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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSEPH J. BELBRUNO

Appeal 2019-001382
Application 14/624,813
Technology Center 1700

Before DONNA M. PRAISS, MICHELLE N. ANKENBRAND, and
JEFFREY R. SNAY, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ appeals under 35 U.S.C. § 134(a) from the Examiner's
decision² finally rejecting claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27.
We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellant identifies FreshAir Sensor LLC as the real party in interest.
Appeal Brief, filed July 18, 2018 (“Appeal Br.”) 4.

² Final Action, mailed March 2, 2018 (“Final Act.”).

STATEMENT OF THE CASE

Background

The subject matter on appeal “relates to systems and methods for passive sensors, and, more specifically, to systems and methods for molecularly imprinted polymer-based sensors for detecting target molecules, for example, small aromatic molecules, such as, for example, benzene.” Specification, filed February 18, 2015 (“Spec.”) ¶ 2. According to the Specification, a molecularly imprinted polymer formed in the presence of a template molecule produces a complementary cavity left behind in the polymer when the molecule is removed. *Id.* ¶ 3. The molecularly imprinted polymer demonstrates an affinity for the template molecule, with most polymers interacting with the molecule via non-covalent interactions, such as hydrogen bonding or electrostatic forces. *Id.* ¶¶ 3–4. The Specification states, however, that small aromatic molecules, such as benzene, are non-polar and do not present such opportunities for interaction with the polymer. *Id.* ¶ 4.

The Specification discloses a molecularly imprinted polymer containing one or more binding sites for one or more target molecules. *Id.* ¶ 15. The molecularly imprinted polymer can be formed by dissolving a structural polymer component in a solvent, dissolving one or more target molecules in the solvent, and removing the target molecule to leave behind the molecularly imprinted polymer with cavities complementary to the target molecule that act as binding sites for the target molecule or similar molecules. *Id.* ¶¶ 43–45. The Specification further discloses a reporting component to allow for detection of a target molecule that binds to the molecularly imprinted polymer. *Id.* ¶ 15.

Of the appealed claims, claims 1, 8, and 11 are independent. Claim 1 is representative of the subject matter on appeal, and reproduced below:

1. A system for the detection of non-polar target molecules, the system comprising:

a polymer film molecularly imprinted with a non-functionalized non-polar template molecule to form cavities complementary in shape to a non-polar target molecule, each of the cavities forming a binding site specific for the non-polar target molecule;

a sensing material for detecting binding of the non-polar target molecule to the polymer film, the polymer film being coated upon the sensing material.

Appeal Br. 25 (Claims App'x).

The References

Warner	US 2007/0141683 A1	June 21, 2007
Murray	US 2008/0144002 A1	June 19, 2008
Hall	WO 2014/030002 A2	Feb. 27, 2014

The Rejections

The Examiner maintains the following rejections on appeal, which include new grounds in the Examiner's Answer, dated November 9, 2018 ("Ans.")³

³ The Examiner rejected claims 1, 4, 5, 7–12, 16, 21, 22, 24, 25, and 27 under 35 U.S.C. § 103 as unpatentable over Warner in the Final Office Action. Final Act. 3–5. In the Answer, however, the Examiner reinstates an earlier rejection of claims 1, 3–5, 7–12, 15, 16, and 21–28 under 35 U.S.C. § 102(a)(1) as anticipated by Warner, but does not include the § 103 rejection of claims 1, 4, 5, 7–12, 16, 21, 22, 24, 25, and 27 over Warner in the list of rejections applicable to the appealed claims. Ans. 3–5. Although the Examiner does not explicitly state so in the Answer, we treat the § 103 rejection of claims 1, 4, 5, 7–12, 16, 21, 22, 24, 25, and 27 over Warner as withdrawn and not before us on appeal.

1. Claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 are rejected under 35 U.S.C. § 112(a) as failing to comply with the written description requirement;
 2. Claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 are rejected under 35 U.S.C § 112(b) as indefinite;
 3. Claims 1, 4, 5, 7–12, 16, 21, 22, 24, 25, and 27 are rejected under 35 U.S.C. § 102(a)(1) as anticipated by Warner;
 4. Claim 2 is rejected under 35 U.S.C. § 103 as unpatentable over Warner in view of Murray; and
 5. Claims 13 and 14 are rejected under 35 U.S.C. § 103 as unpatentable over Warner in view of Hall.
- Final Act. 2–3; Ans. 3–7.

