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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/521,709	10/23/2014	Tsuyoshi SUGIYAMA	163107	5955
25944	7590	10/13/2020	EXAMINER	
OLIFF PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850			SHUKLA, KRUPA	
			ART UNIT	PAPER NUMBER
			1787	
			NOTIFICATION DATE	DELIVERY MODE
			10/13/2020	ELECTRONIC

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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* TSUYOSHI SUGIYAMA and HIROSHI SHUTOH

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Appeal 2020-000843  
Application 14/521,709  
Technology Center 1700

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Before BEVERLY A. FRANKLIN, JEFFREY R. SNAY, and LILAN REN,  
*Administrative Patent Judges.*

REN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the Examiner's decision to reject claims 1–11. *See* Final Act. 2, 4, 5, 6, 7, 8, 9, 11. We have jurisdiction under 35 U.S.C. § 6(b). A hearing was held on September 17, 2020, a transcript of which will be made of record.

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 the real party in interest as “TDK CORPORATION.” Appeal Br. 1.

CLAIMED SUBJECT MATTER

The Specification provides that the invention seeks to “to provide a resin composition having a melting temperature suitable for molding, a resin sheet containing the resin composition, a cured resin product with excellent thermal conductivity and heat resistance, and a substrate.” Spec. ¶ 6. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A resin composition comprising at least one epoxy compound and a curing agent selected from 1,3,5-tris(4-aminophenyl)benzene and 1,3,5-tris(4-hydroxyphenyl)benzene, wherein the content of the 1,3,5-triphenylbenzene moiety of the curing agent is 15 mass% or more and 50 mass% or less of the total organic substances in the resin composition, and the 1,3,5-triphenylbenzene is the main skeleton of the curing agent.

Claims Appendix (Appeal Br. A-1).

REFERENCES

The prior art references relied upon by the Examiner are:

Name	Reference	Date
Butler	US 4,916,202	Apr. 10, 1990
Aslam	US 5,344,980	Sep. 6, 1994
Murata	US 5,597,876	Jan. 28, 1997
Imura	US 5,623,031	Apr. 22, 1997
Eriguchi	US 2008/0132669 A1	June 5, 2008
Hirano	US 2010/0112272 A1	May 6, 2010
Miyata	US 2013/0143981 A1	June 6, 2013

REJECTIONS<sup>2</sup>

Claims 1–3 are rejected under 35 U.S.C. § 103 as being unpatentable over Hilton. Final Act. 4.

Claim 4 is rejected under 35 U.S.C. § 103 as being unpatentable over Hilton in view of Miyata or Wu. Final Act. 5.

Claims 1–4, 9, and 10 are rejected under 35 U.S.C. § 103 as being unpatentable over Hirano in view of Eriguchi and Aslam. Final Act. 6, 9.

Claims 5–7 are rejected under 35 U.S.C. § 103 as being unpatentable over Hirano in view of Eriguchi, Aslam, Imura, and Murata. Final Act. 7.

Claims 5, 8, and 11 are rejected under 35 U.S.C. § 103 as being unpatentable over Hirano in view of Eriguchi, Aslam, Huntsman, and Butler. Final Act. 8, 11.

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>
1–3	103	Hilton
4	103	Hilton, Miyata or Wu
1–4, 9, 10	103	Hirano, Eriguchi, Aslam
5–7	103	Hirano, Eriguchi, Aslam, Imura, Murata
5, 8, 11	103	Hirano, Eriguchi, Aslam, Huntsman, Butler

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<sup>2</sup> Claims 1–11 were rejected “under 35 U.S.C. § 112(a) or 35 U.S.C. § 112 (pre–AIA), first paragraph, as failing to comply with the written description requirement.” Final Act. 2. This rejection was subsequently withdrawn. Advisory Action March 28, 2019.

OPINION

We review the appealed rejections for error based upon the issues identified by Appellant and in light of the arguments and evidence produced thereon. *Cf. Ex parte Frye*, 2010 WL 889747, \*4 (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 having considered the evidence presented in this Appeal and each of Appellant’s contentions, we are not persuaded that reversible error has been identified, and we affirm the Examiner’s § 103 rejections for the reasons expressed in the Final Office Action and the Answer. We add the following primarily for emphasis.

