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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MINGCHENG GUO and FRANS MERCX

Appeal 2019-000715
Application 14/110,334
Technology Center 1700

Before ROMULO H. DELMENDO, BEVERLY A. FRANKLIN, and SHELDON M. MCGEE, *Administrative Patent Judges.*

MCGEE, *Administrative Patent Judge.*

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–6, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40.

We have jurisdiction. 35 U.S.C. § 6(b).

We affirm.

[1] We use the word Appellant to refer to "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as SABIC Global technologies, B.V. Appeal Br. 1.

SUBJECT MATTER

The claims are directed to thermally conductive polymer compositions exhibiting a flame retardancy of V0 at certain sample thicknesses, as measured by UL-94. Claim 1 is illustrative of the claimed subject matter, and is reproduced below:

> 1. A thermally conductive polymer composition comprising:
>
> (a) from about 20 wt% to about 60 wt% of an organic polymer comprising aliphatic polyamide, polyester, or polyolefin;
>
> (b) from about 30 wt% to about 70 wt% of a thermal conductive additive comprising magnesium hydroxide or aluminum oxide hydroxide; and
>
> (c) from about 1 wt% to about 10 wt% of a polyarylene sulfide;
>
> wherein all weight percent values are based on the total weight of the composition; and
>
> wherein the composition exhibits a flame retardancy of V0 as measured by UL-94 at sample thicknesses of 1.5 mm, 1.2 mm, 1.0 mm, and 0.8 mm.

Appeal Br. 13.

The claims also recite methods of improving the flame retardancy of such compositions, as well as extruded or injection molded articles made from such compositions. *Id.* at 16–18.

REFERENCES

Name	Reference	Date
Wang	CN 102070899 A	May 25, 2011
Zeng	CN 101899209 A	Dec. 1, 2010
Taguchi	US 4,788,261	Nov. 29, 1988
Landry-Coltrain	US 7,211,364 B1	May 1, 2007
Fisher	US 7,229,683 B2	June 12, 2007
Herbiet	US 2010/0324193 A1	Dec. 23, 2010

REJECTIONS[2]

The following claims are rejected under pre-AIA 35 U.S.C. § 103(a):

I. Claims 1–4, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40 over Wang, Zeng, Taguchi, and Fischer;

II. Claims 1–3, 5, 6, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40 over Wang, Landry-Coltrain, Taguchi, and Herbiet.

DISCUSSION

Rejection I

Appellant argues this rejection as a group. Appeal Br. 5–11. Consistent with our rules, we select claim 1 as representative of this group of rejected claims, and decide the appeal of Rejection I on the basis of claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner undisputedly finds that "Wang discloses an insulating and heat-conducting polyamide composition" containing a) an aliphatic polyamide, b) a thermal conductive additive such as aluminum oxide or magnesium oxide, and c) a polyarylene sulfide, with each component a), b), and c) in amounts that overlap the ranges claimed. Non-Final Act. 3–4. The Examiner finds that Wang does not disclose the thermal conductive additive as magnesium hydroxide, or the claimed flame retardancy rating of V0 at the recited sample thicknesses. *Id.* at 4.

[2] The Final Action does not contain a full statement of the rejections, but instead refers back to the Non-Final Action dated October 30, 2017 (hereinafter "Non-Final Act."). Final Act. 2. Our Decision, therefore, primarily cites to the findings and conclusions set forth in the Non-Final Action.

To account for these differences, the Examiner turns to Zeng, Taguchi, and Fischer. Non-Final Act. 4–5. Specifically, the Examiner finds, and Appellant does not dispute, that Zeng teaches the equivalency and interchangeability of magnesium oxide and magnesium hydroxide as insulating thermal conductors, and determines that it would have been obvious for the skilled artisan to substitute the magnesium oxide taught by Wang for the magnesium hydroxide taught by Zeng. *Id.* at 4. With respect to the recited flame retardancy rating, the Examiner finds "Taguchi teaches that polyarylene sulfide resins are used for their excellent flame retarding property" and that Fischer "teaches magnesium hydroxide functions as both a thermally conductive filler and as a fire retardant." *Id.* at 4–5.

Based on these disclosures, the Examiner concludes that "one of ordinary skill in the art would have expected that [] the composition taught by [the relied-upon prior art] would provide for the claimed V0 compliant flame retardancy or would have been able to obtain [a] composition having V0 flame retardancy." *Id.* at 5.

Appellant argues that the Examiner has not established a prima facie case of obviousness by failing to properly consider the limitation requiring the composition to exhibit a "flame retardancy value of V0 as measured by UL-94 at sample thicknesses of 1.5 mm, 1.2 mm, 1.0 mm, and 0.8 mm." Appeal Br. 5–11. Specifically, Appellant points to data contained within the Specification that purports to demonstrate "that not all compositions that contain the claimed percentages of components [i.e., Examples 1, 2, and 3] possess the claimed V0 properties." *Id.* at 7. In view of such data, Appellant argues that the claimed flame retardancy value is not achieved by all compositions falling within the claimed ranges, and that it is the

Examiner's burden to establish that achieving the claimed flame retardancy value would have been obvious. *Id.* (citing *In re Stepan Company*, 868 F.3d 1342, 1348 (Fed. Cir. 2017)). Appellant argues that the Examiner has failed to meet that burden. *Id.* Appellant argues further that the Examiner's alternative obviousness rationale—that the skilled artisan would have been able to "obtain" a composition having the claimed V0 flame retardancy—is erroneous because the Examiner has not explained how the skilled artisan would have done so. Appeal Br. 8.

