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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CRYSTAL DAWN HEGE BYRD and
ANTHONY RICHARD GERARDI

Appeal 2018-008109
Application 14/924,394
Technology Center 1700

Before GEORGE C. BEST, GEORGIANNA W. BRADEN, and
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ requests our review under 35 U.S.C. § 134(a) of the Examiner's decision to finally reject claims 1 and 4². We have jurisdiction over this appeal under 35 U.S.C. § 6(b).

¹ Appellant is the Applicant, R.J. Reynolds Tobacco Company, which, according to the Appeal Brief, is also the real party in interest. Appeal Brief filed April 6, 2018 ("Br."), 1.

² Although claims 1, 4, 5, and 47 were rejected in the Final Office Action entered November 6, 2017 ("Final Act.") for obviousness-type double patenting, Appellant submitted a terminal disclaimer on February 6, 2018 to address this rejection. The Examiner confirmed acceptance of the terminal disclaimer in an Advisory Action entered February 22, 2018, and indicated that the terminal disclaimer overcame the rejection. Advisory Act. 2.

We AFFIRM.

CLAIMED SUBJECT MATTER

Appellant claims a molecularly imprinted polymer. Br. 1–2. Claim 1, the sole pending independent claim, illustrates the subject matter on appeal, and is reproduced below with contested language italicized:

1. A molecularly imprinted polymer *selective for 1,3-butadiene*[]*or a precursor thereto*.

Br. 9 (Claims Appendix) (emphasis added).

REJECTION

The Examiner maintains the rejection of claims 1 and 4 under 35 U.S.C. § 103(a) as unpatentable over Southard (US 7,476,316 B2, issued January 13, 2009) in view of Travers et al. (US 2008/0245376 A1, published October 9, 2008) in the Examiner’s Answer entered May 25, 2018 (“Ans.”).

FINDINGS OF FACT AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant’s contentions, we affirm the Examiner’s rejection of claims 1 and 4 under 35 U.S.C. § 103(a), for the reasons set forth in the Final Action, the Answer, and below.

Because claim 5 was rejected only for obviousness-type double patenting in the Final Action, it no longer stands rejected. Appellant also canceled claim 47, and amended claims 1 and 4, in an amendment filed with the terminal disclaimer. The Examiner confirmed entry of the amendments in the February 22, 2018 Advisory Action, and indicated that the amendments overcame the rejection of claims 1 and 4 under 35 U.S.C. § 102(a) as anticipated by Xue (US 2004/0040565 A1, published March 4, 2004), or alternatively under 35 U.S.C. § 102(a) as obvious over Xue, and the rejection of claim 47 under 35 U.S.C. § 103(a) as unpatentable over Southard in view of Travers. Advisory Act. 2.

We review appealed rejections for reversible error based on the arguments and evidence the appellant provides for each issue the appellant identifies. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential) (cited with approval in *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that even if the Examiner had failed to make a prima facie case, “it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections.”)).

Appellant argues claims 1 and 4 together on the basis of claim 1, to which we accordingly limit our discussion. Br. 2–8; 37 C.F.R. § 41.37(c)(1)(iv).

Southard discloses a synthetic polymer designed to selectively bind a particular compound in a fluid, which Southard refers to as a “molecularly imprinted polymer.” Southard col. 3, ll. 17–19; col. 5, l. 66–col. 7, l. 1. Southard indicates that “fluid” refers to any material having the ability to flow, including liquids and gases. Southard col. 4, ll. 1–4.

Southard discloses preparing the molecularly imprinted polymer by incorporating a target compound, also referred to as a “template” compound, into a pre-polymeric mixture of cationic ligands, allowing the template compound to form bonds with the ligands, polymerizing the ligands with the template compound in place, and removing the template compound following polymerization to form cavities in the resulting polymer that correspond to the template compound. Southard col. 2, ll. 41–52; col. 3, ll. 25–33. Southard discloses that the molecularly imprinted polymer so produced is tailored to bind the target or template compound, and similar compounds, with high affinity. Southard col. 3, ll. 31–40.

Southard discloses that although preferred template compounds include inorganic compounds, template compounds may also include low molecular weight organic compounds, such as aliphatic hydrocarbons, having a molecular weight of 250 atomic mass units (a.m.u.) or less, preferably 100 a.m.u. or less.³ Southard col. 4, ll. 45–54; col. 5, ll. 1–7.

The Examiner finds that although Southard discloses low molecular weight aliphatic hydrocarbon target compounds, “Southard does not disclose 1,3-butadiene in particular,” and the Examiner relies on Travers for suggesting such a target compound. Final Act. 5–6.

