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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* ROBERT MICHAEL SMYTHE,  
JEFFREY GERARD HERSHBERGER,  
and RICHARD F. HILL

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Appeal 2019-003863  
Application 12/560,194  
Technology Center 1700

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Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and  
DEBRA L. DENNETT, *Administrative Patent Judges*.

BEST, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the Examiner's decision to reject claims 1–9, 12–14, 16–18, 21, 28, 31, 33–37, 39–43, and 46–49 of Application 12/560,194. Final Act. (April 30, 2018). We have jurisdiction under 35 U.S.C. § 6.

For the reasons set forth below, we *affirm*.

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<sup>1</sup> We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Laird Technologies, Inc., as the real party in interest. Appeal Br. 4.

## I. BACKGROUND

The '194 Application describes a thermoelectric module having upper and lower laminates with thermoelectric elements positioned therebetween. Spec. ¶ 2. The Specification describes that passing an electrical current through the thermoelectric module causes heat to be pumped from one laminate to another, e.g., a lower laminate to an upper laminate. *Id.* ¶¶ 4, 38; Fig. 2. The '194 Application describes that this heat pumping results in a temperature difference in the laminates, e.g., a cooler lower laminate and a warmer upper laminate. *Id.* ¶ 38. The Specification describes that objects exposed to a cooler laminate's side may be cooled by transferring heat from the cooler laminate to the warmer laminate. *Id.* The Specification refers to such a thermoelectric module, which is used as a heat pump to cool objects, as a thermoelectric cooler (TEC). *Id.* ¶ 4.

Claims 1, 28, and 34 are representative of the '194 Application's claims and are reproduced below from the Claims Appendix of the Brief (emphasis added).

1. A *multistage* thermoelectric module comprising:
  - a first laminate having a dielectric layer and multiple electrically conductive pads coupled to the dielectric layer;
  - a second laminate having an electrically conductive layer, dielectric layers coupled to opposing sides of the electrically conductive layer such that the electrically conductive layer is disposed generally between the dielectric layers, and electrically conductive pads coupled to each of the dielectric layers;*
  - a third laminate having a dielectric layer and multiple electrically conductive pads coupled to the dielectric layer, the second laminate disposed generally between the first laminate and the third laminate; and

thermoelectric elements disposed generally between the first and second laminates and between the second and third laminates with each of the thermoelectric elements spaced apart from adjacent thermoelectric elements such that spacing filled with ambient air is provided between the adjacent thermoelectric elements;

wherein the thermoelectric elements disposed generally between the first and second laminates are soldered to the electrically conductive pads of the first and second laminates for electrically coupling the thermoelectric elements together, and wherein the thermoelectric elements disposed generally between the second and third laminates are soldered to the electrically conductive pads of the second and third laminates for electrically coupling the thermoelectric elements together; and

wherein the dielectric layer of the first laminate, the dielectric layers of the second laminate, and the dielectric layer of the third laminate are structurally rigid and not flexible at room temperature.

28. A thermoelectric module comprising:

a first laminate having a polymeric dielectric layer, multiple electrically conductive pads coupled to the polymeric dielectric layer, and an electrically conductive layer coupled to the polymeric dielectric layer such that the polymeric dielectric layer is disposed generally between the electrically conductive pads and the electrically conductive layer;

a second laminate having a polymeric dielectric layer, multiple electrically conductive pads coupled to the polymeric dielectric layer of the second laminate, and an electrically conductive layer coupled to the polymeric dielectric layer of the second laminate such that the polymeric dielectric layer of the second laminate is disposed generally between the electrically conductive pads of the second laminate and the electrically conductive layer of the second laminate; and

multiple thermoelectric elements disposed generally between the first and second laminates;

wherein the thermoelectric elements are electrically coupled to form multiple electrically independent subcircuits, *each of the subcircuits electrically isolated for carrying current between the thermoelectric module and a controller external to the thermoelectric module whereby said subcircuit is electrically controllable from outside the thermoelectric module via the controller.*

34. A thermoelectric module comprising:

a first laminate having a polymeric dielectric layer and multiple electrically conductive pads coupled to the polymeric dielectric layer;

a second laminate having a polymeric dielectric layer and multiple electrically conductive pads coupled to the dielectric layer of the second laminate; and

thermoelectric elements disposed generally between the first and second laminates with each of the thermoelectric elements spaced apart from adjacent thermoelectric elements such that spacing filled with air is provided between the adjacent thermoelectric elements;

wherein the thermoelectric elements are coupled to the electrically conductive pads of the first and second laminates for electrically coupling the thermoelectric elements together; and *wherein the dielectric layer of the first laminate and/or the dielectric layer of the second laminate has a thickness dimension of greater than 0.002 inches but less than 0.013 inches.*

Appeal Br. 23–24, 27–28, 29 (Claims App.) (emphasis added).