*Claim 1 (Hirano, Eriguchi, & Aslam)*<sup>3</sup>

In rejecting claim 1 over Hirano, Eriguchi, and Aslam, the Examiner finds that Hirano discloses a resin composition having 20 to 30 wt% of a phenol based curing agent and an epoxy resin whereas Eriguchi discloses a compound having at least three phenolic hydroxyl groups such as 1,3,5-tris(4'-hydroxyphenylbenzene) and Aslam discloses that 1,3,5-tris(4'-hydroxyphenylbenzene) may act as a crosslinking agent in an epoxy resin. Final Act. 5. The Examiner finds that a skilled artisan would have combined these prior art teachings to arrive at the recited composition “in order to obtain low dielectric constant and increase flexibility of cured film.” *Id.* Furthermore, based on the respective molecular weight of 1,3,5-tris(4'-hydroxyphenylbenzene) and 1,3,5-triphenylbenzene, the Examiner finds

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<sup>3</sup> Appellant argues for the patentability of claims 1–4, 9, and 10 over Hirano, Eriguchi, and Aslam as a group with claim 1 being the representative claim. See Appeal Br. 4–8. These claims stand or fall together. See *id.*; see also 37 C.F.R. § 41.37(c)(1)(iv).

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that the resultant composition would have 17 to 26 wt% of 1,3,5-triphenylbenzene. *Id.*

Appellant argues that Hirano “only describes various kinds of isomers of bisphenols such as bis(2-hydroxyphenyl)methane” and “[t]he Examiner’s analysis incorrectly assumes that one of ordinary skill in the art would have made a 1: 1 weight substitution of the claimed trisphenol but does not take into account the difference in molecular weight” of the compounds. Appeal Br. 5, 6.

We are not persuaded by this argument because Hirano undisputedly discloses a resin composition having a phenol based curing agent. *See* Hirano ¶¶ 57, 60–61 (cited in Final Act. 6; cited in Ans. 16). Appellant’s assertion that Hirano excludes all other phenol based curing agent than bisphenols is therefore unsupported by the record.

Appellant’s argument that “one of ordinary skill in the art would understand that the weight ratio of the curing agent to the third resin composition in Hirano depends on a specific molar ratio of the bisphenol to the thermosetting resin” and various other factors (Appeal Br. 6) is not persuasive because it does not address the Examiner’s rationale in combining the prior art teachings. *See* Final Act. 5 (finding that a skilled artisan would have combined these prior art teachings to arrive at the recited composition “in order to obtain low dielectric constant and increase flexibility of cured film”); *see also KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (holding that in support of an obviousness rejection, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”). To the extent that Appellant attempts to argue that there is no reasonable expectation of success of combining the prior art teachings, Appellant does not present factual

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evidence in support of such an argument. “Attorneys’ argument is no substitute for evidence.” *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1581 (Fed. Cir. 1989).

Moreover, we note that claim 1 recites a resin composition and Appellant’s argument, directed to how the resin may be produced using the prior art compositions, does not structurally distinguish the recited composition. “[W]hen a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.” *KSR*, 550 U.S. at 416 (citing *United States v. Adams*, 383 U.S. 39, 50–51 (1966)).

Appellant’s argument that “Eriguchi and Aslam are also completely silent about reacting 1,3,5-tris(4-hydroxyphenyl)benzene (or 1,3,5-tris(4-aminophenyl)benzene) with any epoxy compound to form a resin composition” (Appeal Br. 7) is likewise unpersuasive because the method by which the recited compound may be produced does not distinguish the composition recited in claim 1. We further note that Appellant’s remaining argument with regard to Eriguchi and Aslam – as that with regard to Hirano – attacks the references individually, rather than considering what the combined references would have suggested to the person of ordinary skill in the art. “Non-obviousness cannot be established by attacking references individually where the rejection is based upon the teachings of a combination of references.” *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Appellant next argues that the Examiner’s calculation of the weight percentage is in error because “at least the Hirano curing catalyst and coupling agent in the third resin composition may include substantial

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amounts of inorganic substances” and that “the 20 to 30 wt% of the phenol-based curing agent based on the total weight of the third resin composition in Hirano does not necessarily mean 20 to 30 wt% to total organic substances in the resin composition, as claimed.” Appeal Br. 8. The Examiner, on the other hand, points out that such curing catalyst and coupling agents are optional. Ans. 20. Appellant acknowledges that “Hirano actually discloses that the curing catalyst and coupling agent are ‘preferred’ inclusions.” Reply Br. 5. No error has therefore been identified in the Examiner’s findings based on Hirano’s teaching – as a whole – not limited to its preferred embodiments. It is well established that a prior art reference “must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole.” *Merck*, 800 F.2d at 1097.

