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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/558,815	09/15/2017	Mark GOEBEL	MERCK-4629	1013
23599	7590	10/02/2020	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
			10/02/2020	ELECTRONIC

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

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MARK GOEBEL, ROCCO FORTTE, LARS LIETZAU,
and CHRISTIAN HOCK

Appeal 2019-006881
Application 15/558,815
Technology Center 1700

Before N. WHITNEY WILSON, MONTÉ T. SQUIRE, and
JANE E. INGLESE, *Administrative Patent Judges*.

SQUIRE, *Administrative Patent Judge*.

DECISION ON APPEAL¹

Appellant² appeals under 35 U.S.C. § 134(a) from the Examiner's decision to finally reject claims 1–21, which are all of the claims pending in this application. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

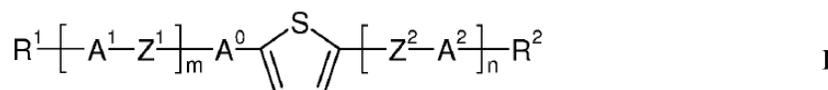
¹ This Decision refers to the Specification filed Sept. 15, 2017 (“Spec.”); Final Office Action dated Jan. 2, 2019 (“Final Act.”); Appeal Brief filed Mar. 29, 2019 (“Appeal Br.”); Examiner’s Answer dated July 22, 2019 (“Ans.”); and Reply Brief filed Sept. 23, 2019 (“Reply Br. “).

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

CLAIMED SUBJECT MATTER

The invention relates to liquid-crystalline media (LC media) comprising thiophene derivatives which are stabilised by sterically hindered amines or amine derivatives, i.e., hindered amine light stabilisers (HALS), and to liquid-crystal displays (LC displays) which contain these LC media. Spec. 1; Abstract. Claim 1 illustrates the subject matter on appeal and is reproduced below from the Claims Appendix to the Appeal Brief:

1. A liquid crystal medium comprising:
one or more compounds of formula I,



in which the individual radicals have the following meanings:

R^1 and R^2 each, independently of one another, denote H, F, Cl, Br, -CN, -SCN, -NCS, SF_5 or straight-chain or branched alkyl having 1 to 12 C atoms, in which, in addition, one or more non-adjacent CH_2 groups may each be replaced, independently of one another, by -CH=CH-, -C≡C-, -O-, -CO-, -CO-O-, -O-CO-, or -O-CO-O- in such a way that O atoms are not linked directly to one another, and in which, in addition, one or more H atoms may be each replaced by F, Cl or Br,

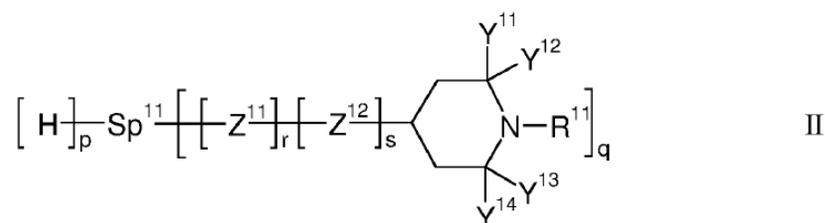
A^0 , A^1 and A^2 each, independently of one another, denote phenylene-1,4-diyl, in which, in addition, one or two CH groups may each be replaced by N and one or more H atoms may each be replaced by halogen, CN, CH_3 , CHF_2 , CH_2F ,

CF₃, OCH₃, OCHF₂ or OCF₃,
 cyclohexane-1,4-diyl, in which, in
 addition, one or two non-adjacent
 CH₂ groups may each be replaced,
 independently of one another, by O or
 S and one or more H atoms may each
 be replaced by F, or cyclohexene-
 1,4-diyl, bicyclo[1. 1. 1]pentane-
 1,3-diyl, bicyclo[2.2.2]octane-1,4-
 diyl, spiro[3.3]heptane-2,6-diyl,
 tetrahydropyran-2,5-diyl or
 1,3-dioxane-2,5-diyl,