## II. REJECTIONS

On appeal, the Examiner maintains the following rejections:

1. Claims 1, 3, 4, 9, 12–14, 16–18, 21, 33, 43, 46, and 47 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi,<sup>2</sup> Tauchi,<sup>3</sup> and Morimoto.<sup>4</sup> Final Act. 3–8.
2. Claim 2 is rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Kato.<sup>5</sup> Final Act. 8–9.
3. Claim 5 is rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Makino.<sup>6</sup> Final Act. 9–10.
4. Claims 6–8 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.<sup>7</sup> Final Act. 10–13.
5. Claims 34, 37, 39–42, 48, and 49 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Morimoto, and Odaira.<sup>8</sup> Final Act. 13–15.

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<sup>2</sup> US 2007/0227158 A1, published Oct. 4, 2007.

<sup>3</sup> US 5,936,192, issued Aug. 10, 1999.

<sup>4</sup> US 2008/0276624 A1, published Nov. 13, 2008.

<sup>5</sup> US 2011/0156853 A1, published June 30, 2011.

<sup>6</sup> JP 08-078847 A, published March 22, 1996. We shall follow the Examiner and Appellant by referring to a machine translation that was made of record in this appeal on Aug. 18, 2017.

<sup>7</sup> US 7,436,059 B1, issued Oct. 14, 2008.

<sup>8</sup> US 5,600,103, issued Feb. 4, 1997.

6. Claims 35 and 36 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang. Final Act. 15–16.
7. Claims 28 and 31 are rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of Kuchimachi, Ouyang, and Morimoto. Final Act. 16–18.

### III. DISCUSSION

Appellant argues for the reversal of the obviousness rejections of claims 1–9, 12–14, 16–18, 21, 28, 31, 33–37, 39–43, and 46–49 on the basis of limitations present in independent claims 1, 28, and 34. Appeal Br. 9–20. We select claims 1, 28, and 34 as representative. 37 C.F.R. § 41.37(c)(1)(iv). Appellant also presents a separate argument for the patentability of claims 8 and 36. Appeal Br. 14–15, 18–19. Accordingly, claims 2–7, 9, 12–14, 16–18, 21, 31, 33, 35, 37, 39–43, and 46–49 will stand or fall with each of their respective independent claims. We will address claims 8 and 36 separately.

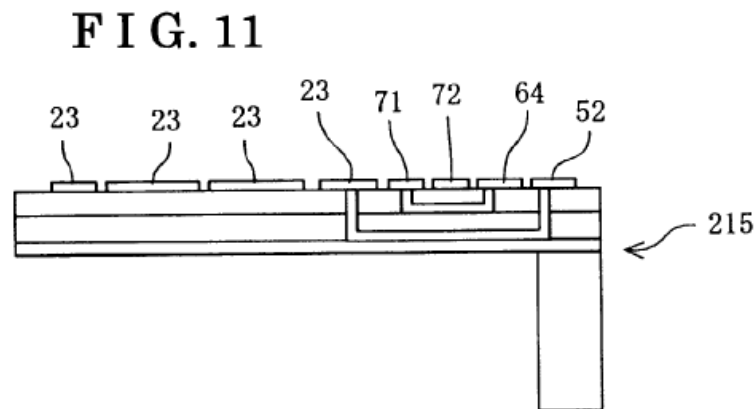
*A. Rejection of claims 1, 3, 4, 9, 12–14, 16–18, 21, 33, 43, 46, and 47 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto.*

According to Appellant, the combination of Kuchimachi, Tauchi, and Morimoto does not describe or suggest the following elements of claim 1: (1) “a second laminate having an electrically conductive layer, dielectric layers coupled to opposing sides of the electrically conductive layer such that the electrically conductive layer is disposed generally between the dielectric layers,” and (2) “electrically conductive pads coupled to each of the dielectric layers.” *See generally id.* 9–12.

