



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/379,793	08/20/2014	Ji-Won Jeong	MERCK-4221	9583
23599	7590	11/04/2019	EXAMINER	
MILLEN, WHITE, ZELANO & BRANIGAN, P.C. 2200 CLARENDON BLVD. SUITE 1400 ARLINGTON, VA 22201			VISCONTI, GERALDINA	
			ART UNIT	PAPER NUMBER
			1722	
			NOTIFICATION DATE	DELIVERY MODE
			11/04/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@mwzb.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JI-WON JEONG,
YONG-KUK YUN, DONG-MEE SONG,
and JUNG-MIN LEE

Appeal 2019–000384
Application 14/379,793
Technology Center 1700

Before MICHAEL P. COLAIANNI, GEORGE C. BEST, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

DENNETT, *Administrative Patent Judge*.

DECISION ON APPEAL¹

¹ In this Decision, we refer to the Specification filed August 20, 2014 (“Spec.”); the Final Office Action dated July 26, 2017 (“Final Act.”); the Appeal Brief filed April 26, 2018 (“Appeal Br.”); the Examiner’s Answer dated August 13, 2018 (“Ans.”); and the Reply Brief filed October 15, 2018 (“Reply Br.”).

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Examiner’s Final rejection of claims 1–13 and 17–30.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

The claims are directed to a liquid crystalline medium used for electro-optical displays. Claims 1 and 23, reproduced below from the Claims Appendix of the Appeal Brief, illustrate the claimed subject matter with disputed terms italicized:

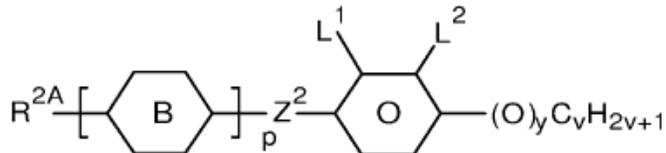
1. A liquid-crystalline medium based on a mixture of polar compounds having negative dielectric anisotropy, comprising

at least two reactive mesogens, at least two of said reactive mesogens having sufficiently different polymerization reactivity from one another allowing their polymerization by two separate polymerizations

and

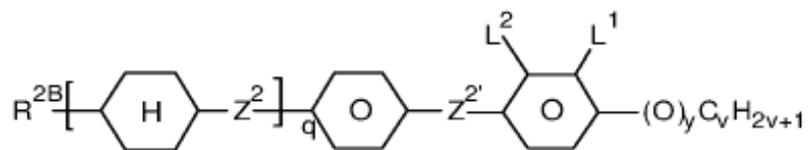
at least one compound selected from the group of compounds consisting of the compounds of formulae IIA, IIB and IIC,

IIA

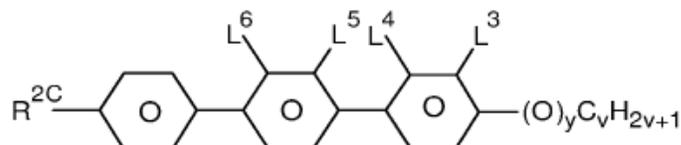


² We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Merck Patent GmbH. Appeal Br. 1.

IIB



IIC,

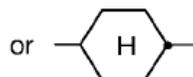
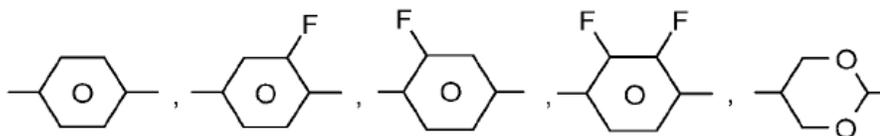


in which

R^{2A} , R^{2B} and R^{2C} each, independently of one another, denote H, an alkyl or alkenyl radical having up to 15 C atoms which is unsubstituted, monosubstituted by CN or CF_3 or at least monosubstituted by halogen, in which one or more CH_2 groups are optionally replaced by $-O-$, $-S-$, $\text{—}\diamond\text{—}$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, $-OC-O-$ or $-O-CO-$ in such a way that O atoms are not linked directly to one another,



denotes



Y^{1-6} each, independently of one another, denote H or F[,]

L^1 and L^2 each, independently of one another, denote F, Cl, CF_3 or CHF_2 ,

- L^{3-6} each, independently of one another, denote H, F, Cl, CF_3 or CHF_2 , but at least two of L^{3-6} denote F, Cl, CF_3 or CHF_2
- Z^2 and $Z^{2'}$ each, independently of one another, denote a single bond, $-CH_2CH_2-$, $-CH=CH-$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, $-CH_2O-$, $-OCH_2-$, $-COO-$, $-OCO-$, $-C_2F_4-$, $-CF=CF-$, or $-CH=CHCH_2O-$,
- p denotes 1 or 2, and, in the case where $Z^2 =$ single bond, p also denotes 0,
- q denotes 0 or 1,
- y denotes 0 or 1, and
- v denotes 1 to 6.