Z¹ and Z² each, independently of one another,
 denote -CF₂O-, -OCF₂-, -CH₂O-,
 -OCH₂-, -CO-O-, -O-CO-, -C₂H₄-,
 -C₂F₄-, -CF₂CH₂-, -CH₂CF₂-,
 -CFHCFH-, -CFHCH₂-, -CH₂CFH-,
 -CF₂CFH-, -CFHCF₂-, -CH=CH-,
 -CF=CH-, -CH≡CF-, -CF=CF-, -C≡C-
 or a single bond,

m and n each, independently of one another,
 denote 0, 1, 2 or 3;

***one or more compounds selected from the group of the
 compounds of the formula II,***

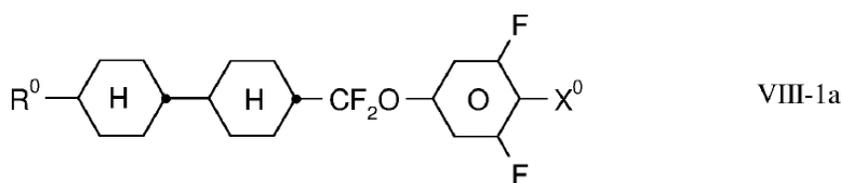


in which

q denotes 1 or 2,
 p denotes (2-q)
 Z¹¹ and Z¹² each, independently of one another, denote
 -O-, -(C=O)- or a single bond, but do not
 both simultaneously denote -O-,

- r and s each, independently of one another, denote 0 or 1,
- Y^{11} to Y^{14} each, independently of one another, denote alkyl having 1 to 4 C atoms and alternatively also, independently of one another, one or both of the pairs (Y^{11} and Y^{12}) and (Y^{13} and Y^{14}) together denote a divalent group having 3 to 6 C atoms,
- R^{11} on each occurrence, independently of one another, denotes H, alkyl, O-alkyl, O-cycloalkyl, O[•] or OH,
- Sp^{11} denotes a straight-chain or branched alkyl chain having 2-20 C atoms, in which one or more $-CH_2-$ groups may each be replaced by $-O-$, but two adjacent $-CH_2-$ groups cannot be replaced by $-O-$, or denotes a hydrocarbon radical which contains a cycloalkyl or alkylcycloalkyl unit and in which one or more $-CH_2-$ groups may each be replaced by $-O-$, but two adjacent $-CH_2-$ groups cannot be replaced by $-O-$; and

one or more compounds selected from the group of the compounds of the formula VIII-1a,



in which

- R^0 denotes an alkyl or alkoxy radical having 1 to 15 C atoms, where, in addition, one or more CH_2 groups in these radicals may each be replaced, independently of one another, by $-C\equiv C-$, $-CF_2O-$, $-CH=CH-$, $-\diamond-$, $-\diamond\diamond-$, $-O-$, $-CO-O-$ or $-O-CO-$ in such a way that O atoms are not linked directly to one another,

and in which, in addition, one or more H atoms may each be replaced by halogen,

X⁰ denotes F, Cl, CN, SF₅, SCN, NCS, or a halogenated alkyl radical, halogenated alkenyl radical, halogenated alkoxy radical or halogenated alkenyloxy radical, each having up to 6 C atoms.

Appeal Br. 17–19 (key disputed claim language italicized and bolded).

REFERENCES

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

Name	Reference	Date
Jansen et al. (“Jansen”)	US 8,486,297 B2	July 16, 2013
Wittek et al. (“Wittek”)	US 8,906,261 B2	Dec. 9, 2014

REJECTIONS

On appeal, the Examiner maintains (Ans. 3) the following rejections:

1. Claims 1–21 are rejected under 35 U.S.C. § 103 as being unpatentable over Wittek (“Rejection 1”). Ans. 3.
2. Claims 1–21 are rejected under 35 U.S.C. § 103 as being unpatentable over Jansen (“Rejection 2”). Ans. 11.