Travers discloses incorporating one or more additives, such as molecularly imprinted polymers, into a cigarette filter to reduce the level of, or remove, particular compounds from smoke generated by the cigarette. Travers ¶¶ 1, 185, 186, 214. Travers discloses that 1,3-butadiene has been identified as a compound in cigarette smoke whose selective reduction is of particular interest. Travers ¶ 100.

In view of these disclosures in Southard and Travers, the Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of Appellant’s invention to form a molecularly imprinted polymer as disclosed in Southard using 1,3-butadiene as a template compound, to produce an additive for cigarette filters as disclosed in Travers for removing 1,3-butadiene from cigarette smoke. Final Act. 6; Ans. 6.

Appellant argues that one of ordinary skill in the art would not have been motivated to “select” 1,3-butadiene for use as Southard’s low

³ We note that 1,3-butadiene has a molecular weight of 60.13 g/mol or 60.13 a.m.u. *See, e.g.*, https://pubchem.ncbi.nlm.nih.gov/compound/1_3-Butadiene_hexadeutero-_trans.

molecular weight organic compound, and would not have “design[ed] a molecularly imprinted polymer for this particular compound.” Br. 3. Appellant argues that Southard and Travers are “primarily related to different applications” because Southard discloses molecularly imprinted polymers “designed for use in liquids,” while Travers discloses removal of compounds from “the gaseous phase.” Br. 4–5. Appellant argues that one of ordinary skill in the art would have recognized that all the “examples” and “all references to preparation and use of molecularly imprinted polymers” in Southard are “highly specific to liquid extraction of target molecules.” *Id.* Appellant argues that “[t]here is no teaching or suggestion that the molecularly imprinted polymers of the Southard reference, designed for use in liquids, would be suitable for the removal of a compound noted only to be of concern within the gas phase (i.e., as a component of mainstream cigarette smoke).” Br. 5.

Appellant’s arguments are unpersuasive of reversible error in the Examiner’s rejection, however, for reasons that follow. As discussed above, Travers discloses using molecularly imprinted polymers to reduce the level of, or remove, particular target compounds from cigarette smoke, and indicates that 1,3-butadiene has been identified as a compound in cigarette smoke whose selective reduction is of particular interest. ¶¶ 100, 185, 186, 214. Contrary to Appellant’s arguments, based on the evidence of record one of ordinary skill in the art, therefore, would have had a reason to design a molecularly imprinted polymer as disclosed in Southard for selectively binding, or targeting, 1,3-butadiene.

Although Appellant argues that all of the examples and references to preparation and use of molecularly imprinted polymers in Southard are

“highly specific to liquid extraction of target molecules” (Br. 4–5), Southard’s disclosures are not limited to the examples and particular embodiments described in the reference, and all of Southard’s disclosures must be considered for what they would have fairly taught and suggested to one of ordinary skill in the art at the time of Appellant’s invention. *In re Mercier*, 515 F.2d 1161, 1165 (CCPA 1975) (“[A]ll of the relevant teachings of the cited references must be considered in determining what they fairly teach to one having ordinary skill in the art.”); *see also In re Applied Materials, Inc.*, 692 F.3d 1289, 1298 (Fed. Cir. 2012) (“A reference must be considered for everything that it teaches, not simply the described invention or a preferred embodiment.”); *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976) (“all disclosure of the prior art, including unpreferred embodiments, must be considered”).

Southard broadly discloses molecularly imprinted polymers designed to selectively bind a particular compound in a fluid, and Southard indicates that “fluid” refers to any material having the ability to flow, including liquids *and gases*. Southard col. 3, ll. 17–19; col. 4, ll. 1–4; col. 5, l. 66–col. 7, l. 1. Southard’s disclosure of examples and particular embodiments relating to liquids does not negate, or detract from, this broader teaching of using molecularly imprinted polymers to selectively bind particular compounds in gases. Accordingly, rather than being related to different applications as Appellant asserts, Southard and Travers both relate to the same application—selective removal of particular target compounds from gases using molecularly imprinted polymers.

In view of Southard’s disclosure of low molecular weight organic target compounds for molecularly imprinted polymers, such as aliphatic

hydrocarbons, and Travers' disclosure of particular interest in selective removal of 1,3-butadiene—a low molecular weight aliphatic hydrocarbon—from cigarette smoke using molecularly imprinted polymers, one of ordinary skill in the art reasonably would have been led to design a molecularly imprinted polymer as disclosed in Southard using 1,3-butadiene as a target or template compound to selectively remove 1,3-butadiene from cigarette smoke, by incorporating the molecularly imprinted polymer into a cigarette filter, as disclosed in Travers.