23. The liquid[-]crystalline medium according to claim 1, wherein *at least two of said reactive mesogens have a substantially different polymerization UV absorption spectrum from each other.*

REFERENCES

The Examiner relies on the following prior art in rejecting the claims on appeal:

Saynor et al. (“Saynor”)	US 6,157,427	Dec. 5, 2000
Bernatz et al. (“Bernatz”)	US 8,999,459 B2	Apr. 7, 2015

REJECTIONS³

The Examiner maintains the following rejections: (1) claims 1–13 and 17–30 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement; (2) claims 1–13 and 17–30 under 35

³ Because this application is a national stage entry of a PCT application filed before the March 16, 2013, effective date of the America Invents Act, we refer to the pre-AIA versions of the statutes.

U.S.C. § 112, second paragraph, as indefinite; and (3) claims 1–13 and 17–30 under 35 U.S.C. § 103(a) as unpatentable over Bernatz in view of Saynor. Final Act. 3–14.

OPINION

Rejection of claims 1–13 and 17–30 as lacking written description

The Examiner finds that all pending claims (1–13 and 17–30) lack written description of “at least two reactive mesogens,[] having *sufficiently different polymerization reactivity* from one another *allowing their polymerization by two separate polymerizations,*” a limitation found in the sole independent claim (claim 1). Final Act. 3–4; *see also* Appeal Br. 14–59 (Claims App.) (emphasis added). The Examiner notes that claim 1 has been amended to include the alleged new matter. Final Act. 2. According to the Examiner, the Specification does not provide any guidance “for determining the metes and bounds of ‘sufficiently different’ polymerization reactivity.” Final Act. 3–4. The Examiner finds that the application describes a liquid crystal mixture having at least two polymerizable compounds with different polymerization reactivities, but fails “to support allowing the polymerization of the reactive mesogens by ‘two separate polymerizations.’” *Id.* at 3 (citing Spec. ¶¶ 23, 90).

The Examiner finds separately that claim 23 also lacks written description for limiting the two reactive mesogens recited in claim 1 to having “a *substantially different polymerization UV absorption spectrum from each other*, much less the metes and bounds defined by ‘substantially different’ polymerization UV absorption spectrum.” *Id.* at 4 (emphasis added).

Appellant argues the claims as a group, with additional argument directed to the term rejected in claim 23. Appeal Br. 4–6. Appellant argues that the disputed limitations are supported by the Specification and Figures. *Id.* Specifically, Appellant directs the reader to the following portions of the Specification: (1) “LCD which contain LC mixtures with at least two polymerisable [sic] compounds, preferably with different polymerization reactivities, can be operated with a single substrate in the display” (Spec. 5, ll. 31–34);⁴ (2) “[p]referred [LC] mixtures are VA mixtures which contain two polymerisable [sic] compounds with different polymerization reactivity (Spec. 23, ll. 12–13); (3) “RMs [reactive mesogens] with different UV absorption band[s] show different reactivity under the certain UV exposure. By measurement of the UV-visible spectrum of each RM it is possible to determine the reactivity of each RM” (Spec. 23, ll. 16–18; (4) “[p]referred mixtures contain at least one RM (RM-A) which is responsible for the building of the RM polymer layer and at least one RM (RM-B) which is responsible for the pre-tilt generation via PS-VA process” (Spec. 23, ll. 20–22); and (5) “RM-A for polymer layer should be separated from LCs easily, move toward the LC-air interface, and be polymerized by UV exposure to build the polymer layer[,] not [the] polymer network in the bulk. RM-B should be alive during the 1st UV exposure for the next PS-VA process” (Spec. 23, ll. 24–27). Appeal Br. 4–5.

The sufficiency of an application’s written description is a question of fact. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir.

⁴ Though Appellant cites paragraph numbers of Jeong et al., US 2015/0036095 A1, published Feb. 5, 2015, our Decision cites the corresponding pages and line numbers of Appellant’s original disclosure.

