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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT DAVIS, RICHARD VANFLEET, KYLE ZUFELT, and DAVID JENSEN

Appeal 2019-004228
Application 13/924,154
Technology Center 1700

Before JEFFREY T. SMITH, KAREN M. HASTINGS, and MERRELL C. CASHION, JR., *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant[1] requests our review under 35 U.S.C. § 134(a) of the Examiner's decision rejecting claims 9 and 11–13 under 35 U.S.C. § 103 as unpatentable over the combined prior art of Wood et al., ("Strength and Mechanical Properties of Carbon Nanotube Templated Materials," Bulletin of the American Physical Society; vol. 54, No. 14, 2009), Bottcher et al., ("Growth of Novel Carbon Phases by Methane Infiltration of Free-Standing

[1] We use the word "Appellant" to refer to the "applicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies BRIGHAM YOUNG UNIVERSITY as the real party in interest (Appeal Br. 3).

Single-Walled Carbon Nanotube Films," Carbon, vol. 45, 2007), and Forest et al. (US 2012/0302117 A1; published Nov. 29, 2012) ("Forest").

We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED SUBJECT MATTER

Claim 9 is illustrative of the subject matter on appeal (emphasis added to highlight key disputed limitations):

> 9. A method for infiltrating carbon nanotubes, comprising:
> providing a carbon nanotube structure that comprises carbon nanotubes on a substrate; and
> infiltrating the carbon nanotubes with an additional amount of carbon, wherein the infiltrating comprises *heating the carbon nanotubes with ethylene gas and hydrogen gas within a furnace, wherein the carbon nanotubes are heated to a temperature between about 800 to 950 °C*, wherein the infiltrating strengthens the carbon nanotube structure such that when the carbon nanotubes are removed from the furnace and cooled, the carbon nanotubes do not delaminate from the substrate.

Appellant's arguments focus on independent claim 9 (*see generally* Appeal Brief).

OPINION

Upon consideration of the evidence of record and each of Appellant's contentions as set forth in the Appeal Brief, we determine that Appellant has not demonstrated reversible error in the Examiner's rejections (e.g., *see generally* Ans.). *In re Jung*, 637 F.3d 1356, 1365–66 (Fed. Cir. 2011) (explaining the Board's long-held practice of requiring Appellant(s) to identify the alleged error in the Examiner's rejection). We sustain the

rejections for the reasons expressed by the Examiner in the Final Office Action and the Answer.

We add the following primarily for emphasis.

It has been established that "the [obviousness] analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007); *see also In re Fritch*, 972 F.2d 1260, 1264–65 (Fed. Cir. 1992) (a reference stands for all of the specific teachings thereof as well as the inferences one of ordinary skill in the art would have reasonably been expected to draw therefrom).

Appellant argues that there is no motivation to combine Wood with Bottcher (Appeal Br. *generally*). Appellant's main contentions are that 1) the prior art fails to teach or suggest the limitation of heating the nanotubes with ethylene gas and hydrogen gas (Appeal Br. 9), (2) the prior art fails to teach or suggest heating the carbon nanotubes to a temperature between 800 to 950°C (Appeal Br. 10), (3) the Examiner's conclusion of obviousness is in error because the Examiner has impermissibly combined the teachings of Wood and Bottcher because, according to the Abelson Declaration[2], the Examiner has misread Bottcher and Bottcher teaches away from combining its teaching with Wood (Appeal Br. 10–15).

Appellant's arguments are not persuasive of reversible error for the reasons presented by the Examiner (Ans. 3–10; no Reply Brief was filed).

[2] Declaration by Dr. John R. Abelson, filed Feb. 6, 2018. The arguments in the Appeal Brief generally follow those expressed in this Declaration.

Appellant's arguments and the Abelson Declaration opinion fail to consider the applied prior art as a whole and the inferences that one of ordinary skill in the art would have made therefrom. Appellant's arguments also fail to take into account the breadth of claim 1. Notably, claim 1 uses the open language "comprising" and does not preclude the use of additional gases, or additional steps. Claim 1 does not require any minimum (or maximum) amount of hydrogen gas, or any particular amounts of any specific gas.

