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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CHRISTOPHER M. GRENIER, THOMAS W. MOSSBERG and DMITRI IAZIKOV

Appeal 2018-006636
Application 14/698,789
Technology Center 2800

Before CATHERINE Q. TIMM, KAREN M. HASTINGS, and JEFFREY SNAY, *Administrative Patent Judges*.

HASTINGS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant[1] seeks our review under 35 U.S.C. § 134(a) of the Examiner's final decision rejecting claims 1–3 and 8–16 under 35 U.S.C. § 112(b) as indefinite; claims 1–3, 6–9 and 11–16 under 35 U.S.C. § 102(a)(1&2) as anticipated by Kaempfe (US 2014/0146390 A1; May 29, 2014); and claim 10 under 35 U.S.C. § 103(a) as unpatentable over the

[1] We use the word "Appellant" to refer to the "applicant" as defined in 37 C.F.R. § 1.42. Appellant identifies Finisar Corporation as the real party in interest (Appeal Br. 2).

combined prior art of Kaempfe with Yoshida (US 2010/0208262 A1, Aug. 19, 2010). We have jurisdiction over the appeal under 35 U.S.C. § 6(b).

We AFFIRM.

Independent claim 1 is illustrative (emphasis added to highlight key disputed limitations):

> 1. A diffraction grating comprising:
>
> (a) a substrate comprising a dielectric or semiconductor substrate material substantially transparent over *a selected range of operational wavelengths* λ with a substrate refractive index n_{sub}, and having a first surface facing an optical medium with a medium refractive index n_{med} that is less than n_{sub};
>
> (b) a dielectric or semiconductor layer formed on the first surface of the substrate, substantially transparent over the selected operational wavelength range, and characterized by a layer refractive index n_L and a layer thickness t, wherein n_L differs from both n_{sub} and n_{med};
>
> (c) a set of diffractive elements formed on the layer on the first surface of the substrate, wherein (i) the diffractive elements comprise a set of protruding ridges of a dielectric or semiconductor ridge material, (ii) the ridge material is substantially transparent over the selected operational wavelength range and has a ridge refractive index n_R that differs from n_{med}, (iii) the ridges are characterized by a ridge spacing Λ, a ridge width d, and a ridge height h, and (iv) the ridges are separated by intervening trenches substantially filled with the optical medium,
>
> wherein:
>
> (d) $\frac{\lambda}{2n_{sub}} < \Lambda < \frac{\lambda}{(n_{sub}+n_{med})}$ *over the selected operational wavelength range*, thereby substantially precluding (i) diffraction of any non-zero order into the optical medium, and (ii) diffraction of any second- or higher-order within the

> substrate, of any portion of an optical signal incident on the diffractive elements from within the substrate; and
>
> (e) n_{sub}, n_{med}, n_L, n_R, Λ, d, h, and *t result in wavelength-dependent, first order diffraction efficiency of the grating, for first-order diffraction within the substrate, greater than a prescribed level over the selected operational wavelength range* for both s- and p-polarized optical signals incident on the diffractive elements from within the substrate at an incidence angle θ_{in} that exceeds a critical angle $\theta_c=\sin^{-1}(n_{med}/n_{sub})$.

Appellant only presents arguments directed to independent claim 1 (Appeal Br. 2–9). Accordingly, all of the remaining claims stand or fall together with claim 1, including separately rejected claim 10.

ANALYSIS

We have reviewed each of Appellant's arguments for patentability. However, we determine that a preponderance of the evidence supports the Examiner's finding that the claimed subject matter of representative claim 1 is anticipated within the meaning of § 102 in view of the applied prior art of Kaempfe.

Accordingly, we sustain the Examiner's §§ 102 and 103 rejections of claims 1–3 and 6–16 for essentially those reasons expressed in the Answer, including the Examiner's Response to Argument section. On the other hand, we reverse the Examiner's § 112 rejection of claims 1–3 and 8–16.

We add the following primarily for emphasis.

The § 112 Rejection

During prosecution, claims are definite if they "set out and circumscribe a particular area with a reasonable degree of precision and

particularity." *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971). The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification.

The Examiner found the language of claim 1 indefinite, since the claim requires "wavelength-dependent, first order diffraction efficiency of the grating, for first-order diffraction within the substrate, *greater than a prescribed level"* but does not provide guidance as to what constitutes "a prescribed level" (except in claims 6 and 7). (Final Act. 2, 3). The Examiner states that "claiming a device can be totally efficient *or* totally inefficient *or* anything in between makes the metes and bounds unclear particularly which species would be covered." (Ans. 3). Appellant points out that the cited portion is context sensitive, because the choice of the parameters recited allow a grating designer to achieve a prescribed level of diffraction efficiency "*whatever* that prescribed level might be and *whatever* the selected wavelength range might be." (Appeal Br. 3). Appellant states that a diffraction grating that meets the rest of the limitations of claim 1 and "is specified to provide a minimum level of diffraction efficiency … (whatever that minimum level might be)" would be within the scope of claim 1. (Appeal Br. 4).

Claim 1 is broad in the sense that it reads on any structure of the diffraction grating that meets the structural limitations of claim 1 and provides some minimum level of diffraction efficiency. However, claim 1 is not indefinite on the basis of its breadth alone. *See In re Gardner*, 427 F.2d 786, 788 (CCPA 1970) ("[B]readth is not indefiniteness."). The Examiner has not explained sufficiently why one of ordinary skill in the art would not have understood how to select parameters to get a prescribed level

diffraction efficiency, in the manner described in the Specification and in Appellant's response, cited above.