2010) (*en banc*). Appearance of a claim in the Specification in *ipsis verbis* does not guarantee that the written description requirement is satisfied. *See, e.g., Enzo Biochem, Inc. v. Gen-Probe Inc.*, 323 F.3d 956, 968 (Fed. Cir. 2002). At the same time, a failure to meet that standard does not require a finding that a claim fails to comply with the written description requirement. *In re Edwards*, 568 F.2d 1349, 1351–52 (Fed. Cir. 1978). All that is required is that the Specification demonstrate, with reasonable clarity, to a person of ordinary skill in the art that the inventor was in possession of the invention. *Carnegie Mellon Univ. v. Hoffmann-La Roche Inc.*, 541 F.3d 1115, 1122 (Fed. Cir. 2008).

Appellant argues that the Specification as filed depicts the different UV absorption spectra of two polymerizable compounds, i.e., RM-1 and RM-41. Appeal Br. 6 (citing Spec. Fig. 1). Appellant explains that these exemplified polymerizable compounds are described in the application as “two reactive mesogens with different reactivity.” Appeal Br. 6 (citing Spec. 112:19–26).

In response, the Examiner argues that Appellant’s relied-upon “passages do not appear to support ‘the *need* for the mixture to participate in *two distinct* polymerization reactions.’” Ans. 16. The Examiner contends that “[t]here is no discussion of why [polymerizable compounds RM-1 and RM-41] were selected, i.e., if and/or how they relate to having ‘sufficiently different’ polymerization reactivities.” *Id.*

Appellant replies that “the Specification teaches monomers whose reactivity differs enough to allow discretely different polymerization as in Example M1, using ‘two reactive mesogenens with different reactivity . . . RM-1 and RM-41 show different UV absorption behavior . . . [t]he

polymerization of RM-1 and RM-41 is done selectively” using two different UV exposures. Reply Br. 2.

The Specification describes that “[t]he polymerization of RM-1 and RM-41 is done selectively” by first exposing RM-41 to a “UV cut filter and the RM polymer is formed,” and in a separate step, “the PS-VA process takes place with RM-1 under 2nd UV exposure” of 100 mW/cm².” Spec. 112:34–113:2. In addition, the original disclosure describes that in the PS-VA process, “polymerisation [sic] of reactive mesogens is intended to take place in the liquid-crystalline mixture.” Spec. 9, ll. 19–20. In other words, after selective polymerization of the RM-41 polymer layer at the LC-air interface, the subsequent PS-VA process forms an RM-1 polymer network in the bulk. *See also* Spec. 23, ll. 20–27.

The Examiner provides no explanation of why one skilled in the art would fail to recognize that the claimed LC mixture’s participation in two distinct polymerization reaction occur at different times to form different polymer layers. Contrary to the Examiner’s finding, the Specification describes that two distinct polymerization reactions are accomplished through the use of reactive mesogens having sufficiently different polymerization reactivities *and* substantially different polymerization UV absorption spectrum. Thus, the original disclosure reasonably conveys to one skilled in the art that, as of the application filing date, the application had possession of the subject matter “at least two reactive mesogens,[] having sufficiently different polymerization reactivity from one another allowing their polymerization by two separate polymerizations,” and “have a substantially different polymerization UV absorption spectrum from each other.” *See* Appeal Br. 14, 58 (Claims App.). Therefore, Appellant shows

reversible error in the Examiner’s finding that claim 1 and its dependent claims (including claim 23) lack written description.

We do not reach the merits of the Examiner’s 35 U.S.C. § 112, first paragraph/written description rejection of claims 26 and 27 for the reasons set forth below discussing the Examiner’s 35 U.S.C. § 112, second paragraph/indefiniteness rejection of these claims. *Cf. In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971) (one is not in a position to determine whether a claim is enabled under 35 U.S.C. § 112, first paragraph, until the metes and bounds of that claim are determined under the second paragraph of this section of the statute).

We reverse the rejection of claims 1–13, 17–25, and 28–30 under 35 U.S.C. § 112, first paragraph, as lacking written description. *See* 37 C.F.R. § 41.37(c)(1)(iv).

Rejection of claims 1–13 and 17–30 as indefinite

The Examiner finds that claims 1–13 and 17–30 are indefinite for reciting “*sufficiently different* polymerization reactivity.” Final Act. 5. The Examiner makes additional specific findings rejecting claims 23, 26, and 27, each depending directly or indirectly from claim 1. *Id.* at 5–6.