*First*, the Examiner found that Kuchimachi, modified by Tauchi, describes or suggests the claimed multistage thermoelectric module with

each requisite laminate. Final Act. 3–4. The Examiner found that modified Kuchimachi, however, fails to describe or suggest that the second laminate would have had “an electrically conductive layer with dielectric layers on opposing sides such that the electrically conductive layer is disposed between the dielectric layers.” *Id.* 4. The Examiner relied upon Morimoto to describe the limitations missing from the combination of Kuchimachi and Tauchi. *Id.*

Morimoto’s Figure 11, reproduced below, illustrates a schematic cross-section diagram of a thermoelectric module:



Morimoto’s Figure 11 illustrates features of substrate intermediate form 215, including thermoelectric transducer electrodes 23, IC electrodes 71 and 72, communication electrode 52, and communication electrode 64. Morimoto ¶ 64, Fig. 11; *see also id.* ¶ 61, Fig. 10 (depicting dielectric aluminum oxide layers 216, 217, 218 with copper layers 510 therebetween providing an electrical connection between thermoelectric transducer electrode 23 and communication electrode 52.).

The Examiner found Morimoto discloses “that connections for a thermoelectric device (pads of 23) can be routed through a substrate, which



comprises several layers, to allow for interconnection to other electrical connections.” Final Act. 4 (discussing Morimoto Fig. 11).

According to Appellant, Morimoto’s teachings regarding internal wirings apply only to a thermoelectric module’s top or bottom laminate, which is used to connect thermoelectric transducers to an external device. Appeal Br. 11 (citing Tauchi Fig. 9). Appellant thus argues that Morimoto’s internal wirings for non-intermediate laminates cannot describe or suggest the claimed second (or intermediate) laminate having dielectric layers coupled to opposing sides of an electrically conductive layer. *Id.* Rather than apply Morimoto’s teachings, Appellant argues that the ordinarily skilled artisan would have “simply use[d Tauchi’s] through hole” 10 for interconnections within an intermediate layer. *Id.*; *see* Tauchi Fig. 4.

The Examiner responds that Tauchi’s electrode 5m on the second laminate in modified Kuchimachi’s multistage thermoelectric module could have been “lead through substrate to interconnecting electrodes on surface[,] as disclosed by Morimoto[,] to connect to a device which provides power.” Answer 21 (discussing Tauchi Fig. 4). The Examiner, furthermore, determined that

[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to modify the second laminate and the method of interconnection between groups of thermoelectric elements of modified Kuchimachi by having *the second laminate comprise multiple dielectric layers and have the interconnections between groups of thermoelectric devices routed through the layers as disclosed by Morimoto* because it will allow for a more efficient use of space.

Final Act. 4–5 (emphasis added).

We determine that the Examiner has provided adequate reasoning to rebut Appellant’s unsupported assertion regarding what the ordinarily skilled artisan would have gleaned from the applied prior art.<sup>9</sup>

We, therefore, are not persuaded that Appellant has established the existence of reversible error regarding the Examiner’s finding that Morimoto describes or suggests the claimed second or intermediate laminate having dielectric layers coupled to opposing sides of an electrically conductive layer.

*Second*, Appellant argues that Morimoto’s electrically conductive pads 23 are coupled only to top dielectric layer 218, with no such pads coupled to bottom dielectric layer 216. Appeal Br. 10–11; *see* Morimoto Figs. 10, 11.