Appellant states, in the “Background” of the argument, that certain “unexpected advantages” are found in the recited composition. Appeal Br. 4. Although it is unclear whether Appellant is arguing for patentability based on such advantages, Appellant does not address the Examiner’s finding that the data purported to show any advantages of the composition “is not [] commensurate in scope with the scope of present claims given that the examples recite specific epoxy resin in specific amounts while the present claims broadly recite any epoxy resin in any amount.” *Compare* Appeal Br. 3–15 *with*, Final Act. 14. No error has therefore been identified in the Examiner’s evaluation of any evidence in support of the purported unexpected results.

*Claim 11 (Hirano, Eriguchi, Aslam, Huntsman, & Butler)*

The dispositive limitation of claim 11 is “wherein the content of the 1,3,5-triphenylbenzene moiety of the curing agent is 35 mass% or more and 50 mass% or less of the total organic substances in the resin composition.”<sup>4</sup>

In rejecting claim 11, the Examiner finds that the combined prior art teaches a resin having “14 to 34.6wt%” of 1,3,5-triphenylbenzene of the total organic substance. Final Act. 12. The Examiner finds that such an amount is so close that a skilled artisan would have found the recited “35 mass% or more” obvious. *Id.* at 13.

Appellant acknowledges that “MPEP §2144.05 instructs that a *prima facie* case of obviousness may be established when the claimed range is close to the prior art such ‘that one of skill in the art would have expected them to have the same properties’” but argues that “there is no evidence in Hirano/Eriguchi/Aslam or otherwise of record to suggest that the Examiner’s proposed composition would have the same properties as the claimed 1, 3, 5-triphenylbenzene moiety.” Appeal Br. 10. Appellant argues that “one of ordinary skill in the art would not have reasonably expected the Hirano/Eriguchi/Aslam composition to have the same properties as the claimed composition” without presenting factual evidence in support. “Attorneys’ argument is no substitute for evidence.” *Johnston*, 885 F.2d at 1581. Absent supporting factual evidence, Appellant has not identified

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<sup>4</sup> Appellant mentions dependent claim 10 in arguing for the patentability of claim 11 but does not present separate arguments. *See* Appeal Br. 11 (“Huntsman and Butler are merely applied for disclosure of an epoxy resin and do not cure the above-described deficiencies of Hirano, Eriguchi and Aslam. For at least these reasons, the § 103 rejection of claim 11 over Hirano, Eriguchi, Aslam, Huntsman and Butler is clearly erroneous.”).

reversible error in the Examiner's fact finding that a skilled artisan would have found the recited composition sufficiently close to the prior art.

We further note that Appellant's argument that the Examiner has not provided a rationale in support of the rejection does not address the Examiner's obviousness analysis. *See* Appeal Br. 11. For example, the Examiner finds:

In light of motivation for using 1,3,5-tris(4'-hydroxyphenylbenzene) disclosed by Eriguchi et al. and for using 1,3,5-tris(4'-hydroxyphenylbenzene) as crosslinking agent for epoxy resin disclosed by Aslam et al. as described above, it therefore would have been obvious to one of ordinary skill in the art to use 1,3,5-tris(4'-hydroxyphenylbenzene) as curing agent in Hirano et al. in order to obtain low dielectric constant and increase flexibility of cured film, and thereby arrive at the claimed invention.

Final Act. 12. The Examiner provides additional fact findings in support of the rationale. *Id.* at 12–14. Appellant does not address and therefore does not dispute the Examiner's fact findings in support of the obviousness rationale. *See* Appeal Br. 10–11.

Appellant's argument that the Examiner erred "for all of the reasons discussed above with respect to claim 1" (Appeal Br. 9) has been addressed *supra* and found to be unpersuasive.