Appellant argues that one of ordinary skill in the art would not have expected that molecularly imprinted polymers as disclosed in Southard could be successfully used to capture organic compounds, such as 1,3-butadiene, because Southard “focuses specifically on molecularly imprinted polymers for the capture of inorganic species,” and “[t]he only references to organic compounds in the Southard reference related specifically to non-preferred embodiments.” Br. 5–7. Appellant argues that “all specific applications for the disclosed molecularly imprinted polymers referenced in the Southard reference are specific to removal of inorganic components,” and “the Southard reference provides no examples of a molecular imprinted polymer suitable for removal of any particular organic compound from a liquid, let alone a molecularly imprinted polymer suitable for removal of a compound with similar functionality as 1,3-butadiene, as claimed.” Br. 6–7. Appellant argues that “[o]ne of skill in the art will readily appreciate that the considerations with respect to effectively binding an inorganic species would be fundamentally different than those with respect to effectively binding an organic compound such as, e.g., 1,3-butadiene.” Br. 6.

As discussed above, however, “all disclosure of the prior art,

including unpreferred embodiments, must be considered” for what they would have fairly taught and suggested to one of ordinary skill in the art at the time of Appellant’s invention. *Lamberti*, 545 F.2d at 750; *Applied Materials*, 692 F.3d at 1298. Although Southard may disclose that inorganic compounds are preferred template compounds for the molecularly imprinted polymers described in the reference, Southard nonetheless also explicitly discloses that template compounds may include low molecular weight organic compounds, such as aliphatic hydrocarbons. Southard col. 4, ll. 45–54; col. 5, ll. 1–7. And although Southard may disclose particular embodiments related to removal of inorganic components, and may not include examples involving removal of organic compounds, such disclosures, or lack thereof, do not negate, or detract from, Southard’s broader teaching of the suitability of using low molecular weight organic compounds as target compounds for molecularly imprinted polymers.

Appellant does not provide any objective evidence to support the assertion that “[o]ne of skill in the art will readily appreciate that the considerations with respect to effectively binding an inorganic species would be fundamentally different than those with respect to effectively binding an organic compound such as, e.g., 1,3-butadiene.” Br. 6. It is well-established that unsupported attorney arguments do not constitute evidence necessary to resolve a disputed question of fact. *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997) (“An assertion of what seems to follow from common experience is just attorney argument and not the kind of factual evidence that is required to rebut a prima facie case of obviousness.”); *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (“Attorney argument is not evidence” and cannot rebut other admitted evidence.); *In re Pearson*,

494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”); *In re Schulze*, 346 F.2d 600, 602 (CCPA 1965) (“Argument in the brief does not take the place of evidence in the record.”).

To the extent Appellant asserts that one of ordinary skill in the art would not have had sufficient skill to appropriately adapt Southard’s molecularly imprinted polymers to successfully target 1,3-butadiene, Appellant’s unsupported arguments do not demonstrate that such modification would have been “uniquely challenging or difficult for one of ordinary skill in the art.” *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–419 (2007)); *In re Sovish*, 769 F.2d 738, 743 (Fed. Cir. 1985) (In an obviousness assessment, skill is presumed on the part of the artisan, rather than the lack thereof.). This is particularly the case in view of Southard’s explicit disclosure that suitable target compounds for the molecularly imprinted polymers described in the reference include low molecular weight organic compounds, such as aliphatic hydrocarbons, which disclosure is presumptively enabling. *In re Antor Media Corp.*, 689 F.3d 1282, 1288 (Fed. Cir. 2012) (a prior art printed publication, like a prior art patent, “is presumptively enabling barring any showing to the contrary by a patent applicant or patentee.”); *In re Morsa*, 713 F.3d 104, 110 (Fed. Cir. 2013) (“[A]n applicant must generally do more than state an unsupported belief that a reference is not enabling.”).

Consequently, in view of Southard’s disclosure that suitable target compounds for molecularly imprinted polymers include low molecular weight organic compounds, such as aliphatic hydrocarbons, and Travers’ disclosure of particular interest in selective removal of 1,3-butadiene—a low

molecular weight aliphatic hydrocarbon—from cigarette smoke using molecularly imprinted polymers, one of ordinary skill in the art reasonably would have expected that a molecularly imprinted polymer as disclosed in Southard designed to selectively bind 1,3-butadiene as a target compound could be successfully used for removal of 1,3-butadiene from a gas such as cigarette smoke.

We, therefore, sustain the Examiner's rejection of claim 1, and claim 4, which depends from claim 1, under 35 U.S.C. § 103(a).

DECISION

We affirm the Examiner's rejection of claims 1 and 4 under 35 U.S.C. § 103(a).

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