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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MUHAMMAD IRAQI, NOAM ROZENSTEIN, EVA IGNER,  
MICHAEL LITVIN, and YARON MAZOR

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Appeal 2015-006462  
Application 13/316,591  
Technology Center 1700

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Before ROMULO H. DELMENDO, LINDA M. GAUDETTE, and  
MONTÉ T. SQUIRE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants<sup>1</sup> appeal under 35 U.S.C. § 134(a) from the Examiner’s decision<sup>2</sup> finally rejecting claims 1–15 and 31–44. App. Br. 3. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

The invention relates to a method of applying a coating over non-planar features of an electrical circuit, such as the metallic conductors on an insulating planar substrate. Specification filed Dec. 12, 2011 (“Spec.”) ¶ 2.

Claim 1 is reproduced below:

1. A method, comprising:

determining or receiving a multiple iteration printing scheme indicative of multiple printing iterations of a coating material to be applied on an electrical circuit that comprises at least one three dimensional structure to be coated by the coating material; wherein the multiple iteration printing scheme is responsive to a shape and size of the at least one three dimensional structure; wherein the coating material is solder mask;

performing multiple printing iterations of the coating material, according to the multiple iteration printing scheme; wherein each printing iteration except a last printing iteration is followed by partially curing, before executing a next printing iteration, coating material printed during the printing iteration; and wherein the last printing iteration is followed by fully curing coating material printed during the last printing iteration; wherein the partially curing and the fully curing differ from each other only by at least one out of (a) amount of heat or radiation and (b) duration.

App. Br. (Claims App’x) 41. Claim 33, the only other independent claim on appeal, is likewise directed to a method comprising similar steps of “determining or receiving” and “performing.” *See id.* at 43.

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<sup>1</sup> Appellants identify the real party in interest as Camtek Ltd. Appeal Brief filed Dec. 24, 2014 (“App. Br.”), 3.

<sup>2</sup> Final Office Action mailed Aug. 4, 2014 (“Final Act.”).

The claims stand finally rejected under pre-AIA 35 U.S.C. § 103(a) as follows (*see* Final Act. 3–11):

1. claims 1, 3–6, and 9–14 over Lepsche et al. (US 5,871,822, issued Feb. 16, 1999) (“Lepsche”), Kohm (US 4,774,279, issued Sept. 27, 1988), and Harlow Jr. et al. (US 5,645,884, issued July 8, 1997) (“Harlow”);
2. claim 2 over Lepsche, Kohm, Harlow, and Halahmi et al. (US 2009/0163615 A1, published June 25, 2009) (“Halahmi”);
3. claim 15 over Lepsche, Kohm, Harlow, and Stramel et al. (US 6,588,892 B1, issued July 8, 2003) (“Stramel”);
4. claims 7 and 8 over Lepsche, Kohm, Harlow, and Richards (US 7,040,729 B2, issued May 9, 2006);
5. claims 31–35, 37, and 40–43 over Zhang et al. (US 6,869,750 B2, issued Mar. 22, 2005) (“Zhang”), Kohm, and Harlow<sup>3</sup>;
6. claim 36 over Zhang, Kohm, Harlow, and Halahmi;
7. claim 44 over Zhang, Kohm, Harlow, and Stramel; and
8. claims 38 and 39 over Zhang, Kohm, Harlow, and Richards.

The Examiner finds Lepsche and Zhang disclose methods of applying multiple coating layers to electronic assemblies, but acknowledges these references do not disclose a step of partial curing prior to application of the final coating layer as required in claims 1 and 33. Final Act. 3, 7. The Examiner, relying on Example 3 of Kohm, finds Kohm describes a method of preventing pin holes in a coating applied to a printed wiring board that includes steps of applying multiple layers of

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<sup>3</sup> Claims 31 and 32 depend from claim 1. *See* App. Br. (Claims App’x) 43. It appears these claims should have been included in the above-listed first ground of rejection based on Lepsche, rather than combined with independent claim 33 and its dependent claims in a rejection based on Zhang.

a solder mask, partially curing after the application of each layer, and then performing a final cure after all layers have been applied. *Id.* at 3. The Examiner finds one of ordinary skill in the art would have included a partial curing step prior to application of the final coating layer in the respective methods of Lepsche and Zhang to achieve the advantages of a pin free coating (*id.* at 4) and a more precise coating (*id.* at 7). The Examiner relies on Harlow for a teaching of a printing scheme as recited in claims 1 and 33. *Id.* at 4, 8.

Appellants contend the Examiner erred in finding Kohm's method includes a partial curing step as recited in claims 1 and 33. *See* App. Br. 11–12, 27–29. Appellants argue Kohm performs a partial cure only after the application of the final solder mask layer. *See id.* at 11–12. According to Appellants, claims 1 and 33 require partial curing following each application of a solder mask layer, with the exception of the last solder mask layer. *See* App. Br. (Claims App'x) 41, 43 (Claims 1, 33: “wherein each printing iteration except a last printing iteration is followed by partially curing, before executing a next printing iteration, coating material printed during the printing iteration”).

Appellants' argument is supported by Kohm's disclosure. In Example 3, Kohm describes forming a multi-layer coating by applying multiple layers of solder mask, drying for 20 minutes at 120 °C after the application of each layer, *partially curing* for 20 minutes at 160 °C *after the application of all solder mask layers*, and then performing a final cure for one hour at 160 °C after the application of an adhesive layer. Kohm 10:18–29.

In the Response to Argument section of the Answer, the Examiner clarifies that the rejections of claims 1 and 33 are based on a finding that the partial curing steps of claims 1 and 33 read on Kohm's drying steps. *See* Examiner's Answer mailed Apr. 23, 2015, 3 (also referencing Example 1 of Kohm, wherein Kohm

describes drying a solder mask coating for 15 minutes at 65 °C and then at 150 °C for 15 minutes, followed by reapplication of a solder mask coating, redrying, and then curing for 2 hours at 150 °C (Kohm 8:45–50)).

In their Reply Brief, Appellants convincingly argue that the Examiner has not identified persuasive evidence to support a finding that the drying procedure conducted between applications of solder mask layers in Kohm meets the claim 1 and 33 recitations of “partially curing.” *See* Reply Brief filed June 22, 2015, 2–3. In this regard, we note that both Kohm and Appellants’ Specification use the term “drying” and the term “partially curing” to describe separate, distinct procedures in their respective methods. *See* Kohm 7:11–31 (“the coating is dried *and* partially cured” (emphasis added)); Spec. ¶¶ 53–58.

In sum, Appellants have argued persuasively that the Examiner’s obviousness determination is based on an unsupported finding of fact. Because the Examiner’s obviousness determination is not supported by a preponderance of the evidence on this appeal record, we do not sustain the Examiner’s rejections of claims 1–15 and 31–44.

REVERSED