Appellant’s argument fails to address the Examiner’s specific findings. For example, the Examiner relies on Tauchi for disclosing a multistage device comprising a second laminate between a first and a third laminate. Answer 20 (citing Tauchi Figs. 4, 9). In particular, the Examiner found Tauchi, not Morimoto, teaches that a “second laminate includes

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<sup>9</sup> We note that the Summary of Claimed Subject Matter undercuts Appellant’s argument that Morimoto’s internal wirings are limited to top and *bottom laminates*. Appeal Br. 4–5. For a depiction of the claimed *second laminate* “having an electrically conductive layer, dielectric layers coupled to opposing sides of the electrically conductive layer,” Appellant directs our attention to electrically conductive layer 216b and dielectric layers 220b and 220c. *Id.* (citing Spec. Figs. 8, 9). Appellant, thus, implicitly admits that internal wirings, which are located in a *bottom* or “lower laminate 204,” can be used in an intermediate, i.e., the claimed second, laminate. Spec. ¶¶ 44, 45; *see also id.* ¶¶ 16, 19, 20; *compare id.* Figs. 8, 9 with Morimoto Figs. 10, 11.

conductive pads on opposing sides of the laminate to interconnect thermoelectric elements (6).” Answer 20; *see also* Tauchi 5:4–8, Fig. 4 (Depicting copper pads 5m and 5b on substrate 3’s top and bottom surfaces, respectively.)). We note Kuchimachi discloses that thermoelectric elements are soldered to electrically conductive pads. Kuchimachi ¶ 46.

Appellant’s argument is thus directed to attacking the individual references rather than the combined teaching of these references. Appellant’s criticism of Morimoto, therefore, does not establish nonobviousness. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981); *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) (“[T]he test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art.”).

In view of the foregoing, we are not persuaded that Appellant has demonstrated that the Examiner reversibly erred in finding that the combination of Kuchimachi, Tauchi, and Morimoto describes or suggests the claimed “second laminate having an electrically conductive layer, dielectric layers coupled to opposing sides of the electrically conductive layer such that the electrically conductive layer is disposed generally between the dielectric layers, and electrically conductive pads coupled to each of the dielectric layers.”

We, therefore, determine that the Examiner did not reversibly err in rejecting claim 1, as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. Accordingly, we also affirm the rejection of claims 3, 4, 9, 12–14, 16–18, 21, 33, 43, 46, and 47, which depend from claim 1.

*B. Rejection of claim 2 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Kato.*

Appellant argues that the rejection of claim 2 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Kato should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. Appeal Br. 12.

As discussed above, we have affirmed the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claim 2 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Kato.

*C. Rejection of claim 5 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Makino.*

Appellant argues that the rejection of claim 5 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Makino should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. *Id.*

As discussed above, we have affirmed the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claim 5 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Makino.

*D. Rejection of claims 6–8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.*

*a. Claim 8*

Claim 8 is reproduced below from the Claims Appendix of the Brief (emphasis added).

8. The multistage thermoelectric module of claim 1, wherein the thermoelectric elements are electrically coupled to form two or more electrically independent subcircuits, each subcircuit disposed in a different layer of the first or third laminate, *each subcircuit electrically isolated for carrying current between the thermoelectric module and a controller external to the thermoelectric module whereby said subcircuit is electrically controllable from outside the module via the controller.*

Appeal Br. 25 (Claims App.) (emphasis added).

According to Appellant, the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang does not describe or suggest that each subcircuit is: (1) electrically isolated, *id.* 14, and (2) disposed between substrates. *Id.*

*First*, the Specification describes that subcircuits 230 are thermoelectric elements 210 arranged to “allow[] cooling power to be raised and lowered in different areas separately, and dynamically.” Spec. ¶ 39, Fig. 5. Likewise, Ouyang teaches that thermoelectric elements may be grouped for a substantially similar purpose as the claimed subcircuits. As the Examiner found, Ouyang discloses use of an external controller to direct groups of smaller thermoelectric elements to cool localized hot spots on a microprocessor chip. Final Act. 12 (citing Ouyang 6:22–40, Fig. 3). We, therefore, agree with the Examiner that such external control of localized

cooling describes or suggests “electrical isolation between thermoelectric element groups.” Answer 23 (citing Ouyang 6:58–67).<sup>10</sup>

Appellant’s argument thus fails to show error in the Examiner’s findings that Ouyang’s groupings of thermoelectric elements suggests the claimed “subcircuits,” which are “electrically isolated.”

*Second*, Appellant argues that Ouyang’s multiple individual modules fail to have “a common first and second (or second and third) substrate[,] between which the thermoelectric elements are all disposed.” Appeal Br. 14; *see* Spec. Fig. 10.

