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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JONATHAN MICHAEL MADSEN and WEIDONG YANG

Appeal 2015-001758
Application 12/775,392
Technology Center 2100

Before ERIC S. FRAHM, NATHAN A. ENGELS, and
MATTHEW J. McNEILL, *Administrative Patent Judges*.

FRAHM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Introduction

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1–26. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

Exemplary Claim

Exemplary independent claim 1 under appeal, with emphasis added, reads as follows:

1. A method comprising:
 - providing a grating structure in a metrology system;
 - simulating a set of diffraction orders for the grating structure based on two or more azimuth angles and on one or more angles of incidence;
 - providing a simulated spectrum based on the set of diffraction orders; and
 - determining, from the simulated spectrum, index of refraction and coefficient of extinction material optical properties of the grating structure.*

The Examiner's Rejection

The Examiner rejected claims 1–26 as being unpatentable under 35 U.S.C. § 103(a) over the combination of Bischoff (US 2010/0042388 A1; published Feb. 18, 2010), Walsh (US 7,990,549 B2; issued Aug. 2, 2011), and Willis (US 7,763,404 B2; issued July 27, 2010). Final Act. 5–28.

*Principal Issues on Appeal*¹

Based on Appellants' arguments in the Appeal Brief (App. Br. 6–10) and the Reply Brief (Reply Br. 4–10), the following principal issue is presented on appeal:

Did the Examiner err in rejecting claims 1–26 under 35 U.S.C. § 103(a) over the combination of Bischoff, Walsh, and Willis because Willis, and thus the combination, fails to teach or suggest the limitation at issue in representative independent claim 1, namely “determining, from the simulated spectrum, index of refractivity and coefficient of extinction material optical properties of the grating structure,” as recited in representative independent claim 1?

ANALYSIS

We have reviewed the Examiner's rejections (Final Act. 5–28) in light of Appellants' arguments in the Appeal Brief (App. Br. 6–10) and the Reply Brief (Reply Br. 4–10) that the Examiner has erred in view of the Examiner's Answer including the Examiner's response to Appellants' arguments (Ans. 4–6). We disagree with Appellants' arguments.

¹ Independent claims 1, 9, 17, and 22, and claims 2–8, 10–16, 18–21, and 23–26 which depend respectively therefrom, contain the same disputed limitations pertaining to a method for determining an index of refractivity and coefficient of extinction material optical properties from a simulated spectrum of diffraction order sets which are simulated for a grating structure in a metrology system, and are argued together as a group by Appellants in the briefs on the basis of claim 1 (App. Br. 6–10; Reply Br. 3–10). We select independent claim 1 as representative of claims 1–26 which all stand rejected for obviousness over the combination of Bischoff, Walsh, and Willis.

With respect to representative claim 1, we adopt as our own (1) the findings and reasons set forth by the Examiner in the action from which this appeal is taken (Final Act. 5–8), and (2) the reasons set forth by the Examiner in the Examiner’s Answer (Ans. 4–6) in response to Appellants’ Appeal Brief. We concur with the conclusions reached by the Examiner.

We note that each reference cited by the Examiner must be read, not in isolation, but for what it fairly teaches in combination with the prior art as a whole. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (one cannot show non-obviousness by attacking references individually where the rejections are based on combinations of references). In this light, Appellants’ arguments as to representative independent claim 1 (App. Br. 9–10; Reply Br. 8–9) concerning the individual shortcomings in the teachings of Willis are not persuasive of the non-obviousness of the claimed invention set forth in representative independent claim 1. The Examiner has relied upon the *combination* of Bischoff, Walsh, and Willis as teaching or suggesting a method for determining an index of refractivity and coefficient of extinction material optical properties from a simulated spectrum of diffraction order sets which are simulated for a grating structure in a metrology system, as recited in claim 1.

We agree with the Examiner (Final Act. 5–8; Ans. 4–6) that Willis teaches determining index of refractivity and coefficient of extinction material optical metrological properties of a grating structure (*see* at least col. 28, ll. 20–22; col. 35, ll. 50–58), which are also known as n and k values (*see* col. 47, ll. 3–9), and suggests using simulations (*see* Ans. 7 citing col. 28, ll. 7–26). We also agree with the Examiner that Bischoff and Walsh both teach performing analyses on simulations of physical grating structures

(Final Act. 5–6). And, we agree with the Examiner’s motivational statement for the combination, namely,

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined teachings of Bischoff et al. and Walsh to incorporate the teachings of Willis et al. for determining, from a simulated enhanced signal (e.g., a simulated spectrum), index of refractivity and coefficient of extinction material optical properties of the grating structure because, as suggested by Willis et al., optically tunable soft mask (OTSM) technology includes tunable resist compositions that are *capable of high resolution lithographic performance*, especially in bilayer or multilayer lithographic applications.

Final Act. 8 (emphasis in original).

Appellants have not adequately shown otherwise. Based on the foregoing, Appellants’ contentions are not persuasive of Examiner error.

Although Appellants’ Reply Brief presents an additional argument regarding whether Bischoff, Walsh, and Willis, alone or in combination, fail to disclose the “determining . . .” step (Reply Br. 6), this argument was not raised in front of the Board in the initial brief and is therefore waived.² In any event, this argument is conclusory and unsupported by record evidence.

In view of the foregoing, we sustain the rejection of claim 1, as well as the respective claims 2–26 grouped therewith, under § 103(a) over the

² “Any bases for asserting error, whether factual or legal, that are not raised in the principal brief are waived.” *Ex parte Borden*, 93 USPQ2d 1473, 1474 (BPAI 2010) (internal citation omitted) (informative). *See also Optivus Tech., Inc. v. Ion Beam Appl’ns. S.A.*, 469 F.3d 978, 989 (Fed. Cir. 2006) (“[A]n issue not raised by an appellant in its opening brief . . . is waived.”) (citations and quotation marks omitted); *Advanced Magnetic Closures, Inc. v. Rome Fastener Corp.*, 607 F.3d 817, 833 (Fed. Cir. 2010).

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combination of Bischoff, Walsh, and Willis for the reasons provided by the Examiner (*see, e.g.*, Final Act. 5–8; Ans. 4–6)(discussing claim 1).

CONCLUSION OF LAW

The Examiner did not err in rejecting claims 1–26 under 35 U.S.C. § 103(a) over the combination of Bischoff, Walsh, and Willis because Appellants’ arguments are not persuasive of Examiner error in reaching the conclusion of obviousness as to representative independent claim 1.

DECISION

We affirm the Examiner’s rejection of claims 1–26.

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). *See* 37 C.F.R. §§ 41.50(f), 41.52(b).

AFFIRMED