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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte SHIH-HSIEN TSENG,
WEN-HSIUNG LIAO, JOSEPH D.S. DENG, and
IAN-CHUN CHENG

Appeal 2019-001380
Application 13/571,381
Technology Center 2800

Before MICHELLE N. ANKENBRAND, *Acting Vice Chief Administrative Patent Judge*, DONNA M. PRAISS, and JEFFREY R. SNAY, *Administrative Patent Judges*.

PRAISS, *Administrative Patent Judge*.

DECISION ON APPEAL¹

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner’s decision rejecting claims 1–3, 22, and 25. We have jurisdiction over the appeal under 35 U.S.C. § 6(b). We AFFIRM.

¹ Our Decision refers to the Specification (“Spec.”) filed Aug. 10, 2012, the Examiner’s Non-Final Office Action (“Non-Final Act.”) dated Dec. 15, 2017, Appellant’s Appeal Brief (“Appeal Br.”) filed June 12, 2018, the Examiner’s Answer (“Ans.”) dated Oct. 4, 2018, and Appellant’s Reply Brief (“Reply Br.”) filed Dec. 4, 2018.

² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Cyntec Co., Ltd. as the real party in interest. Appeal Br. 1.

STATEMENT OF THE CASE

The invention “relates to an electronic component and, in particular, to a substrate-less electronic component.” Spec. 1:7–8. According to the Specification, an internal electrode and passive elements for a circuit can be formed by screen printing a metal with high electrical conductivity on a green sheet of glass ceramic supported by a substrate, stacking the sheets, and firing the stack to provide a multi-chip package. *Id.* at 1:12–18, 2:6–13. The Specification discloses various drawbacks to a device made this way, such as poor conductivity of external electrodes due to poor adhesion of the metallic film, additional stress due to the different materials of insulating layers, coils, and substrate, and the substrate hindering the design of a slim-type device. *Id.* at 2:13–24. According to the Specification, the substrate-less electronic component is manufactured via film processing, such as thin-film processing, and has the benefits of having a smaller thickness, a smaller size, and a better electrical performance compared to a device formed on a substrate. *Id.* at 3:8–13.

Claim 1, reproduced below from the Claims Appendix to the Appeal Brief, is illustrative (emphasis added).

1. An electronic component, comprising:

a conductive element formed by a plurality of metal layers that are electrically connected; and

a plurality of insulating layers, wherein each metal layer of the plurality of metal layers is formed on a corresponding first insulating layer of the plurality of insulating layers by a thin-film process and *a corresponding second insulating layer is disposed on a patterned area of the metal layer and filled into a non-patterned area of the metal layer, each metal layer being bonded to its corresponding first insulating layer without using adhesive*

material, wherein the plurality of insulating layers and the plurality of metal layers are not supported by a substrate.

ANALYSIS

We review the appealed rejections for error based upon the issues Appellant identifies, in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (*cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (“[I]t has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections.”)). After considering the argued claims in light of the case law presented in this Appeal and each of Appellant’s arguments, we are not persuaded of reversible error in the Examiner’s rejections.

Rejection 1: Written Description

The Examiner rejects claims 1–3, 22, and 25 under 35 U.S.C. § 112(a) as failing to comply with the written description requirement. Ans. 2–4.

The Examiner finds the Specification does not describe the limitation of claim 1, “filled into a non-patterned area of the metal layer” in a way that reasonably conveys to one of ordinary skill in the art that Appellant had possession of the claimed invention. Ans. 3.

Appellant asserts that a claim need not be described literally in order for a disclosure to satisfy the written description requirement because implicit or inherent disclosure can support a limitation. Appeal Br. 5. In particular, Appellant argues:

It is well [known] that during a sequence of thin-film processes to form multiple stacked metal layers interleaved with insulating

layers, the substance of an insulating layer that is being disposed on a patterned area of a metal layer is in a LIQUID state so as to fill into the non-patterned area of the metal layer to encapsulate and be adhered to the patterns of the metal layer, thereby producing a reliable structure; otherwise, if the substance of an insulating layer that is being disposed on a patterned area of a metal layer were instead in solid state, it would not work as intended, which is understood to a person skilled in the art.

Id. at 6. In other words, Appellant argues it is well known that the insulating layer material is in a liquid state when it is deposited during a thin-film process. This would cause the insulating material to be disposed on a patterned area of a metal layer and fill into a non-patterned area of the metal layer, as claim 1 recites. *Id.* at 6; Reply Br. 5–7.

Appellant’s arguments do not persuade us that the Examiner reversibly erred in rejecting the claims for failing to comply with the written description requirement. Accordingly, we sustain the Examiner’s rejection for essentially those reasons expressed in the Answer, including the Response to Argument section, and we add the following primarily for emphasis.