We are unpersuaded that Appellant has identified reversible error in the rejection. Controlling precedent from our reviewing court is clear:

> [S]tructural similarity between claimed and prior art subject matter, provided by combining references or otherwise, where the prior art gives reason or motivation to make the claimed compositions, creates a *prima facie* case of obviousness, and [] the burden (and opportunity) then falls on an applicant to rebut that *prima facie* case. Such rebuttal or argument can consist of a comparison of test data showing that the claimed compositions possess unexpectedly improved properties or properties the prior art does not have, that the prior art is so deficient that there is no motivation to make what might otherwise appear to be obvious changes, or any other argument or presentation of evidence that is pertinent.

In re Dillon, 919 F.2d 688, 692–693 (Fed. Cir. 1990) (en banc) (internal citations omitted).

Here, the Examiner undisputedly finds that Wang discloses a structurally similar composition with respect to elements (a)–(c) recited in claim 1, except for the identical "thermal conductive additive" species claimed (element (b)). Non-Final 3–4. The Examiner also undisputedly finds that Wang's thermal conductive additive, e.g., magnesium oxide, is an art-recognized equivalent to magnesium *hydr*oxide—one of the claimed

"thermal conductive additives"—and is taught by Zeng to be interchangeable with Wang's magnesium oxide. *Id.* at 4. The Examiner furthermore determines that, based on the equivalence of magnesium oxide and magnesium hydroxide as insulating thermal conductors, it would have been obvious for the skilled artisan to have substituted Wang's magnesium oxide with Zeng's magnesium hydroxide because doing so would have been "the mere substitution of an equivalent." *Id.*

Based on these undisputed findings and determinations, the Examiner has established a structural similarity between the claimed composition and the prior art composition disclosed in Wang and Zeng, and has also identified a reason or motivation to make the claimed composition. Non-Final 3–4. Such circumstances create a prima facie case of obviousness, and shifts the burden to Appellant to rebut the prima facie case, e.g., by "showing that the claimed compositions possess unexpectedly improved properties or properties the prior art does not have." *Dillon*, 919 F.2d at 692–693.

We have reviewed Appellant's argument and evidence and determine that it fails to rebut the Examiner's prima facie case. Appellant's evidence appears to demonstrate that not all compositions having claimed elements (a), (b), and (c) within the claimed amounts exhibit the recited flame retardancy of V0 at the recited thicknesses of 1.5mm, 1.2mm, 1.0mm, and 0.8mm. Spec. 54 (Table 4), 57 (Table 6). Specifically, Example 1 achieved a flame retardancy value of V2 at a sample thickness of 0.8 mm, and had a flammability rating of "non-rated"[3] at sample thicknesses of 1.5, 1.2, and 1.0

[3] "NR" or "non-rated" appears to be a flammability rating. *See* Spec. ¶185 ("the flammability rating decreases from V2 to NR (non-rated)"); *see also*

mm. *Id.* at 57. Examples 2 and 3 had a flame retardancy rating of "NR" at all sample thicknesses recited in claim 1. *Id.* Examples 7 and 8, however, each achieved the recited V0 flame retardancy at each claimed thickness. *Id.* at 58 (Table 6).

Here, we observe Appellant's Examples 1, 3, and 8—exhibiting various flame retardancy ratings of V0, V2, and NR at the recited thicknesses—fall within the scope of not only elements (a)–(c) of the claims, but also the *prior art* composition. *Compare* Non-Final Act. 3–4 (setting forth undisputed "weight percent value" conversions of elements (a)–(c) in the prior art) *with* Spec. 54–55 (Table 4 setting forth the weight percent values[4] of components (a) [PA1], (b) [MG], and (c) [PPS]). Appellant's evidence regarding the Example 8 composition appears to show that the recited V0 flame retardancy is indeed achieved by the prior art composition.

We are unpersuaded by Appellant's assertions that the data specific to Examples 1–3, 7, and 8 exhibits "unexpected properties" or "unexpected results" of the claimed composition. Appeal Br. 7, 9. It is well-settled that "when unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art." *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991). Appellant's evidence makes no such showing.

Under these circumstances, Appellant has failed to show that the claimed "compositions had properties not possessed by the prior art

id. ¶ 186 ("the flammability rating improved from NR (example C2) to V1").

[4] In discussing the Examples, the Specification indicates that "percentages referring to composition are in terms of wt%." Spec. ¶ 178.

compositions or that they possessed them to an unexpectedly greater degree." *Dillon*, 919 F.2d at 693. We, therefore, do not agree with Appellant (Appeal Br. 9) that the data provided sufficiently rebuts the Examiner's prima facie case of obviousness.

For these reasons, and those provided by the Examiner, we sustain Rejection I.

Rejection II

In this rejection, the Examiner relies on the identical Wang and Taguchi references relied on in Rejection I, but substitutes Landry-Coltrain for Zeng and Herbiet for Fischer. Non-Final Act. 6–7. The Examiner also relies on the same obviousness rationales advanced for Rejection I. *Id.* at 7.

For this rejection, Appellant essentially relies on the same arguments presented for Rejection I. Appeal Br. 11. Because those arguments were unpersuasive for Rejection I, they are likewise unpersuasive for this rejection for the same reasons articulated above.

CONCLUSION

The Examiner's obviousness rejections are affirmed.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	References	Affirmed	Reversed
1–4, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40	103(a)	Wang, Zeng, Taguchi, and Fischer	1–4, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40	
1–3, 5, 6, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40	103(a)	Wang, Laundry–Coltrain, Taguchi, and Herbiet	1–3, 5, 6, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40	
Overall Outcome			1–6, 8, 11–14, 17–26, 28, 29, 31–35, and 37–40	

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