OPINION

Indefiniteness Rejection

The Examiner concludes the phrase “non-functionalized” in independent claims 1 and 11 is indefinite because the Specification does not describe or define the phrase in a manner that would allow one of ordinary skill in the art to determine the metes and bounds of the claims. Ans. 3–4.

Appellant argues “non-functionalized” is a term of art that an “artisan will understand as pertaining to whether or not a molecule has any functional groups or facilitating chemical reactions,” a non-polar molecule is only capable of relatively weak interactions but this shortcoming may be overcome by substituting in functional groups, and a “non-functionalized non-polar template molecule’ refers to a non-polar molecule that has not undergone substitution to have such functional groups.” Reply Brief, filed December 5, 2019 (“Reply Br.”) 12. Appellant further argues that the

Specification “implicitly defines non-polar molecules as being unable to interact strongly with the polymer host, and thereby also implicitly defines non-polar molecules as being non-functionalized” and, thus, “the additional term ‘non-functionalized’ is redundant” but was added “in the interest of additional clarity” to distinguish the claimed invention from Warner. *Id.* at 13 (citing Spec. ¶ 30).

After having considered the evidence presented in this Appeal and each of Appellant’s contentions, we are not persuaded that Appellant identifies reversible error with respect to the Examiner’s indefiniteness rejection. We affirm the Examiner’s rejection for the reasons expressed in the Answer and explained below.

Appellant’s position is that a “non-functionalized non-polar template molecule” is a non-polar template molecule that does not have any functional groups or does not facilitate chemical reactions. Appellant also contrasts a functionalized template molecule with a non-polar template molecule that is only capable of weak interactions. However, Appellant does not provide evidence or persuasive technical reasoning to outline what functional groups cause an otherwise non-polar template molecule to “facilitate chemical reactions” or interact more strongly with a polymer host than a non-polar template molecule. *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (“Attorney’s argument in a brief cannot take the place of evidence.”).

We agree with the Examiner that a person of ordinary skill in the art would not be able to determine the metes and bounds of a “non-functionalized non-polar template molecule” because the Specification fails to provide details as to what constitutes a non-functionalized template

molecule or which molecular groups would cause a strength of interactions with a polymer host sufficient to characterize a molecule as functionalized. Indeed, the Specification does not even use the language “non-functionalized.”

Further, although dependent claims 16, 22, and 25 all recite “the non-functionalized non-polar template molecule being benzene,” they still require a non-functionalized benzene. The Specification, however, fails to provide any details as to which types of benzene molecules are non-functionalized (i.e., does “non-functionalized” mean that the benzene ring cannot have any functional groups at all, or does it mean that only certain functional groups are excluded).

As to Appellant’s argument that the phrase “non-functionalized” is co-extensive in meaning and scope with “non-polar,” Appellant also does not direct us to evidence in the record as to what functional groups provide polarity (e.g., render a “non-polar” template molecule polar). Nor does Appellant cite a standard in the Specification for what degree of interaction a functional group must provide in comparison to the degree of interaction a non-polar template molecule provides, or to what degree a template molecule must facilitate a chemical reaction to fall outside the scope of the phrase “non-functionalized non-polar template molecule.”

Accordingly, we affirm the Examiner’s rejection of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 under § 112(b).

Written Description Rejection

The Examiner finds “non-functionalized non-polar template molecule” lacks written description support because the Specification is silent in regard to a “non-functionalized” template molecule and discussions

of benzene as a non-polar molecule do not teach how any other template molecule is non-functionalized. Final Act. 2–3.

Appellant contends there is written description support for a “non-functionalized non-polar template molecule” because the Specification discloses that benzene may be a template molecule. Appeal Br. 6–8.

After having considered the evidence presented in this Appeal and each of Appellant’s contentions, we are not persuaded that Appellant identifies reversible error with respect to the Examiner’s written description rejection. We affirm the Examiner’s rejection of those claims for the reasons expressed in the Final Action, the Answer, and explained below.