Appellant does not direct us to evidence in the record or persuasive technical reasoning to support the argument that it is well known that insulating material would be in a liquid state during thin-film processing and that this would result in the insulating material filling into a non-patterned area of a metal layer when the insulating material is disposed on a patterned area of the metal layer, as claim 1 recites. *In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s arguments in a brief cannot take the place of evidence.”). Further, the Examiner finds there is no discussion of a liquid state in Appellant’s Specification. Although the Specification discloses a

thin-film process, the Specification does not disclose a specific thin-film process or that insulating material would fill into a non-patterned area of a metal layer, as claim 1 recites.

The Examiner also finds the Specification does not describe the limitation “without using adhesive material” in a way that reasonably conveys to one of ordinary skill in the art that Appellant had possession of the claimed invention. Ans. 3. Appellant argues:

It is well known that a thick-film process prints adhesive conductive material on an insulating layer to create a conductive layer. In contrast, a thin-film process uses a chemical deposition (such as Chemical Vapor Deposition, CVD) or physical deposition (such as Physical Vapor Deposition, PVD) technique to deposit metal material on a corresponding insulating layer without using adhesive material so that it is capable of making the metal layer thinner compared with the thick film process, which is understood to a person skilled in the art. As a result, the limitation of the claim 1: “without using adhesive material” is supported in the specification through implicit, or inherent disclosure.

Appeal Br. 6; Reply Br. 7 (emphasis omitted).

As with the previous argument, Appellant relies solely on attorney argument to support its contention that something is well known without directing us to any supporting evidence. Nor does Appellant provide sufficient technical reasoning that thin-film processes would inherently bond metal layers to insulating layers without using adhesive material.³ As a

³ Moreover, the limitation “without using adhesive material” is a negative limitation. Appellant’s arguments do not sufficiently explain how their disclosure excludes the use of adhesive material when bonding a metal layer to a corresponding insulating layer, as claim 1 recites. “Negative claim limitations are adequately supported when the specification describes a

result, Appellant's argument does not identify a reversible error in the Examiner's rejection.

For these reasons and those the Examiner provides, we uphold the Examiner's rejection of claims 1–3, 22, and 25 under 35 U.S.C. § 112(a) for failing to comply with the written description requirement.

Rejection 2: Obviousness

The Examiner rejects claims 1–3, 22, and 25 under 35 U.S.C. § 103 as being unpatentable over Matsushita⁴ in view of Kudo⁵ and Arata⁶ for the reasons provided on pages 4–8 of the Examiner's Answer.

Appellant argues the claims together. Appeal Br. 6–12. Therefore, we confine our discussion to claim 1, which we select as representative. Claims 2, 3, 22, and 25 stand or fall with claim 1. *See* 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner finds Matsushita discloses an electronic component comprising, among other things, a conductive element formed by a plurality of metal layers and a plurality of insulating layers, wherein each metal layer is formed on a corresponding first insulating layer by a thin-film process. Ans. 4–5. The Examiner also finds each metal layer of Matsushita is bonded to a corresponding first insulating layer without using adhesive material. *Id.* at 5.

reason to exclude the relevant limitation.” *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012).

⁴ Matsushita, US 2011/0102124 A1, published May 5, 2011 (“Matsushita”).

⁵ Kudo et al., JP 2005-109097 A, published April 21, 2005 (“Kudo”) (An English language translation of the Abstract is included in the record).

⁶ Arata et al., US 2009/0115563 A1, published May 7, 2009 (“Arata”).

The Examiner finds Matsushita does not disclose that the insulating layers and metal layers are not supported by a substrate. *Id.* at 6. The Examiner also finds the limitation of the metal layers being formed on a corresponding first insulating layer by a thin-film process, as claim 1 recites, is a product-by-process limitation. *Id.*

The Examiner finds Kudo discloses an inductor having a plurality of metal layers and a plurality of insulating layers not supported by a substrate. *Id.* The Examiner concludes it would have been obvious to one of ordinary skill in the art to modify Matsushita's electronic component in view of Kudo so the electronic component is not supported by a substrate because this would provide a compact design to reduce manufacturing size while obtaining high inductance and low DC resistance. *Id.* at 7.

The Examiner finds Matsushita, as modified in view of Kudo, does not disclose a second insulating layer disposed on a patterned area of a metal layer and filled into a patterned area of the metal layer, as claim 1 recites. *Id.* The Examiner finds Arata discloses an inductor having a second insulating layer disposed on a patterned area of a metal layer and filled into a non-patterned area of the metal layer. *Id.* The Examiner determines it would have been obvious to further modify Matsushita to include Arata's second insulating layer structure so that Matsushita's electronic component has a compact design to facilitate stability of its coil, to facilitate coupling, and to protect the device more efficiently to reduce cracking and short-circuits between adjacent conductors. *Id.* at 7–8.