There is no dispute that both Wood and Bottcher are directed to infiltrating carbon nanotubes with additional carbon via heating the carbon nanotubes in the presence of gases (Appeal Br. 9; Final Act 4; Woods Abstract, Slides 6–8; Bottcher Abstract, 1085–1086, 1095). There is no dispute that Wood heats the nanotubes to a temperature of 900°C, and uses ethylene gas and argon gas. There is no dispute that Bottcher teaches use of hydrogen gas and methane gas in a process of infiltrating carbon nanotubes with additional carbon (e.g., Ans. 10). As the Examiner notes, it is well established that combining two compositions, each known to be useful for the same purpose, is obvious (Ans. 6, *citing In re Kerkhoven*, 626 F.2d 846, 850 (CCPA 1980) ("It is [generally considered] 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.")).[3]

[3] Whether the prior art teaches away from the claimed invention is a question of fact, *In re Harris*, 409 F.3d 1339, 1341 (Fed. Cir. 2005). It is well established that a prior art reference must be considered in its entirety, i.e., as a whole, when determining if it would lead one of ordinary skill in the art away from the claimed invention. *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550 (Fed. Cir. 1983). One of ordinary skill

Accordingly, Appellant has not shown reversible error in the Examiner's determination that it would have been prima facie obvious to use some hydrogen gas (or hydrogen/methane gas mixtures), as exemplified in Bottcher, in the process of Wood. *See also KSR*, 550 U.S. at 417 (the predictable use of known prior art elements or steps performing the same functions they have been known to perform is normally obvious; the combination of familiar elements/steps is likely to be obvious when it does no more than yield predictable results); *Ball Aerosol & Specialty Container, Inc. v. Limited Brands, Inc*., 555 F.3d 984, 993 (Fed. Cir. 2009) (under the flexible inquiry set forth by the Supreme Court, the PTO must take account of the "inferences and creative steps," as well as routine steps, that an ordinary artisan would employ) (emphasis omitted). Appellant has not shown adequate evidence commensurate in scope with the claims that the use of any minimal amount of hydrogen with a minimal amount of methane in combination with other gases, as encompassed by claim 9, yields any unexpected results.[4]

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in the art would have readily appreciated that hydrogen may be used as a gas in a carbon infiltration process as exemplified in Bottcher. *Cf. In re Susi*, 440 F.2d 442, 446 n.3 (CCPA 1971) (Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments); *Syntex (U.S.A.) LLC v. Apotex, Inc.,* 407 F.3d 1371, 1379–80 (Fed. Cir. 2005) (Even a "statement that a particular combination is not a preferred embodiment does not teach away absent clear discouragement of that combination.").

[4] It is well established that the burden of showing unexpected results rests on the person who asserts them by establishing that the difference between the claimed invention and the closest prior art was an unexpected difference. *See In re Baxter Travenol Labs*., 952 F.2d 388, 392 (Fed. Cir. 1991); *In re Klosak*, 455 F.2d 1077, 1080 (CCPA 1972). The unexpected

Likewise, any argument that may be considered as a lack of motivation or reason to combine the cited art is also unpersuasive for the reasons given above. That is, the arguments fail to account for "the inferences and creative steps that a person of ordinary skill in the art would employ." *See KSR*, 550 U.S. at 418. Furthermore, the Supreme Court has stated that it is error to "look only to the problem the patentee [or applicant] was trying to solve." *KSR*, 550 U.S. at 420; *see also*, *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) ("[T]he law does not require that the references be combined for the reasons contemplated by the inventor."); *also In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

Appellant's contentions that the Examiner has failed to give proper weight to the Abelson Declaration, which expresses an opinion on what Bottcher teaches and suggests and which also de facto expresses an opinion on the legal conclusion of obviousness, are not persuasive of reversible error in the Examiner's rejection. There is no dispute that Bottcher teaches the use of hydrogen gas for a process similar to Wood's process. For all the reasons explained by the Examiner and above, we do not find the Declaration opinion persuasive of reversible error. *Cf. Velander v. Garner,* 348 F.3d 1359, 1371 (Fed. Cir. 2003) ("In giving more weight to prior publications than to subsequent conclusory statements by experts, the Board

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results must be established by factual evidence, and attorney statements are insufficient to establish unexpected results. *See In re Geisler*, 116 F.3d 1465, 1470-71 (Fed. Cir. 1997). Further, a showing of unexpected result supported by factual evidence must be reasonably commensurate in scope with the degree of protection sought by the claims on appeal. *In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983).

acted well within [its] discretion."); *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (factfinder has discretion to give more weight to one item of evidence over another "unless no reasonable trier of fact could have done so").

Appellant's remarks with respect to dependent claims 11–13 do not amount to separate arguments because they merely allege that the applied prior art does not teach or suggest the claims' limitations (Appeal Br. 16, Ans. 11). As such, Appellant's statements are considered to be nothing more than general allegations of patentability and are not considered separate patentability arguments. *See* 37 C.F.R. § 41.37(c)(1)(vii) ("A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim.")

Accordingly, we sustain the Examiner's rejection of all the claims on appeal.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
9, 11–13	103	Wood, Bottcher, Forest	9, 11–13	

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)(1)(iv).

AFFIRMED