Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte RICHARD C. MARLOR and PAUL W. SALVI

Appeal No. 2003-1246
Application 08/393,617

ON BRIEF

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

MARTIN, Administrative Patent Judge.

DECISION ON APPEAL

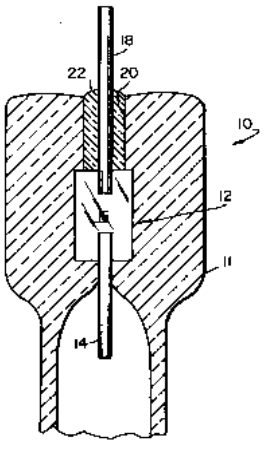
This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-4, all of the pending claims, under 35 U.S.C. § 103(a).[1] We reverse.

A. The invention

The invention relates to solder glass compositions which become molten at from about 388° C to about 466° C and can be employed with quartz-to-metal seals in electrical devices

[1] The rejection of claims 4 and 6 was withdrawn in the Answer (at 10).

(Specification at 1, ll. 6-8). Appellants' Figure 1 shows one end of a prior art electrical device 10, such as a tungsten halogen lamp.



The figure shows a body 11 formed of fused silica or quartz or some other high silica content glass, 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 body 11, and a distal portion 18, which extends out of body 11 (Specification at 3, ll. 8-20). As noted in Appellants' specification (at 3, ll. 26-27), in order to prevent oxidation of molybdenum foil 16 at elevated temperatures it has been proposed to use solder glass 22 to fill the capillary passage 20 between distal portion 18 and body 11. While lead borate glass has been suggested for this purpose, "the use of such a glass requires the use of platinum or platinum clad lead-wires since lead borate

attacks molybdenum" (Specification at 1, ll. 30-32). Appellants' specification also mentions a number of U.S. patents which disclose solder glasses that apparently do not require the use of platinum. These patents include U.S. Patent 3,588,315, which describes binary glasses such as antimony borate and ternary glass compositions of antimony borate with the addition of small amounts of molybdenum trioxide or tungsten trioxide, and 4,492,814; 4,521,641; and 4,493,944 (Snell et al.), which disclose antimony borate systems which respectively also include 5% of BiO_3, V_2O_3, and PbO and have melting points at about 350° C (Specification at 1, l. 32 to p. 2, l. 4). The specification then explains (at 2, ll. 6-8) that "[r]ecently, it has been discovered that lamps which operate at higher wattages and which have higher operating seal temperatures (i.e., above 400° C) have not been adequately protected from moly-foil oxidation, resulting in premature lamp failures."

Appellants' solution is a solder glass which comprises by weight about 60 to 67% Sb_2O_3 (antimony trioxide), about 27 to 32% B_2O_3 (boron trioxide), and from greater than 0 to 10% ZnO (zinc oxide). The melting point ranges from 380° C to 466° C, depending on the amount of ZnO, as shown in the graph in Figure 2 (Specification at 3, ll. 29-30). Because Appellants' solder

glass is not deleterious to molybdenum (Specification at 2, ll. 18-19), the use of platinum is not required.

B. The claims

Claim 1, the broader of the two independent claims, reads as follows:

> 1. A solder glass comprising, by weight: about 60 to 67% Sb_2O_3; about 27 to 32% B_2O_3; and from greater than 0 to 10% ZnO.

C. The references, rejection, and level of skill in the art

The rejection is based on the following U.S. patents:

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

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) for obviousness over Snell in view of Weaver.

The level of skill in the art, which has not been addressed by the examiner or Appellants, 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).

As Appellants' brief (at 2, para. (7)) states that the rejected claims will stand or fall together and argues the merits of only claim 1, we will treat claims 2-3 as standing or falling with claim 1.

D. The merits of the rejection

Snell's solder glass comprises by weight about 65% Sb_2O_3, 30% B_2O_3, and 5% PbO (lead oxide)(col. 2, ll. 34-36). In contrast to prior art lead borate solder glasses, which have a lead content above 70% and thus attack molybdenum (col. 1., ll. 41-45), the amount of lead in Snell's solder glass is said to be too small to adversely affect the molybdenum seal (col. 2, ll. 38-39) which is formed by molybdenum foil portion 16 (id. at ll. 24-25). The weight percentages of Sb_2O_3 and B_2O_3 in Snell's solder glass fall within the ranges set for these components in Appellants' claim 1. However, Snell does not indicate that the solder glass can contain any ZnO, as required by claim 1. For this teaching, the examiner cites Weaver.