OPINION

Having considered the respective positions the Examiner and Appellant advance in light of this appeal record, we affirm the Examiner’s rejections based essentially on the fact-finding and reasoning the Examiner provides in the Answer and Final Office Action. We add the following primarily for emphasis.

Rejection 1

The Examiner rejects claims 1–21 under § 103 as obvious over Wittek. Ans. 3–10. In response, Appellant presents arguments for the patentability of claims 1–14 as a group, and claim 4 and claim 6, respectively, under separate headings/groupings in the Appeal Brief (Appeal Br. 3–9), which we address in turn below.

Claims 1–21

Appellant presents argument for the patentability of claims 1–14 as a group but does not present separate argument for the patentability of claims 15–21. Appeal Br. 3–8. We select claim 1 as representative and claims 2–21 stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner determines that Wittek teaches or suggests a liquid crystal medium satisfying the limitations of claim 1 and concludes the reference would have rendered the claim obvious. Ans. 3–10, 18–20. On this appeal record, we determine a preponderance of the evidence and sound technical reasoning support the Examiner’s findings regarding the teachings of Wittek and the Examiner’ conclusion that the reference would have rendered the liquid crystal medium of claim 1 obvious to a person having ordinary skill in the art. Wittek, Title, Abstract, 4:11–15, 4:21–30, 6:40–55 (formulae I1, I2), 7:1–40 (formulae I6–I11), 9:50–11:5 (formulae I32–I36, I38–I43), 11:25–12:15 (formulae I47–I53), 11:40–55 (formulae II, III), 14:15–55 (formulae IV–VIII), 18:50–65 (formulae VII-1a, VII-1b), 19:30–40 (formula VIIIa), 21:60–22:10 (formulae X, XI), 28:40–50 (formula XXVI), 59–60, 65–66 (third compound at bottom of page), 69–70 (third compound at bottom of page), 71–72 (first compound at top of page).

Appellant argues the Examiner's rejection should be reversed because one of ordinary skill in the art would not have arrived at the claimed composition based on Wittek's disclosure. Appeal Br. 3. In particular, Appellant contends

the Wittek et al. disclosure provides no guidance to lead one of ordinary skill in the art to select from the vast number of possible combinations of compounds, encompassed by the numerous formulas disclosed by Wittek et al., so as to arrive at a composition in accordance with Appellants' claims.

Id. at 3. Appellant further contends Wittek "provides no hints, suggestions or guideposts that would lead one of ordinary skill in the art to select from all the possible liquid crystal mixtures generically encompassed by [Wittek's] broad . . . disclosure." *Id.* at 4.

Relying on decisions in *In re Baird* and *In re Jones*, Appellant argues that, because Wittek describes "an extremely broad genus generically encompassing a vast number of liquid crystal mixtures" and "a seemingly infinite number of ways . . . available to one of ordinary skill in the art to prepare liquid crystal mixtures," Wittek's disclosure does not provide motivation sufficient to lead one of ordinary skill to arrive at any particular claimed embodiment. *Id.* at 4–5 (citing *In re Baird*, 16 F.3d 380, 383 (Fed. Cir. 1994); *In re Jones*, 958 F.2d 347, 350 (Fed. Cir. 1992)); *see also* Reply Br. 3 (arguing "the disclosure of Wittek et al. presents one of ordinary skill in the art with numerous possible selections of compounds, encompassing a seemingly infinite number of composition embodiments").

We do not find Appellant's arguments persuasive of reversible error in the Examiner's rejection based principally on the fact-finding and reasoning the Examiner provides at pages 3–10 and 17–20 of the Answer.

