be employed as a substitute for lead oxide in an antimony-boron system, particularly when used in specific amounts to control the molten range of solder glasses for use with electrical devices.

. . . [T]he suggestion that it would have been obvious to one skilled in the art to look to Weaver if one wanted to replace the lead oxide of Snell would appear to be meaningless when one studies the instant specification and sees that the objects of the present invention are to provide a solder glass for use with electrical devices having seal temperatures in the neighborhood of 400°C, which glasses do not deleteriously effect [sic] molybdenum. [Brief at 3.]

Appellants' argument is unconvincing because the motivation for combining reference teachings is not limited to the specific motivation disclosed in appellants' application. See In re

Beattie, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) ("As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor. In re Kronig, 539 F.2d 1300, 1304, 190 USPQ 425, 427-28 (CCPA 1976); In re Lintner, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972)."). We are affirming the rejection because appellants have not addressed the examiner's argument for motivation, i.e., that one skilled in the art would have been motivated by safety considerations to replace the lead oxide component in Snell's solder glass with a less hazardous material, or the examiner's conclusion that an artisan seeking a solution to that particular problem would have understood Weaver to be suggesting that zinc oxide is a suitable alternative to lead oxide in Snell's  $Sb_2O_3$  and  $B_2O_3$  solder glass. In addressing this latter point, appellants should have explained why the examiner's conclusion of equivalence lacks prima facie support in Weaver's disclosure that his glass compositions, which use lead oxide and/or zinc oxide, are useful as solder glasses and his disclosure that these components lead oxide are compatible with  $Sb_2O_3$  and  $B_2O_3$ , the two principal components of Snell's glass.

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For the foregoing reasons, the rejection is affirmed with respect to claim 1 as well as with respect to claims 2-4, which are not separately argued.

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

**AFFIRMED**

JOHN C. MARTIN	)	
Administrative Patent Judge	)	
	)	
	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	
Administrative Patent Judge	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
LANCE LEONARD BARRY	)	
Administrative Patent Judge	)	

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