Weaver's glass compositions, which can be used either as sealing (i.e., solder) glasses or as resistive, arc-preventive coatings on the interior surfaces of cathode ray tubes (col. 2, ll. 24-28), include binary and ternary systems comprising 45-80% of V_2O_5 (vanadium oxide), 5-50% of P_2O_5 (phosphorous oxide), and

0-25% of a metal oxide, which can be zinc oxide, lead oxide, or a mixture of the two, with zinc oxide being preferred (col. 3, ll. 1-10). Even more desirable compositions are ternary systems containing 50-75% of V_2O_5, 15-40% of P_2O_5, and 5-20% of metal oxide, which is zinc oxide, lead oxide, or a mixture of the two (col. 3, ll. 11-19). Weaver further explains that the glass compositions may additionally contain other metal oxides, such as antimony oxide and boron oxide (the two main components in Snell's glass compositions), in an amount up to about 15% by weight (col. 3, ll. 31-37). Antimony oxide adjusts the electrical resistivity of the glass and boron oxide improves the flow properties of the fused glass (col. 3, ll. 38-43).

The examiner contends it would have been obvious in view of Weaver to replace the PbO in Snell's solder glass with ZnO:

> Weaver shows that ZnO is equivalent to PbO for use in solder glass (see abstract line[s] 7 and 8; column 2 lines 31 and 32; column 2 lines 57-58 and column 3 line[s] 9 and 10). Therefore, because these two components were recognized equivalent[s] at the time the invention was made, on[e] 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. For example, one reason for substituting ZnO for PbO might be the known safety hazards associated with lead use.

Final Office action (Paper No. 20), at 2-3; Answer at 2-3.

In response to Appellants' argument that "Weaver teaches the equivalence of PbO and ZnO in a vanadium-phosphorous solder glass

and not a universal equivalence of PbO and ZnO in all solder glasses" (Brief at 3), the examiner explains in the Answer (at 5) that Weaver "acknowledge[s] that PbO and ZnO are compatible with Sb_2O_3 and B_2O_3," presumably referring to Weaver's disclosure of employing Sb_2O_3 and B_2O_3 as optional components in his glass compositions (col. 3, ll. 31-37). As a result, rather than relying of Weaver as teaching the equivalence of PbO and ZnO in all solder glasses, the examiner relies on Weaver as teaching the equivalence of ZnO and PbO in solder glasses which may contain Sb_2O_3 and B_2O_3, as is true of Snell's solder glass compositions.

Nevertheless, we agree with Appellants (Brief at 4) that Weaver and Snell fail to establish a reasonable expectation of success[2] in substituting ZnO for PbO in Snell's solder glass compositions. While Weaver gives several reasons why ZnO is

[2] In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1142 (Fed. Cir. 1991), cited in the Brief at 4 n.2, held:

> Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, inter alia, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. See In re Dow Chemical Co., 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure.

preferable to PbO when the glass compositions are employed as resistive coatings in cathode ray tubes,[3] Weaver does not describe the function of PbO and ZnO when the glass compositions are employed as solder glasses or identify the property of PbO and ZnO which accounts for their equivalence in Weaver's solder glasses. Likewise, Snell fails to explain the function of PbO in his solder glass compositions or identify the property of PbO that is responsible for that function. Furthermore, in view of the considerable differences between Weaver's and Snell's solder glass compositions (i.e., Weaver's solder glasses contain at least 50% by weight of V_2O_5 and P_2O_5 and no more than 15% by weight of Sb_2O_3 and/or B_2O_3, whereas Snell's solder glasses contain at least about 95% by weight of Sb_2O_3 and B_2O_3 and no V_2O_5 or P_2O_5), it is unreasonable to assume (a) that PbO plays the same role in Weaver's and Snell's solder glass compositions or (b) that ZnO can be substituted for PbO in Snell's solder glass compositions. Weaver does not suggest that the similar effect of PbO and ZnO in his solder glass compositions is independent of the identity and amount of the other components.

[3] ZnO is more water soluble than PbO (col. 5, ll. 35-39) and is not subject to being reduced into lead and oxides of carbon when in contact with an Aquadag coating (col. 6, ll. 12-18).

In the absence of a teaching that ZnO and PbO would be expected to be equivalent in Snell's glass compositions, we do not reach the question of whether the known toxicity of PbO would have motivated one skilled in the art to substitute ZnO for PbO in Snell's solder glass compositions.

Accordingly, we are reversing the rejection as to claim 1 and also as to claims 2-4, which stand or fall therewith.

REVERSED

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

JCM/dpl

William H. McNeill
OSRAM SYLVANIA INC.
100 Endicott Street
Danvers, MA 01923