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HAGAN, SEAN P	

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CATHERINE GENEVIEVE CANEAU, FENG XIE, and CHUNG-EN ZAH

Appeal 2019-003432
Application 13/772,694
Technology Center 2800

Before JEFFREY T. SMITH, LINDA M. GAUDETTE, and DONNA M. PRAISS, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1, 3–11, and 19–21; claims 12–18 are withdrawn from consideration. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

[1] 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 Thorlabs Quantum Electronics, Inc. Appeal Br. 3.

The following rejections are presented for appeal:

I. Claims 1, 3–6, and 20 are rejected under 35 U.S.C. § 103(a) as unpatentable over Arimura (US 7,856,046 B2; Dec. 21, 2010) in view of Kawasaki (US 5,115,284; May 19, 1992) and further in view of Hwang (US 6,560,259 B1; May 6, 2003).

II. Claims 7–11 are rejected under 35 U.S.C. § 103(a) as unpatentable over Arimura in view of Kawasaki in view of Hwang and further in view of Goyal (US 2012/0033697 A1; Feb. 9, 2012).

III. Claims 19 and 21 are rejected under 35 U.S.C. § 103(a) as unpatentable over Arimura in view of Kawasaki in view of Hwang and further in view of Kwon (US 5,561,683; Oct. 1, 1996).

Appellant's invention relates generally to distributed feedback lasers in the mid-infrared region that have an active core made of concentric rings to generate several wavelengths simultaneously or sequentially. (Spec. ¶ 2.) Independent claims 1 and 19 are presented in the appeal and representative claim 1 is reproduced below:

> 1. A laser comprising:
>
> i) a gain material comprising at least two, compositionally non-identical, layers forming a superlattice, wherein the gain material generates photons by intersubband transitions;
>
> ii) at least two circular lasing sections with non-equivalent lengths placed in a concentric circle with a common center, the surface of the circular lasing sections being parallel to the layers forming the superlattice, wherein:
>
> a. each lasing section comprises
>
> i. a grating;
>
> ii. an active region; and
>
> iii. an electrical contact for injecting current into the gain material in a direction perpendicular to the surface of the circular lasing sections;

b. the lasing sections are separated by an electrical isolation region; and
c. the gratings in the at least two circular lasing sections have non-equivalent periods or Bragg wavelengths, and are configured to act as reflectors reflecting the photons partly within the surface to achieve lasing and partly out of the surface as surface emitting output,

wherein the lasing sections are arranged such that the section emitting at the shortest wavelength, which is defined by the grating with the smallest grating period, is closest to the common center, and the section emitting at the longest wavelength, which is defined by the grating with the largest grating period, is farthest from the common center.

Appeal Br. 19, Claims Appendix (italics added).

OPINION

Having considered the respective positions advanced by the Examiner and Appellant in light of this appeal record, we reverse the Examiner's rejections based on the arguments presented by Appellant. We add the following.

We limit our discussion to the independent claims 1 and 19.

The Examiner finds Arimura teaches a laser comprising a gain material comprising at least two, compositionally non-identical, layers forming a superlattice as required by independent claim 1. (Final Act. 6.) The Examiner finds Arimura differs from the claimed invention by not disclosing "at least two circular lasing sections with non-equivalent lengths placed in a concentric circle with a common center." The Examiner finds Kawasaki teaches this feature. (Final Act. 6.) The Examiner determines it would have been obvious to one of ordinary skill in the art at the time of the

invention to combine the teachings of Arimura with the teachings of Kawasaki.[2] The Examiner further states:

> In view of the teachings of Arimura regarding the provision of a ring laser having vertical output, the formation of such lasers in an array of ring lasers having vertical output by nesting lasers having a common center as taught by Kawasaki would enhance the teachings of Arimura by allowing additional independent lasing regions of the same or different wavelength to be formed with predetermined alignment in a compact area.
> (Final Act. 6).

During examination, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). "[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." *KSR Int'l v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)); *see also*, *Ball Aerosol and Specialty Container, Inc. v. Ltd. Brands, Inc.*, 555 F.3d 984, 993 (Fed. Cir. 2009) ("[T]he analysis that 'should be made explicit' refers not to the teachings in the prior art of a motivation to combine, but to the court's analysis.").

The dispositive issue on appeal is:

Did the Examiner err in determining that a person of ordinary skill in the art would have combined the teachings of Arimura and Kawasaki to form a laser having at least two circular lasing sections with non-equivalent

[2] The Examiner cites Hwang for describing subject matter not related to the dispositive issue.

lengths placed in a concentric circle with a common center as required by independent claim 1?

We answer this question in the affirmative.

Appellant argues the cited references do not teach a laser wherein the lasing sections are arranged such that the section emitting at the shortest wavelength, which is defined by the grating with the smallest grating period, is closest to the common center, and the section emitting at the longest wavelength, which is defined by the grating with the largest grating period, is farthest from the common center as required by independent claim 1. (Appeal Br. 10–16.)

The Examiner has not identified where Arimura and Kawasaki teach lasing sections arranged such that the section emitting at the shortest wavelength is closest to the common center, and the section emitting at the longest wavelength is farthest from the common center as required by independent claim 1.

Although the combination of Arimura and Kawasaki might suggest arriving at a device having multiple rings, neither Arimura nor Kawasaki discloses a wavelength relationship among the rings. The Examiner's reliance on Arimura for teaching the radius of the ring as an input variable for the value that sets the emission wavelength of the ring resonator does not describe a relationship among concentric rings. Although Kawasaki discloses multiple polygons, there is no teaching or suggestion of wherein the lasing sections are arranged as required by independent claim 1. Consequently, the combined teachings of Arimura and Kawasaki do not suggest a device wherein the lasing sections are arranged such that the section emitting at the shortest wavelength, which is defined by the grating

with the smallest grating period, is closest to the common center, and the section emitting at the longest wavelength, which is defined by the grating with the largest grating period, is farthest from the common center as required by independent claim 1.

Therefore, we do not sustain the Examiner's decision to reject independent claims 1 and 19 for the reasons presented by Appellant and given above. We likewise reverse the Examiner's decision to reject dependent claims 3–11, 20, and 21 because the rejections of these claims are premised on the Examiner's unsupported combination of Arimura and Kawasaki. We need not reach whether the Examiner's reliance on other references in addition to Arimura and Kawasaki for the rejection of the dependent claims was supported by the evidence of record because the base combination of Arimura and Kawasaki cannot stand.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 3–6, 20	103(a)	Arimura, Kawasaki, Hwang		1, 3–6, 20
7–11	103(a)	Arimura, Kawasaki, Hwang, Goyal		7–11
19, 21	103(a)	Arimura, Kawasaki, Hwang, Kwon		19, 21
Overall Outcome				1, 3–11, 19–21

REVERSED