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JOHNS MANVILLE 10100 WEST UTE AVENUE PO BOX 625005 LITTLETON, CO 80162-5005			QIAN, YUN	
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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* KIARASH ALAVI SHOOSHTARI

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Appeal 2017-003287  
Application 13/490,638  
Technology Center 1700

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Before BRADLEY R. GARRIS, N. WHITNEY WILSON, and  
JEFFREY R. SNAY, *Administrative Patent Judges*.

SNAY, *Administrative Patent Judge*.

DECISION ON APPEAL<sup>1</sup>

Appellant<sup>2</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1, 4, 7, 10, 12, 13, 17, 19, 20, 22, 23, 35, and 36. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

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<sup>1</sup> We cite to the Specification ("Spec.") filed June 7, 2012; Final Office Action ("Final Act.") dated November 23, 2015; Appellant's Appeal Brief ("Br.") dated May 20, 2016; and Examiner's Answer ("Ans.") dated July 8, 2016.

<sup>2</sup> Appellant identifies Johns Manville Company as the real party in interest. Br. 3.

## BACKGROUND

The invention relates to crosslinkable binders for composite fiber products. Spec. ¶¶ 2, 5. Claim 1 illustrates the subject matter on appeal:

1. A binder composition comprising:  
a reducing sugar; and  
a crosslinking agent that is a reaction product of a urea compound and an aldehyde-containing compound, wherein the crosslinking agent and the reducing sugar have a molar ratio of 1:2 to 1:50.

Br. 12 (Claims Appendix).

## REJECTION

Claims 1, 4, 7, 10, 12, 13, 17, 19, 20, 22, 23, 35, and 36 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hampson<sup>3</sup> and Wang.<sup>4</sup>

## OPINION

Appellant limits the arguments to claim 1. *See* Br. 5–10. In accordance with 37 C.F.R. § 41.37(c)(1)(iv), we select claim 1 as representative and decide the appeal based on the representative claim alone.

Hampson discloses a binder for fiber products, such as insulation or wood boards, that includes a carbohydrate, a nitrogen source, and an acid precursor. Hampson Abstract. The carbohydrate preferably is a reducing sugar, such as dextrose. *Id.* at 3:24–26. The nitrogen source may be an amine reactant. *Id.* at 4:14. Curing occurs via a Maillard type reaction. *Id.*

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<sup>3</sup> GB 2 451 719 A, published February 11, 2009 (“Hampson”).

<sup>4</sup> US 2007/0082187 A1, published April 12, 2007 (“Wang”).

at 5:4–6).<sup>5</sup> Hampson’s disclosed binder composition differs from that of claim 1 in that Hampson does not identify the above-mentioned amine reactant as a reaction product of a urea compound and an aldehyde-containing compound. Nor does Hampson teach the claimed molar ratio.

The Examiner finds that Wang teaches a binder composition that includes a dihydroxyethylene urea (DHEU), particularly, 4,5-dihydroxyimidazolidin-2-one (Final Act. 3–4), which Appellant identifies in the Specification as an example of the claimed crosslinking agent that is a reaction product of a urea compound and an aldehyde-containing compound (Spec. ¶ 5). Wang teaches that the above-mentioned DHEU crosslinks with a crosslinking agent containing hydroxyl groups, such as maltodextrin. Wang ¶¶ 45, 46, 57. Fiber products, including wood boards, fabricated with Wang’s crosslinked DHEU are stated to exhibit reduced emission of volatile organic compounds, particularly formaldehyde. *Id.* ¶¶ 10–11. In light of the foregoing disclosures, the Examiner finds that one of ordinary skill in the art would have had a reason to use Wang’s DHEU to crosslink dextrose in Hampson’s binder composition. Final Act. 4.

Appellant argues that Hampson teaches away from using a complex organic nitrogen source such as Wang’s DHEU because, according to Appellant, Hampson’s disclosed binder is based on a discovery that complex organic nitrogen-containing compounds can be replaced with cheaper and more available inorganic ammonium salts without compromising the suitability of the binder. Br. 6 (citing Hampson 2:5–15). We disagree. At

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<sup>5</sup> Appellant acknowledges in the Specification that Maillard binders contain reaction products of reducing sugar carbohydrates and amine reactants. Spec. ¶ 4.

the passage relied upon by Appellant, Hampson's noted discovery relates to the acid component of the binder, not the nitrogen source. *See* Hampson 2:1–10 (identifying a known Maillard-type binder that includes a reducing sugar, ammonia, and a carboxylic acid, and stating that it was considered “surprising that an acid precursor derivable from an inorganic salt should provide a suitable acid precursor in an otherwise apparently similar binder system”). Although Hampson goes on to teach that a “particular advantage” can be achieved by using inorganic ammonium salts that can serve both as the acid precursor and nitrogen source (*id.* at 2:13–17),<sup>6</sup> we do not read that preferred embodiment as a teaching away from using other non-preferred nitrogen sources. *See In re Mills*, 470 F.2d 649, 651 (CCPA 1972) (“All the disclosures in a reference must be evaluated, including nonpreferred embodiments, and a reference is not limited to the disclosure of specific working examples”) (internal citations omitted).

Appellant also argues that Wang's teaching of reduced emission of volatile organic compounds (VOCs) and autoclave curing would not have been reasons to modify Hampson because Hampson's preferred inorganic ammonium salt already provides reduced VOCs and shorter cure times by hot air circulation. Br. 7. Neither of these points, however, refutes the Examiner's finding that Wang's DHEU nitrogen source is taught to yield a Maillard-type binder that produces useful wood composites. Final Act. 4.

Appellant disputes the Examiner's calculation result that suggests Wang's DHEU/maltodextrin molar ratio falls within the range recited in

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<sup>6</sup> *See also* Hampson 4:14–16 (“The source of nitrogen may be an amine reactant; it *may be* derivable from the same source as the in [sic] acid precursor, for example, from an inorganic ammonium salt”) (emphasis added).

claim 1. Br. 8–9. However, Appellant presents no argument against the Examiner’s finding that the molar ratio of these ingredients would have been recognized as a result-effective variable, the optimization of which would have been obvious to one of ordinary skill in the art. Final Act. 5.

Consistent with the Examiner’s finding, Wang teaches that DHEU and the other binder components are provided in “effective amounts” and that the amount of DHEU included “can vary significantly.” Wang ¶¶ 15, 57.

For the foregoing reasons, Appellant does not persuasively identify reversible error in the Examiner’s rejection of claim 1. Accordingly, the Examiner’s rejection as applied to claim 1, and each of the remaining claims on appeal that are not separately argued, is sustained.

#### DECISION

The Examiner’s rejection of claims 1, 4, 7, 10, 12, 13, 17, 19, 20, 22, 23, 35, and 36 is affirmed.

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

AFFIRMED