As the Examiner finds (Ans. 3–7), Wittek discloses thiophene compounds falling within the scope of the “one or more compounds of formula I” recitation of claim 1, namely, Wittek’s compounds of the formulae I1, I2, I6–I11, I32–I36, I38–I43, and I47–I53. Wittek, Abstract, 6:40–55 (I1, I2), 7:1–40 (I6–I11), 9:50–11:5 (I32–I36, I38–I43), 11:25–12:15 (I47–I53). As the Examiner further finds (Ans. 9–10), Table D of Wittek discloses compounds falling within the scope of “one or more compounds selected from the group of the compounds of the formula II” as claimed, and that the compounds “can be added to the LC media.” *See* Wittek, 59–60, 65–66 (third compound at bottom of page), 69–70 (third compound at bottom of page), 71–72 (first compound at top of page).

As the Examiner also finds (Ans. 7–9), regarding “one or more compounds selected from the group of the compounds of the formula VIII-1a,” Wittek discloses compounds falling within the scope of that recitation of the claim, including for example, Wittek’s compound of the formula VII-1a (Wittek, 18:55). *See also* Wittek, 11:40–55 (II, III), 14:15–55 (IV–VIII), 18:50–65 (VII-1a, VII-1b), 19:30–40 (VIIIa), 21:60–22:10 (X, XI), 28:40–50 (XXVI). Wittek further discloses an LC medium comprising one or compounds of formula VII-1a as being preferred. Wittek, 18:45–55. As the Examiner finds and explains (Ans. 7, 18), Wittek also recognizes the use of thiophene compounds in LC media to achieve certain desired properties, including, for example, a broad nematic phase range and a low threshold voltage. Wittek, 4:7–15.

Thus, in view of Wittek’s disclosures, we agree with the Examiner (Ans. 10, 18–20) that a person having ordinary skill in the art would have found it obvious to use three or more of Wittek’s thiophene compounds an

liquid crystal medium to arrive at a mixture falling within the scope of the claimed liquid crystal medium and had a reasonable expectation of success that a mixture of such compounds, each identified as suitable, would provide desired results. *Merck & Co., Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 808–09 (Fed. Cir. 1989) (“[T]he ‘joint use [of magnesium oxide and calcium carbide] is not patentable’ where the prior art teaches ‘that both magnesium oxide and calcium carbide, individually, promote the formation of a nodular structure in cast iron, and it would be natural to suppose that, in combination, they would produce the same effect and would supplement each other.’”) (internal citation omitted); *In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980) (citation omitted) (“It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose.”); *see also KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 416 (2007) (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

Appellant’s arguments do not reveal reversible error in the Examiner’s factual-findings, analysis, and conclusions in this regard. Appellant’s arguments regarding Wittek’s disclosure providing no guidance to one of ordinary skill in the art to select from a vast number of possible combinations of compounds and liquid crystal mixtures (Appeal Br. 3–4) are not persuasive because the fact that Wittek “discloses a multitude of effective combinations does not render any particular formulation less obvious.” *Merck*, 874 F.2d at 807. *See also In re Arkley*, 455 F.2d 586, 587

(CCPA 1972) (“[P]icking and choosing may be entirely proper in the making of a [§] 103, obviousness rejection.”).

Moreover, as the Examiner finds (Ans. 3–10) and we discuss above, Wittek discloses compounds for LC media, which fall squarely within formulae I, II, and VII-1a, as recited in claim 1, and describes certain of the compounds as preferred classes of compounds for which only a limited amount of picking and choosing is necessary to arrive at the compounds represented by formulae I, II, and VII-1a, as claimed.

We do not find Appellant’s arguments regarding *In re Baird* and *In re Jones* persuasive because the cases are inapposite to the facts of the current case. In *Baird*, 16 F.3d at 383, the court held that a “disclosure of millions of compounds does not render obvious a claim to three compounds, particularly when that disclosure indicates a preference leading away from the claimed compounds” (emphasis added). In *Jones*, 958 F.2d at 350, the court held that the prior art reference disclosed a “potentially infinite genus of ‘substituted ammonium salts’” (emphasis added) without listing the claimed salt and that the PTO failed to provide a reason for combining other references in the manner claimed.