Appellant’s argument fails to address the Examiner’s specific findings. As set forth above, the Examiner relies on Kuchimachi, as modified by Tauchi and Morimoto, for disclosing or suggesting the claimed multistage device module comprising the first, second, and third laminates, with thermoelectric elements therebetween. Final Act. 3–5. In particular, the Examiner found Tauchi, not Ouyang, teaches that “multi-stage thermoelectric cooling can comprise stacks of thermoelectric modules,” which “leads to more efficient cooling.” *Id.* (citing Tauchi Fig. 4). The Examiner found Morimoto, not Ouyang, teaches placement of electrically conductive layers on opposing sides of a laminate to provide connections to external leads. *Id.* at 12–13 (citing Morimoto ¶ 61; Figs. 10, 11, 14). The Examiner, moreover, found Ouyang teaches that ceramic substrates may be

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<sup>10</sup> We note that Ouyang’s Figure 4a describes that an external “controller 303 may adjust the cooling rate of a TEC device 151 in the TEC device array 106 to counter the change in the non-uniform heat emission pattern.” Ouyang 6:6–9, Fig. 4a. Appellant, furthermore, does not dispute the Examiner’s findings that Ouyang teaches the use of multiple individual thermoelectric modules together. Appeal Br. 14.

located above and below the thermoelectric elements. Answer 23 (citing Ouyang 4:40–45).

The Examiner determined, *inter alia*, that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kuchimachi’s thermoelectric device to have: (i) “multiple stages including three or more stages as disclosed by Tauchi . . . because it will allow for more efficient cooling and a more compact size, Final Act. 4; (ii) “different groups of thermoelectric elements wherein each group is a subcircuit[,] on the same substrate[, and] connected to a controller as disclosed by Ouyang because it will optimize the amount of cooling delivered,” *id.* at 12; and (iii) “a plurality of conductive layers on different dielectric layers of the dielectric substrate . . . because it will aid in routing connections through different layers of the laminate substrate to the subcircuits and allow for external leads to be connected as disclosed by Morimoto.” *Id.* at 13.

Therefore, Appellant’s argument that Ouyang’s individual thermoelectric modules lack a common first and second (or second and third) substrate, between which the thermoelectric elements are all disposed, is directed to attacking the individual references rather than the combined teaching of these references. Appellant’s criticism of Ouyang, therefore, does not establish nonobviousness. *See Keller*, 642 F.2d at 426; *McLaughlin*, 443 F.2d at 1395.

In view of the foregoing, we are not persuaded that Appellant has demonstrated that the Examiner reversibly erred in finding that the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang describes or suggests the limitations recited in claim 8.

We, therefore, determine that the Examiner did not reversibly err in rejecting claim 8, as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.

*b. Claims 6–8*

Appellant argues that the rejection of claims 6–8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. Appeal Br. 14.

As discussed above, we have affirmed the rejection of claim 1 as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claims 6–8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.

*E. Rejection of claims 34, 37, 39–42, 48, and 49 as unpatentable over the combination of Kuchimachi, Morimoto, and Odaira.*

According to Appellant, the combination of Kuchimachi, Morimoto, and Odaira does not describe or suggest the following elements of claim 34: “the dielectric layer of the first laminate and/or the dielectric layer of the second laminate has a thickness dimension of greater than 0.002 inches but less than 0.013 inches.” *See id.* at 15–17.

The Examiner found that Kuchimachi, modified by Morimoto, describes or suggests each limitation of the claimed thermoelectric module except the thickness(es) of the dielectric layer(s). Final Act. 13–15. The Examiner, however, relied upon Odaira to describe these limitations. *Id.* at 14–15. In particular, the Examiner found “Odaira discloses that . . . the first/second laminate dielectric layer . . . has a wiring interconnection



running through . . . and that the dielectric resin with the wiring interconnection can have a thickness ranging from 50 to 800 microns (0.002–0.03 inches).” *Id.* (citing Odaira 6:50–7:15; Figs. 8A, 8B); *see also* Answer 24. The Examiner determined that

[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to modify the thickness of the polymeric dielectric layer of modified [Kuchimachi] to be within the overlapping range claimed and the range disclosed in Odaira because selection of overlapping portion of ranges has been held to be a *prima facie* case of obviousness.