The test for sufficiency of a written description is whether the disclosure “clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562–63 (Fed. Cir. 1991)). The disclosure must “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* at 1351. To claim a genus, a patentee must disclose “a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can visualize or recognize the members of the genus.” 598 F.3d at 1350.

Here, Appellant’s Specification discloses a single species—benzene—to support both the genus of “non-functionalized non-polar template molecule[s]” and “non-functionalized non-polar” benzene template molecules. This is insufficient to provide a representative number of species

so that one of ordinary skill in the art can visualize or recognize members of either genus.

Appellant further argues “[i]t is well known in the art that Benzene is not a functionalized molecule” and one of ordinary skill in the art would understand from the Specification “that functionalization of non-polar molecules enables the stronger types of interactions.” Appeal Br. 7–8; Reply Br. 10. Appellant continues that an ordinarily skilled artisan also would understand that a non-polar template molecule is non-functionalized. Reply Br. 11. These are mere attorney arguments without evidentiary support or persuasive technical reasoning.

Further, as discussed above with regard to the indefiniteness rejection, the Specification provides no guidance as to what functional groups are included in or excluded from the phrases “non-functionalized non-polar template molecule” or “non-functionalized non-polar template molecule being benzene.” Therefore, Appellant’s disclosure does not reasonably convey to one of ordinary skill in the art possession of the claimed subject matter as of the filing date.

Accordingly, we affirm the Examiner’s rejection of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 under 35 U.S.C. § 112(a) as failing to comply with the written description requirement.

Prior Art Rejections

The Examiner rejects claims 1, 4, 5, 7–12, 16, 21, 22, 24, 25, and 27 as anticipated by Warner and rejects claims 2, 13, and 14 as having been obvious over Warner and Murray (claim 2) or Warner and Hall (claims 13 and 14). *See* Ans. 3. As explained above, we affirm the Examiner’s indefiniteness rejection of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27

under § 112(b) because we determine that a person of ordinary skill in the art would not be able to ascertain the metes and bounds of those claims without speculation. In such a situation, the more prudent course is to decline to review a claim rejection that requires us to consider the scope of the invention as claimed. *See In re Aoyama*, 656 F.3d 1293, 1300 (Fed. Cir. 2011) (holding that the Board erred in affirming an anticipation rejection of indefinite claims); *In re Steele*, 305 F.2d 859, 862 (CCPA 1962) (holding that the Board erred in affirming an obviousness rejection of indefinite claims because the rejection was based on speculative assumptions as to the meaning of the claims). Here, review of the Examiner’s anticipation and obviousness rejections as to claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 would require us to consider the scope of the claims as to the phrases “non-functionalized non-polar template molecule” and “non-functionalized non-polar” benzene template molecule—phrases that we have determined are indefinite. Thus, we procedurally reverse the Examiner’s rejections of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 under §§ 102 and 103, and do not reach the merits of those rejections.

CONCLUSION

The Examiner’s rejections of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 under 35 U.S.C. §§ 112(a) and 112(b) are affirmed.

The Examiner’s rejections of claims 1, 2, 4, 5, 7–14, 16, 21, 22, 24, 25, and 27 under §§ 102(a)(1) and 103 are procedurally reversed.

In summary:

Claim(s) Rejected	35 U.S.C. §	References/Basis	Affirmed	Reversed
1, 2, 4, 5, 7– 14, 16, 21, 22, 24, 25, 27	112(b)	Indefiniteness	1, 2, 4, 5, 7– 14, 16, 21, 22, 24, 25, 27	
1, 2, 4, 5, 7– 14, 16, 21, 22, 24, 25, 27	112(a)	Written Description	1, 2, 4, 5, 7– 14, 16, 21, 22, 24, 25, 27	
1, 4, 5, 7–12, 16, 21, 22, 24, 25, 27	102(a)(1)	Warner		1, 4, 5, 7–12, 16, 21, 22, 24, 25, 27
2	103	Warner and Murray		2
13, 14	103	Warner and Hall		13, 14
Overall Outcome			1, 2, 4, 5, 7– 14, 16, 21, 22, 24, 25, 27	

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