*Claims 9 & 10 (Hirano, Eriguchi, & Aslam)*

Although presented under a separate heading, Appellant does not present arguments separate for claims 9 and 10. *See* Appeal Br. 14 ("For all of the reasons discussed above with respect to claims 1 and 11, the Examiner's basis for arriving at the overlapping range in Hirano is flawed."), 13 ("Claim 10 recites the same range recited in claim 11 and therefore all of

the arguments presented above with respect to claim 11 also apply to claim 10.”). The rejection of claims 9 and 10 is sustained for the reasons provided with regard to claims 1 and 11. *See id.*; *see also* 37 C.F.R. § 41.37(c)(1)(iv).

We additionally note that Appellant states “the claimed range [of claim 9] produces unexpected results[.]” Appeal Br. 15. Appellant, however, does not support this argument with evidence. No error has therefore been identified in the Examiner’s fact findings in support of the rejection of claim 9.

*Claim 1 (Hilton)*<sup>5</sup>

The Examiner finds that Hilton discloses a resin composition comprising epihalohydrin as well as 1,3,5-tris(4'-hydroxyphenyl)benzene). Final Act. 4 (citing various portions of Hilton). Based on the molecular weight of 1, 3, 5-tris(4'-hydroxyphenyl)benzene), the Examiner finds that the prior art composition encompasses that recited in claim 1. *Id.* (citing various portions of Hilton).

Appellant does not address the portions of Hilton cited in support of the Examiner’s rejection. *See* Appeal Br. 12–14. Appellant instead argues that the Examiner erred because “the Hilton 1,3,5-tris(4-hydroxyphenyl)benzene is merely a precursor compound in the formation of a pre-polymer.” *Id.* at 12. We are not persuaded by this argument because it is incommensurate in scope with the claim and does not structurally distinguish the recited composition. Likewise, Appellant’s arguments that “[t]he Hilton 1,3,5-tris(4-hydroxyphenyl)benzene is not used as a curing agent in curing step in Hilton, and therefore does not ‘cure’ any epoxy

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<sup>5</sup> Appellant argues for the patentability of claims 1–3 over Hilton as a group with claim 1 being the representative claim. *See* Appeal Br. 11–14. These claims stand or fall together. *See id.*; *see also* 37 C.F.R. § 41.37(c)(1)(iv).

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compound, as would be understood by one of ordinary skill in the art” (*id.*) and that “the content range in Hilton does not take into account any organic substances in the curing agent used to cure the pre-polymer to form the cured resin composition” (*id.* at 14) are unpersuasive because these arguments are not based on the structural limitations of the composition claim. We further note that the Examiner finds that the prior art “curing agents are optional” (Ans. 28) and Appellant does not address this finding. *See* Reply Br. 7–9. Appellant’s argument is therefore unpersuasive also because it does not identify error in the Examiner’s fact findings.

Appellant also argues that 1,3,5-tris(4-hydroxyphenyl)benzene in Hilton “does not further react with any epoxide groups to cross-link polymer chains” and “cannot reasonably be considered to correspond to the claimed curing agent.” Appeal Br. 13. This argument does not structurally distinguish the composition in claim 1 as “the patentability of apparatus or composition claims depends on the claimed structure, not on the use or purpose of that structure.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 809 (Fed. Cir. 2002).

Appellant lastly argues that the Examiner erred in finding that the prior art composition encompasses the recited weight ranges. Appeal Br. 14. Appellant’s argument, however, is based on the preferred prior art weight range of “typically about 2-15 wt%, and preferably about 5-10 wt%” instead of the prior art teaching as a whole which discloses a range of 0.5 to 20 wt%. *See id.* Because the Examiner’s obviousness analysis is based on the prior art teaching as a whole – rather than the preferred embodiments, Appellant’s argument does not identify reversible error in the Examiner’s fact findings.

CONCLUSION

The Examiner's rejections are affirmed.

DECISION SUMMARY

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1-3	103	Hilton	1-3	
4	103	Hilton, Miyata or Wu	4	
1-4, 9, 10	103	Hirano, Eriguchi, Aslam	1-4, 9, 10	
5-7	103	Hirano, Eriguchi, Aslam, Imura, Murata	5-7	
5, 8, 11	103	Hirano, Eriguchi, Aslam, Huntsman, Butler	5, 8, 11	
<b>Overall Outcome</b>			1-11	

TIME PERIOD FOR RESPONSE

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

AFFIRMED