With respect to independent claim 1 (and, by extension, its dependent claims), the Examiner finds that “‘*sufficiently different* polymerization reactivity’ . . . is a relative term which renders the claim indefinite.” *Id.* The Examiner finds that that the term “is not defined by the claim, the [S]pecification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.” *Id.* at 5.

The Examiner finds that claim 23 is indefinite for the additional reason of reciting “*substantially different* polymerization UV absorption spectrum.” *Id.* The Examiner again finds that the term is a relative term, is not defined by the claim, is not standardized by the Specification, and would not allow the skilled artisan to reasonably understand the scope of the claim. *Id.* at 5–6.

Appellant contends:

[i]t is clear from the sections of the text, and from the examples quoted in respect to the response to the rejection under first paragraph, that one of ordinary skill in the art would understand from these passages that it is necessary for a portion of the combined mixture (the first reactive mesogen) to be polymerized by exposure to UV of one wavelength, and then a portion subject to a second polymerization by UV of a different wave length, whereby the second reactive mesogen is polymerized, so that different layers of polymer can be produced.

Appeal Br. 7.

The use of relative terms such as “substantially” does not automatically render a claim indefinite. *See, e.g., Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1359 (Fed. Cir. 2012) (“This court has repeatedly confirmed that relative terms such as ‘substantially’ do not render patent claims so unclear as to prevent a person of skill in the art from ascertaining the scope of the claim.”); *see also Ecolab, Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001); *Andrew Corp. v. Gabriel Elecs., Inc.*, 847 F.2d 819, 821–822 (Fed. Cir. 1988). Rather, the test for indefiniteness is whether the claim, when read in light of the Specification, reasonably apprises one skilled in the art of its scope. *In re Warmerdam*, 33 F.3d 1354, 1361 (Fed. Cir. 1994). “Claim language employing terms of degree has long been

found definite where it provided enough certainty to one of skill in the art when read in the context of the invention.” *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1370 (Fed. Cir. 2014).

We are persuaded by Appellant’s arguments that the Specification’s disclosure reasonably apprises the skilled artisan of the scope of the invention. Appellant’s relied-upon passages (discussed *supra* in relation to the written description rejection) adequately describe to one of ordinary skill in the art the degree of difference required by each claim for polymerization reactivities and polymerization UV absorption spectra in the liquid-crystalline medium. Appellant, therefore, shows the Examiner reversibly errs in finding claims 1 and 23 to be indefinite.

With respect to claim 26, the Examiner finds that the terms “at least one compound of formulae IIA, IIB and/or IIC of claim 1” and “*different polymeric components produced obtained or obtainable by separate polymerization*” to be indefinite. Final Act. 6; *see also* Ans. 18. The Examiner finds claim 27 to be indefinite for reciting “polymerization of the at least two reactive mesogens is *achieved or achievable by UV radiation.*” Ans. 18; *see also* Final Act. 6. According to the Examiner, “the antecedent basis for ‘a spectral distribution different from that one used for the polymerization of the other of said at least two reactive mesogens’ is not clear.” Final Act. 6. The Examiner finds that “the antecedent basis for []at least one o[f] said polymerizations is also unclear.” *Id.* at 7.

Appellant fails to substantively argue or adequately address the Examiner’s concerns regarding the indefiniteness of the additional terms in dependent claims 26 and 27. Rather, Appellant merely alleges that “separate

polymerization would be well understood by one of ordinary skill in the art.”
Appeal Br. 7.

Appellant’s fails to show the Examiner reversibly errs in finding that claims 26 and 27 are indefinite.

In summary, we reverse the rejection of claims 1–13, 17–25, and 28–30 under 35 U.S.C. § 112, second paragraph, as indefinite. *See* 37 C.F.R. § 41.37(c)(1)(iv). We affirm the rejection of claims 26 and 27 under 35 U.S.C. § 112, second paragraph.

Rejection of claims 1–13 and 17–30 as unpatentable over Bernatz in view of Saynor

The Examiner rejects claims 1–13 and 17–30 as obvious over Bernatz in view of Saynor. Final Act. 7–14. The Examiner finds that Bernatz discloses a liquid crystal medium with: (1) at least one polymerizable compound represented by the general formula $R^a-A^1-(Z^1-A^2)_{m1}-R^b$, which is inclusive of the polymerizable compounds of claimed formula I; (2) at least one compound represented by the general formula CY, which is inclusive of compounds of claimed formula IIA (claim 4); (3) at least one compound represented by the general formula LY, which is inclusive of compounds of claimed formula L1 to L11 (claim 8) and T1 to T21 (claim 9); (4) at least one compound F1 inclusive of compounds of claimed formula O1 to O16 (claim 10), and at least one indane compound inclusive of present claim 11. Final Act. 7–13. The Examiner finds that Bernatz discloses a liquid crystal medium comprise at least two or more polymerizable compounds. *Id.* at 13.