In light of these circumstances, we agree with Appellant that one of ordinary skill in the art would have understood the scope of the claim in light of the Specification. Accordingly, we cannot sustain the Examiner's rejection of claims 1–3 and 8–16 based merely on the breadth with which the Examiner has interpreted claim 1.

The §§ 102 and 103 Rejections

We review the appealed rejections for error based upon the issues identified by Appellant and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (Fed. Cir. 2011) (BPAI 2010) (precedential), *cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections.").

"[T]he PTO must give claims their broadest reasonable construction consistent with the specification . . . . Therefore, we look to the specification to see if it provides a definition for claim terms, but otherwise apply a broad interpretation." *In re ICON Health & Fitness, Inc*., 496 F.3d 1374, 1379 (Fed. Cir. 2007). "[A]s applicants may amend claims to narrow their scope, a broad construction during prosecution creates no unfairness to the applicant or patentee." *Id.*

The main disputes for claim 1 are: whether the claim language "operational wavelength range," which describes the range of values for which the diffraction grating works, encompasses the optic domain described in Kaempfe (Appeal Br. 5); whether Kaempfe teaches a ridge

spacing that is encompassed by the conditional equation of (d) of the claim (Appeal Br. 5–6); and whether Kaempfe, either inherently or implicitly, teaches an arrangement encompassed by claim 1's clause (e) such that there is first order diffraction within the substrate greater than a prescribed value (Appeal Br. 7).

First, Appellant argues that the operational wavelength is limited in such a way that the optical domain of Kaempfe cannot disclose this limitation (Appeal Br. 5). Appellant states that the operational wavelength range is the range "over which a given device is designed to exhibit diffraction efficiency" above a prescribed minimum diffraction efficiency, while the optical domain of Kaempfe is a range "within which the devices of Kaempfe could be designed to operate over certain subranges." *Id*. These arguments are not persuasive of reversible error.

The Examiner explains that the Specification has offered no special definition, that the claim has no limitation on the range, and that the Appellant indeed even describes that the operational wavelength range as "whatever." (Ans. 4; quoting from Appeal Br. 3 (which states "*whatever* the selected wavelength range might be")). Thus, applying the broadest reasonable interpretation of "a selected range of operational wavelengths" in clause (a), we agree with the Examiner that the range of the claim does not limit claim in a manner that distinguishes the diffraction grating structure of the claim from Kaempfe's diffraction grating. Indeed, one of ordinary skill in art would appreciate that any diffraction grating, as in Kaempfe, will be transparent over some range of operational wavelengths.

Second, Appellant contends that Kaempfe does not disclose a ridge spacing that meets the conditional equation of (d) of the claim (Appeal Br.

5-6). Appellant demonstrate how to determine the ridge spacing of (d) but use a different λ on both sides (Ans. 5, 6).

The Examiner uses the conditional equation to determine the ridge spacing of (d), similarly to Appellant, to determine that the range for ridge spacing according to the optical domain of Kaempfe is between 40 nanometers to 5877 microns. (Ans. 5). The range of ridge spacings is disclosed by Kaempfe in Example 1 and 2 as 591 – 597 nanometers and 694 – 733 nanometers, respectively. (Final Act. 4). Thus, the Examiner finds that the ridge spacing, at least in two instances, is taught by the disclosure of Kaempfe. Appellant's arguments do not point to reversible error in the Examiner's determination of the limitation (d). *Cf. In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997) (Where there is reason to conclude that the structure of the prior art is inherently capable of performing the claimed function, the burden shifts to the applicant to show that the claimed function patentably distinguishes the claimed structure from the prior art structure); *In re Hallman*, 655 F.2d 212, 215 (CCPA 1981).

Third, Appellant argues that there is no "first order diffraction within the substrate" at all, much less "greater than a prescribed level," and thus Kaempfe cannot inherently teach the limitation of (e). (Appeal Br. 7; Reply Br. 1).

As explained by the Examiner, the "extremely broad construction of the claim" allows the minimum first-order diffraction efficiency to be "whatever." (Ans. 7, quoting Appeal Br. 3 (which also states "*whatever* that prescribed level might be")). While the prescribed level can be zero ("whatever"), the minimum efficiency must be nonzero, since the actual efficiency must be something "greater than" that prescribed level (zero, in

the lowest case). The breadth of the claim language encompasses any efficiency level above zero (e.g., 0.01 first-order diffraction efficiency). In this case, the evanescence of the first order diffraction within the substrate (Kaempfe, ¶ 14, ¶ 50), means the first order diffraction is present in a limited and exponentially vanishing manner, but this is still "greater than a prescribed level" of zero. Thus, the Examiner's statement that Kaempfe, due to the similar structures, inherently possesses the property as recited in clause (e) of claim 1 is reasonable (Final Act. 4). Appellant has advanced no compelling rationale why the Examiner's conclusion is not reasonable. *Cf. In re Spada*, 911 F.2d 705, 708 (Fed Cir. 1990) (when a claimed product reasonably appears to be substantially the same as a product disclosed by the prior art, the burden is on the applicant to prove that the prior art product does not necessarily or inherently possess characteristics attributed to the claimed product); *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977).

Appellant relies upon the same arguments presented for claim 1 for each dependent claim (Appeal Br. 5, 10). Appellant also does not sufficiently point out any error in the Examiner's obviousness determination of dependent claim 10 (e.g., Appeal Br. 8, 9 (Appellant again relies on the same/similar arguments to those previously made)).

Accordingly, the Examiner's §§ 102 and 103 rejections are affirmed with respect to all of the claims on appeal.

DECISION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–3, 8–16	112			1–3, 8–16
1–3, 6–9, 11–16	102	Kaempfe	1–3, 6–9, 11–16	
10	103	Kaempfe, Yoshida	10	
Overall Outcome			1–3, 6–16	

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