Here, in contrast, Wittek does not teach or lead away from the composition of the claimed liquid crystal medium and does not teach a potentially infinite genus but, instead, lists a finite number of preferred classes of compounds of relatively narrow scope—any of which may be selected and used in LC media to achieve Wittek’s stated goals, either alone or in combination. *See* Wittek 4:11–15 (disclosing “certain thiophene derivatives are used in LC media, in particular in LC media having positive dielectric anisotropy, and in MLC, TN, STN and IPS displays” and “[t]hese

thiophene derivatives result in LC media having the desired properties indicated above”). Moreover, the claims themselves cover an extremely large number (too large to specifically count) of specific compounds, not simply the very limited number of compounds covered by the claim in *Baird*.

Appellant further argues the Examiner’s rejection should be reversed because Wittek does not disclose a specific example of a mixture that includes all of the compounds recited in the claim. Appeal Br. 5–6. In particular, based on Examples 1–3 of Wittek, Appellant contends that none of Wittek’s examples discloses or suggests a specific LC mixture containing compounds of formulae I, II, and VII-1a, as recited in the claim. This argument is not persuasive because Wittek’s disclosure is not limited to the disclosures in its working examples or preferred embodiments. *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.”); *see also In re Mills*, 470 F.2d 649, 651 (CCPA 1972) (“[A] reference is not limited to the disclosure of specific working examples.”); *Merck*, 874 F.2d at 807 (explaining “all disclosures of the prior art, including unpreferred embodiments, must be considered”).

Appellant also argues the Examiner’s rejection should be reversed because it is based on impermissible hindsight. Appeal Br. 6–7. This argument is not persuasive because it is conclusory and unsupported by persuasive evidence in this appeal record. *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984). Moreover, as we discuss above, we find the Examiner’s rejection is based on explicit disclosures in Wittek, and what those disclosures considered as a whole reasonably would have suggested to

one of ordinary skill in the art, rather than based on impermissible hindsight reconstruction, as Appellant argues. *See In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971) (acknowledging that “[a]ny judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning” but such reconstruction is proper “so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure”).

Lastly, Appellant argues that the claimed invention yields unexpected results. Appeal Br. 7–8; Reply Br. 3–4. In particular, Appellant contends that “[t]he combination of compounds of Appellants’ formulas I, II, and VIII-la provides a liquid crystal mixture that has both high dielectric anisotropy as well as high stability.” Appeal Br. 7 (citing Spec. 66–67). *See also* Reply Br. 4 (arguing “compared to base mixture M2, base mixture M1 with its higher polarity is associated with a lower stability under UV exposure” and “[t]his is what one of ordinary skill in the art would predict”).

In attempting to overcome a prima facie case of obviousness by showing unexpected results, the burden rests with Appellant to establish (1) that the alleged unexpected results presented as being associated with the claimed invention are, in fact, unexpected, (2) that the comparisons are to the disclosure of the closest prior art, and (3) that the supplied evidentiary showing is commensurate in scope with the claimed subject matter. *See In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972).

Appellant’s alleged showing of unexpected results does not satisfy the requisite burden. Appellant has not sufficiently established that the alleged unexpected results presented as being associated with the claimed invention

are, in fact, unexpected. Appellant does not make clear what the unexpected results are and how that is reflected or shown in the data. As the Examiner explains (Appeal Br. 20), the fact that Appellant may have “recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the difference would otherwise [have been] obvious.” *Ex parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985). Appellant also does not adequately show or explain why the alleged “advantageous” results (Appeal Br. 8) Appellant contends are associated with the claimed liquid crystal medium are considered to be unexpected results and not just typical results obtained by one of ordinary skill in the art. *Klosak*, 455 F.2d at 1080 (“[T]he burden of showing unexpected results rests on [the party] who asserts them.”).