The Examiner finds that Saynor teaches the concept of utilizing a combination of reactive mesogens having differing polymerization functionalities and the benefits therefrom. *Id.*

The Examiner concludes that

[i]t would have been obvious to one of ordinary skill in the requisite art at the time the invention was made to utilize at least two of the polymerizable compounds in the liquid crystal medium of Bernatz as generally taught therein, and, in light of the teachings of [Saynor] a combination of reactive mesogens having differing polymerization functionalities, i.e., combining mono-, di- and/or tri-functional polymerizable liquid crystal[] compounds, and the benefits therefrom such combination, with reasonable expectations of achieving, absent object evidence to the contrary, the advantages taught therein.

Id. at 13–14.

Appellant argues, *inter alia*, that Bernatz merely encompasses the possibility of more than one polymerizable compound present in a medium and nothing about two polymerizable compounds having different polymerization reactivity. Appeal Br. 8. Appellants contend that more than a mere possibility that selection could be made from a genus is required to support a 35 U.S.C. § 103 rejection. *Id.* Appellants argue that the no advantages of using at least a second polymerizable mesogen, especially having a substantially different polymerization reactivity are disclosed. *Id.* at 9.

Appellant argues that Bernatz’s broad disclosure lacks any guidance for formulating a liquid-crystalline medium comprising at least two reactive mesogens having sufficiently different polymerization reactivities, such that each reactive mesogen is capable of separate polymerization reactions. Appeal Br. 8. Appellant argues that Bernatz fails to specifically teach “using one or more respective compounds having a substantially different polymerization reactivity[,] in particular[,] a different UV (light) absorption.” *Id.* at 9 (citing Spec. 23:16, Fig. 1). Appellant contends that

one of ordinary skill in the art would have had no reason or motivation to derive the claimed subject matter based on Bernatz’s “very generic statement at most without any apparent benefit” that more than one polymerizable compound could be present in a liquid-crystalline medium. Appeal Br. 8, 11.

In response, the Examiner finds that using reactive mesogens having different functionalities, “by definition[,] inherently allow[s] for separate polymerization reactions and subsequently have different polymerization reactivities.” Ans. 19.

The Examiner’s findings fall short of the requirements for supporting an obviousness rejection. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”). We are provided no explanation of why the ordinarily skilled artisan would have been motivated to combine Bernatz’s teachings with Saynor’s to derive the claimed liquid-crystalline medium, but told that the claimed subject matter is inherent when using multi-functional reactive mesogens. *See* Ans. 19. Furthermore, our review of the Examiner’s cited passage in Bernatz finds that it does not establish use of two or more polymerizable compounds for *separate* polymerizations. *See* Bernatz 6:34–39. Rather, Bernatz teaches that such mixtures form copolymers, i.e., a polymer derived from more than one species of monomer. On this record, the Examiner fails to support findings that the applied prior art teaches or suggests that combining the teachings of Bernatz and Saynor would have been beneficial. *See In re Nuvasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir.

2016) (“[T]he [PTO] must make the necessary findings and have an adequate ‘evidentiary basis for its findings.’”).

We do not sustain the rejection of claim 1 as unpatentable over Bernatz in view of Saynor. For the same reasons as for claim 1, we do not sustain the rejection of claims 2–13, 17–25, and 28–30 over the same references. *See* 37 C.F.R. § 41.37(c)(1)(iv).

We *pro forma* reverse the 35 U.S.C. § 103(a) rejection of claims 26 and 27 over Bernatz in view of Saynor because we find that the Examiner’s rejection is based on speculative meaning as to the scope of claims 26 and 27. *In re Steele*, 305 F.2d 859, 862–63 (CCPA 1962). Our reversal of the obviousness rejection is not based on the merits of that rejection in the context of 35 U.S.C. § 103(a).

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–13, 17–30	112	1 st paragraph		1–13, 17–25, 28–30
1–13, 17–30	112	2 nd paragraph, indefiniteness	26, 27	1–13, 17–25, 28–30
1–13, 17–30	103(a)	Bernatz, Saynor		1–13, 17–25, 28–30
Overall Outcome			26, 27	1–13, 17–25, 28–30

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-IN-PART