Final Act. 15.

Appellant argues, *inter alia*, that: (1) Odaira’s conductive bumps, which extend through a laminate, would have compromised the electrical insulating characteristics of the polymeric dielectric layers in Kuchimachi’s modified thermoelectric module, Appeal Br. 15–16; (2) named inventor Mr. Hershberger’s Rule 132 Declaration (filed June 22, 2017) avers that Kuchimachi’s substrate could not have a thickness of less than 0.02 inches, and still provide suitable mechanical strength for manufacturing, handling, and soldering, Rule 132 Decl. ¶ 4; and (3) Odaira’s conductive bumps would have rendered Kuchimachi’s modified thermoelectric module unsatisfactory for its intended use in cooling a heating element, Appeal Br. 16.

*First*, argument (1) is unpersuasive because it is directed to whether it was improper for the Examiner to combine Odaira’s conductive bumps with Kuchimachi’s modified thermoelectric module, when Kuchimachi’s structure does not have conducting bumps extending through the laminate.

The test for obviousness[, however,] is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of

the references would have suggested to those of ordinary skill in the art.

*Keller*, 642 F.2d at 425. In this case, the Examiner did not rely upon Odaira to teach modifying Kuchimachi based on the structure of Odaira because Kuchimachi, as modified by Morimoto, already teaches the structure recited in claim 34. Final Act. 13–15.

*Second*, in view of Odaira’s teachings, we are not persuaded by Mr. Hershberger’s Rule 132 Declaration. The preponderance of evidence supports the Examiner’s findings that Odaira’s dielectric layers, with electrical connections running therethrough and conductive layers on either side, can possess a thickness ranging from .002–0.03 inches. Answer 25 (citing Odaira Figs. 8A, 8B); *see also* Odaira 6:50–7:15.

It is well established that when claimed and prior art products are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. *In re Best*, 562 F.2d 1252, 1256 (CCPA 1977). Appellant has not met this burden. The Rule 132 Declaration is silent as to any persuasive evidence demonstrating that Kuchimachi’s substrate, comprising an inorganic filler and polyimide resin like Odaira, could not be modified to have a thickness less than approximately 0.013 inches and still have the necessary mechanical strength. *See* Kuchimachi ¶ 57; Odaira 6:65–7:15.

*Third*, we are not persuaded by argument (3) as Odaira and Kuchimachi teach similar materials for providing heat exchange surfaces. As mentioned *supra*, Odaira’s circuit board is formed from synthetic resin sheets, such as polyimide, with inorganic filler. Odaira 6:65–7:15. Likewise,

Kuchimachi similarly teaches the combination of polyimide resin with ceramic filler for improved heat transference. Kuchimachi ¶ 57.

In view of the foregoing, we are not persuaded that Appellant has demonstrated that the Examiner reversibly erred in finding that the combination of Kuchimachi, Morimoto, and Odaira describes or suggests the claimed “dielectric layer of the first laminate and/or the dielectric layer of the second laminate has a thickness dimension of greater than 0.002 inches but less than 0.013 inches.” Answer 24.

We, therefore, determine that the Examiner did not reversibly err in rejecting claim 34, as unpatentable over the combination of Kuchimachi, Tauchi, and Morimoto. Accordingly, we also affirm the rejection of claims 37, 39–42, 48, and 49, which depend from claim 34.

*F. Rejection of claims 35 and 36 as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang.*

*a. Claim 36*

Claim 36 is reproduced below from the Claims Appendix of the Brief (emphasis added).

36. The thermoelectric module of claim 34, wherein the thermoelectric elements are electrically coupled to form two or more electrically independent subcircuits, each subcircuit disposed in a different layer of the first laminate or the second laminate, and *each subcircuit electrically isolated for carrying current between the thermoelectric module and a controller external to the thermoelectric module whereby said subcircuit is electrically controllable independent of the other subcircuits from outside the module via the controller.*

Appeal Br. 30 (Claims App.) (emphasis added).

According to Appellant, the combination of Kuchimachi, Morimoto, Odaira, and Ouyang does not describe or suggest that each subcircuit: (1) is

electrically isolated, *id.* 18, and (2) has “a common first and second substrate between which the thermoelectric elements are all disposed.” *Id.*

Appellant essentially argues that the rejection of claim 36 as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.