Moreover, Appellant has not sufficiently established that the alleged showing of unexpected results is commensurate in scope with the claims. Appellant’s claims are broader in scope than the examples tested and Appellant does not explain sufficiently why the examples tested are representative of the overall scope of the claims. For example, the inventive examples Appellant relies on for showing unexpected results uses a base mixture that contains a specific compound (“CCQU-3-F”) Appellant contends corresponds to the compound of “formula VIII-1a” of the claim. Appeal Br. 7 (citing Spec. 66). The claims, however, are not limited to that specific CCU-3-F compound tested by Appellant or a compound of formula VIII-1a having only those specific properties of the CCU-3-F compound tested by Appellant. Thus, absent more, we are not persuaded Appellant provides data sufficient to show that the alleged unexpected results are commensurate in scope with the claims. *See In re Kao*, 639 F.3d 1057, 1068

(Fed. Cir. 2011) (“Evidence of secondary considerations must be reasonably commensurate with the scope of the claims.”).

In view of these deficiencies, Appellant’s assertion that “the combination of a compound of Appellants’ formula II and a compound of Appellants’ formula VIII-1a provides an unexpected and advantageous result” (Appeal Br. 8) is conclusory and, without more, insufficient to establish unexpected results. *De Blauwe*, 736 F.2d at 705 (“It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.”).

Claims 4 and 6

Although Appellant nominally presents separate arguments for the patentability of claims 4 and 6, enumerated under separate headings at pages 8 and 9 of the Appeal Brief, respectively, Appellant does not present any new or additional substantive argument. Rather, Appellant repeats and relies principally on the same arguments it previously discusses and presents above in response to the Examiner’s rejection of claim 1. *See* Appeal Br. 8–9 (asserting for both claims 4 and 6 “the Wittek et al. disclosure does not lead one or ordinary skill in the art to select, from all the possible mixtures encompassed by the generic disclosure of Wittek et al.”).

Thus, based on the fact-finding, conclusions, and analysis the Examiner provides in this appeal record, and for principally the same reasons discussed above for sustaining the Examiner’s rejection of claim 1, we sustain the Examiner’s rejection of claims 4 and 6.

Accordingly, we affirm the Examiner’s rejection of claims 1–21 under 35 U.S.C. § 103 as obvious over Wittek.

Rejection 2

The Examiner rejects claims 1–21 under § 103 as obvious over Jansen.³ Ans. 11–17 (citing Jansen, Title, Abstract, 12:20–15:35 (formulae I1–I25), 20:1–10 (formulae II–III), 21:35–22:10 (formulae IV–VIII), 26:5–10 (formulae VII-1a, VIII-1a), 29:1–17 (formulae X, XI), 35:5–15 (formula XXVI), 75–76:25 (second compound at top of page), 81–82 (two compounds at top of page)). In this rejection, the Examiner relies on and applies Jansen in essentially the same way the Examiner relies on and applies Wittek above in Rejection 1.

In response to this rejection, Appellant does not present any additional substantive arguments. Rather, Appellant repeats and relies on essentially the same arguments it previously discusses and presents above in response to the Examiner’s Rejection 1. *Compare* Appeal Br. 10–14 (Rejection 2) *with*, Appeal Br. 3–8 (Rejection 1).

Thus, based essentially on the fact-finding, conclusions, and analysis the Examiner provides in this appeal record, and for principally the same reasons we discuss above for sustaining the Examiner’s rejection of claims 1–21 under 35 U.S.C. § 103 as obvious over Wittek, we affirm the Examiner’s rejection of claims 1–21 under 35 U.S.C. § 103 as obvious over Jansen.

³ Jansen is directed to LC media comprising thiophene derivatives and its disclosure is similar to the disclosure of Wittek. *Compare* Jansen (Title, Abstract) *with*, Wittek (Title, Abstract).

CONCLUSION

In summary:

Claim(s) Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1-21	103	Wittek	1-21	
1-21	103	Jansen	1-21	
Overall Outcome			1-21	

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