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Paper 34
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BUTAMAX ADVANCED BIOFUELS LLC,
Petitioner,

v.

GEVO, INC.,
Patent Owner.

Case IPR2014-00142
Patent 8,193,402 B2

Before SHERIDAN K. SNEDDEN, CHRISTOPHER L. CRUMBLEY, and GEORGIANNA W. BRADEN, *Administrative Patent Judges*.

SNEDDEN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318 and 37 C.F.R. § 42.73

I. INTRODUCTION

Butamax Advanced Biofuels LLC ("Petitioner") filed a Petition to institute an *inter partes* review of claims 1–23 of U.S. Patent No. 8,193,402 B2 ("the '402 patent") pursuant to 35 U.S.C. §§ 311–319. Paper 1 ("Pet."). Gevo, Inc. ("Patent Owner") did not file a preliminary response to the Petition. On May 22, 2014, we instituted trial for challenged claims 1–17 and 19–23 on the following grounds of unpatentability asserted by Petitioner:

Challenged Claim[s]	Basis	Reference[s]
1–10, 12, 15–17, 19–20, 22–23	§ 102(e)	D'Amore[1]
1–10, 12, 15–17, 19–20, 22–23	§ 103(a)	D'Amore and ASTM D4814[2]
11	§ 103(a)	D'Amore, Wilke,[3] and ASTM D4814
13	§ 103(a)	D'Amore and ASTM D975[4]
14	§ 103(a)	D'Amore and ASTM D1655[5]
21	§ 103(a)	D'Amore and D910[6]

Decision to Institute (Paper 13, "Dec.").

After institution of trial, the Patent Owner filed a Patent Owner Response

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[1] D'Amore, US 2008/0132741 A1, published June 5, 2008. Ex. 1003.

[2] ASTM Standard D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," ASTM International, West Conshohocken, PA, Sept. 2007, available at http://www.astm.org ("ASTM D4814"). Ex. 1014.

[3] Wilke, US 4,359,533, issued Nov. 16, 1982. Ex. 1006.

[4] ASTM Standard D975, "Standard Specification for Diesel Fuel Oils," ASTM International, West Conshohocken, PA, Aug. 2007, available at http://www.astm.org ("ASTM D975"). Ex. 1015.

[5] ASTM Standard D1655, "Standard Specification for Aviation Turbine Fuels," ASTM International, West Conshohocken, PA, July 2007, available at http://www.astm.org ("ASTM D1655"). Ex. 1017.

[6] ASTM Standard D910, "Standard Specification for Aviation Gasolines," ASTM International, West Conshohocken, PA, Aug. 2007, available at http://www.astm.org ("ASTM D910"). Ex. 1016.

(Paper 20, "PO Resp."), to which Petitioner filed a Reply (Paper 22, "Reply").

Petitioner relies upon the Declarations of Dr. Joseph T. Joseph (Exs. 1030 and 1040) in support of its Petition.

Oral argument was conducted on January 14, 2015. A transcript is entered as Paper 33 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine Petitioner has shown by a preponderance of the evidence that claims 1–17 and 19–23 of the '402 patent are unpatentable.

A. Related Proceedings

Petitioner informs us of no related litigations. Pet. 2. Concurrent with the present *inter partes* review, Petitioner also requested review of, and the Board instituted trial on, the following claims in patents in the same family as the '402 patent: claims 1–21 of U.S. Patent No. 8,378,160, Case IPR2014-00143 (PTAB May 22, 2014) (Paper 9); claims 1–14 and 16–19 of U.S. Patent No. 8,487,149, Case IPR2014-00144 (PTAB May 22, 2014) (Paper 9); and claims 1–21 of US Patent No. 8,546,627, Case IPR2014-00250 (PTAB May 22, 2014) (Paper 8). Additionally, Petitioner requested review of, and the Board instituted trial on, claims 1–15 of unrelated U.S. Patent No. 8,373,012 in IPR2014-00402 (PTAB August 8, 2014) (Paper 11).

B. The '402 patent (Ex. 1001)

Transportation fuels are defined as mixtures of typically aliphatic and (optionally) aromatic hydrocarbons that meet a collection of physical properties and requirements, as defined in standards such as ASTM D4814 (gasoline), ASTM D975 (diesel fuel), ASTM D910 (aviation gasoline), and ASTM D1655 (jet fuel). Ex. 1001, 12:15–17:25. Gasoline, for example, is defined not by its composition,

but by its ability to function in a spark ignition engine according to properties defined by ASTM D4814. *Id.* at 11:36–43. Such properties include vapor pressure, energy density, octane number, water solubility, thermal oxidation stability, gum content, and drivability. *Id.* at 15:27–45. The properties of gasoline can be adjusted by modifying the amounts and types of organic molecules that make up the gasoline. *Id.* For example, the octane number of a gasoline mixture can be raised by adding high octane components. *Id.*

The '402 patent, titled "Renewable Compositions," describes methods for making renewable hydrocarbons. *Id.* at 3:62–4:59. The methods involve preparing a feedstock from a biomass to serve as a carbon source. *Id.* at 6:47–7:13. The feedstock is fermented with microorganisms to form C_2–C_6 alcohols. *Id.* at 3:65–67. The alcohols are dehydrated to form C_2–C_6 olefins (alkenes). *Id.* at 4:1–3. The olefins are reacted with an oligomerization catalyst to form more highly alkylated aromatic hydrocarbons, for example, C_6–C_{24} unsaturated oligomers. *Id.* at 4:5–8 and 9:62–10:9. The dehydration step and oligomerization step may be carried out separately or combined into a single process. *Id.* at 20:35–41. The olefins are then reduced to heat-stable saturated hydrocarbons in a hydrogenation reaction. *Id.* at 23:53–59. The '402 patent discloses that the compositions produced according to the methods of the patent meet the fuel-defining ASTM International specifications. *Id.* at 18: 26–38.

C. Illustrative Claim

Claim 1 is the only independent claim of the '402 patent, and is reproduced below:

1. A process for preparing renewable hydrocarbons comprising:
   (a) treating biomass to form a feedstock;
   (b) fermenting the feedstock with one or more species of microorganism, thereby forming one or more C_2–C_6 alcohols;

> (c) dehydrating at least a portion of the one or more C_2–C_6 alcohols obtained in step (b), thereby forming a product comprising one or more C_2–C_6 olefins;
>
> (d) isolating the one or more C_2–C_6 olefins;
>
> (e) oligomerizing at least a portion of the one or more C_2–C_6 olefins isolated in step (d), thereby forming a product comprising one or more C_6-C_{24} unsaturated oligomers; and
>
> (f) hydrogenating at least a portion of the product of step (e) in the presence of hydrogen, thereby forming a product comprising one or more C_6–C_{24} saturated alkanes;
>
> whereby the product of step (f) itself meets the requirements of at least one of ASTM D4814, ASTM D975, ASTM D910, or ASTM D1655, or a blend of at least 10% of the product of step (f) with a mixture of hydrocarbons meets the requirements of at least one of ASTM D4814, ASTM D975, ASTM D910 or ASTM D1655.

Id. at 62:11–33.

II. ANALYSIS

A. Claim Interpretation

We interpret claims using the "broadest reasonable construction in light of the specification of the patent in which [they] appear[]." 37 C.F.R. § 42.100(b); *see also In re Cuozzo Speed Techs., LLC*, 778 F.3d 1271, 1279–83 (Fed. Cir. 2015) ("Congress implicitly adopted the broadest reasonable interpretation standard in enacting the AIA," and "the standard was properly adopted by PTO regulation."). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

We interpret the following claim terms of the challenged claims as part of our analysis.

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