As discussed above, we have affirmed the rejection of claim 8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang. As mentioned, *supra*, Appellant’s arguments: (1) fail to show error in the Examiner’s findings that Ouyang’s groupings of thermoelectric elements suggests the claimed electrically isolated subcircuits, and (2) attack Ouyang separately rather than identifying error in the Examiner’s reasons for combining references’ teachings.

In view of the foregoing, we are not persuaded that Appellant has demonstrated that the Examiner reversibly erred in finding that the combination of Kuchimachi, Morimoto, Odaira, and Ouyang describes or suggests the limitations recited in claim 36.

We, therefore, determine that the Examiner did not reversibly err in rejecting claim 36, as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang.

*b. Claims 35 and 36*

Appellant argues that the rejection of claims 35 and 36 as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 34 as unpatentable over the combination of Kuchimachi, Morimoto, and Odaira. Appeal Br. 14.

As discussed above, we have affirmed the rejection of claim 34 as unpatentable over the combination of Kuchimachi, Morimoto, and Odaira. In view of the foregoing, we determine that the Examiner did not reversibly err in rejecting claims 35 and 36 as unpatentable over the combination of Kuchimachi, Morimoto, Odaira, and Ouyang.

*G. Rejection of claims 28 and 31 as unpatentable over the combination of Kuchimachi, Ouyang, and Morimoto.*

According to Appellant, the combination of Kuchimachi, Ouyang, and Morimoto does not describe or suggest that each subcircuit: (1) is electrically isolated, *id.* 19, and (2) has “a common first substrate and second substrate between which all of the thermoelectric elements are connected (to electrically conductive pads on each of the first and second substrates) and disposed.”<sup>11</sup> *Id.* 20.

Appellant essentially argues that the rejection of claim 28 as unpatentable over the combination of Kuchimachi, Ouyang, and Morimoto should be reversed for the reasons set forth in arguing for reversal of the rejection of claim 8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.

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<sup>11</sup> To the extent that Appellant presents a new argument that the applied prior art does not disclose or suggest the claimed location of electrical conductive pads, we are not persuaded. Kuchimachi discloses that thermoelectric elements are soldered to electrically conductive pads. Kuchimachi ¶ 46. Likewise, Morimoto similarly depicts conductive electrode pads for a thermoelectric device. *See* Morimoto Fig. 11 (showing pads 23 on dielectric surface 218 (*see* Fig. 9)).

As discussed above, we have affirmed the rejection of claim 8 as unpatentable over the combination of Kuchimachi, Tauchi, Morimoto, and Ouyang.

In view of the foregoing, we are not persuaded that Appellant has demonstrated that the Examiner reversibly erred in finding that the combination of Kuchimachi, Ouyang, and Morimoto describes or suggests the limitations recited in claim 28. We, therefore, determine that the Examiner did not reversibly err in rejecting claim 28, as unpatentable over the combination of Kuchimachi, Ouyang, and Morimoto. Accordingly, we also affirm the rejection of claim 31, which depends from claim 28.

#### IV. CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3, 4, 9, 12-14, 16-18, 21, 33, 43, 46, 47	103(a)	Kuchimachi, Tauchi, Morimoto	1, 3, 4, 9, 12-14, 16-18, 21, 33, 43, 46, 47	
2	103(a)	Kuchimachi, Tauchi, Morimoto, Kato	2	
5	103(a)	Kuchimachi, Tauchi, Morimoto, Makino	5	
6-8	103(a)	Kuchimachi, Tauchi, Morimoto, Ouyang	6-8	
34, 37, 39-42, 48, 49	103(a)	Kuchimachi, Morimoto, Odaira	34, 37, 39-42, 48, 49	
35, 36	103(a)	Kuchimachi, Morimoto, Odaira, Ouyang	35, 36	
28, 31	103(a)	Kuchimachi, Ouyang, Morimoto	28, 31	
<b>Overall Outcome</b>			1-9, 12-14, 16-18, 21, 28, 31, 33-37, 39-43, 46-49	

Appeal 2019-003863  
Application 12/560,194

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)(iv).

AFFIRMED