Appellant contends that the embodiment depicted in Matsushita's Figure 2 is made by forming conductive layers from conductive paste on green sheets, which is a thick-film method, and that it is impossible for this

method to form metal layers on corresponding insulating layers using a thin-film process, wherein a corresponding second insulating layer is disposed on a patterned area of a metal layer and filled into a non-patterned area of the metal layer, as claim 1 recites.⁷ Appeal Br. 6–10; Reply Br. 8–13, 15, 18–19. According to Appellant, it would not have been obvious to apply the thin-film method mentioned in Matsushita’s paragraph 49 to the technical features depicted in Figure 2 or to combine Matsushita with the other cited references to provide the electronic component of claim 1. Appeal Br. 9–11; Reply Br. 14–18.

Appellant’s arguments do not persuade us that the Examiner reversibly erred in rejecting the claims over the cited prior art references. Accordingly, we sustain the Examiner’s rejection for essentially those reasons expressed in the Answer, including the Response to Argument section, and we add the following primarily for emphasis.

Regarding claim 1’s recitation “each metal layer of the plurality of metal layers is formed on a corresponding first insulating layer of the plurality of insulating layers by a thin-film process,” the Examiner finds this is a product-by-process limitation. Non-Final Act. 6; Ans. 12–13. It is well established that, when a product recited in product-by-process format reasonably appears to be the same as or obvious from a product of the prior

⁷ Appellant argues that “[b]ased on the content of claim 1, one can know that . . . said insulating layer is in liquid form so that said insulating layer is disposed on a patterned area and filled into a non-patterned area of the metal layer immediately under said insulating layer.” Appeal Br. 7 (emphasis omitted). As the Examiner correctly states, claim 1 does not require that the second insulating layer is in liquid form so it is disposed on a patterned area of a metal layer and fills into a non-patterned area of the metal layer. Ans. 14–15.

art, the burden is on the applicant to show that the prior art product is in fact different from the claimed product, even though the products may be made by different processes. *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985).

Here, the Examiner finds Matsushita's Figure 2 depicts metal layers on corresponding insulating layers. Non-Final Act. 5. Matsushita's disclosure, which teaches insulator layers 16a–16j with coil electrodes 18a–18e, supports this finding. Matsushita ¶¶ 25, 26. Appellant argues that Matsushita discloses a thick-film method for this structure, not a thin-film process; however, Appellant's argument does not demonstrate that Matsushita's product is in fact different from the claimed product. For instance, Appellant contends that one of ordinary skill in the art would have understood Matsushita's paragraph 49 as teaching that each conductive layer can be formed on a corresponding green sheet by thin-film processing followed by pressing the green sheets together. Appeal Br. 10. This, however, is merely unsupported attorney argument. *In re Pearson*, 494 F.2d at 1405.

Moreover, even considering the thin-film process claim 1 recites, the Examiner finds Matsushita discloses thin-film processing for the electronic component depicted in Figure 2. Non-Final Act. 5; Ans. 12, 14. Matsushita states “[t]he electronic component 10a, for example, may be manufactured using a thin film method.” Matsushita ¶ 49. Matsushita's Figure 2 depicts electronic component 10a. Matsushita ¶ 24. Thus, Matsushita teaches that Figure 2's electronic component 10a can be made via thin-film processing. Although Matsushita does not disclose the specific details for its thin-film method, Matsushita discloses that electronic component 10a can be made via thin-film processing. This suggests that the parts of electronic component

10a, including insulator layers 16a–16j and coil electrodes 18a–18e likewise are formed by a thin-film process, as claim 1 recites.

With regard to claim 1’s recitation “a corresponding second insulating layer is disposed on a patterned area of the metal layer and filled into a non-patterned area of the metal layer,” the Examiner finds Matsushita does not disclose this structure. Non-Final Act. 5. The Examiner finds Arata discloses an inductor with this structure and determines it would have been obvious to further modify Matsushita in view of Arata to include this structure. *Id.* at 7–8. Appellant argues Matsushita does not disclose the claimed second insulating layer, but this does not address the Examiner’s rejection over Matsushita, Kudo, and Arata. As the Examiner notes, Appellant does not present specific arguments addressing the combination of Matsushita, Kudo, and Arata.⁸ Ans. 13–14.

As a result, Appellant’s arguments do not identify a reversible error in the Examiner’s § 103 rejection of claim 1 over Matsushita, Kudo, and Arata.

For these reasons and those the Examiner provides, we uphold the Examiner’s rejection of claims 1–3, 22, and 25 under 35 U.S.C. § 103 as obvious over Matsushita, Kudo, and Arata.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

⁸ Appellant’s assertion that “it is impossible to combine the cited reference Matsushita with other references(s) to derive the claim 1 AS A WHOLE” does not adequately rebut the Examiner’s finding that Arata discloses the recited second insulating layer structure or the Examiner’s conclusion it would have been obvious to further modify Matsushita in view of Arata. Appeal Br. 11 (emphasis omitted).

CONCLUSION

In summary:

Claims Rejected	Basis	Affirmed	Reversed
1-3, 22, 25	§ 112(a)	1-3, 22, 25	
1-3, 22, 25	§ 103 Matsushita in view of Kudo and Arata	1-3, 22, 25	
Overall Outcome		1-3, 22, 25	

AFFIRMED