UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JEFFREY T. HASTINGS, MICHAEL H. LIM and HENRY I. SMITH

Appeal 2008-0989
Application 10/446,245
Technology Center 2800

Decided: May 14, 2008

Before BRADLEY R. GARRIS, CATHERINE Q. TIMM, and KAREN M. HASTINGS, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's decision rejecting claims 1-30, 40 and 41. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

I. BACKGROUND

The invention relates to an optical waveguide with non-uniform grating structures formed in a first and second sidewall thereof, wherein the grating structures are formed by varying the width of the waveguide. Claims 1, 10, 11, 12, 15, 17 and 18 are illustrative of the subject matter on appeal:

1. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying according to a functional form, said functional form being a product of a periodic function and aperiodic function.

10. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying according to a functional form comprising the sum of two periodic functions and an aperiodic function.

11. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;

said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying according to a functional form comprising the sum of a periodic function and two aperiodic functions.

12. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying according to a functional form comprising the sum of a periodic function and an aperiodic function.

15. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying asymmetrically with respect to said widths of said teeth of said second grating.

17. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first

grating varying according to a functional form such that the period of the functional form changes along the direction of propagation.

18. An integrated optical device, comprising:
a substrate;
a waveguide formed on said substrate;
a first grating formed in a first sidewall of said waveguide, said first grating having a plurality of teeth; and
a second grating formed in a second sidewall of said waveguide, said second grating having a plurality of teeth;
said teeth of said first grating having widths that vary non-uniformly along a direction of light propagation, said widths of said teeth of said first grating varying according to a functional form such that the phase of the functional form changes along the direction of propagation.

Appellants request review of the sole rejection maintained by the Examiner, namely the rejection of claims 1-30, 40 and 41 under 35 U.S.C. § 103(a) over U.S. Patent No. 6,823,111, issued November 23, 2004 to Jette et al. ("Jette").

II. DISCUSSION

Appellants argue Jette refers to only a single "grating 132E" and thus does not teach a "waveguide" with two "gratings" as called for in the claims. (App. Br. 7, 9, 12, 14, 16, 19 and 21). Appellants also argue that "grating 132E" as taught by Jette is comprised of "waveguides" 100E and 100E' which have no "gratings" in them as claimed. (App. Br. 8, 10, 12, 15, 17, 19 and 22). Thus, Appellants argue that "Jette et al. discloses that a grating is formed from waveguides, not in the sidewall of a waveguide." (App. Br. 8, 10, 13, 15, 17, 20 and 22).

Appellants provide arguments under separate headings for each of independent claims 1, 10, 11, 12, 15, 17 and 18. (App. Br. 9-23). Thus, we decide the sole ground of rejection on the basis of claims 1, 10, 11, 12, 15,

17 and 18. *See* 37 C.F.R. § 41.37(c)(1)(vii). However, the arguments made with respect to claim 1 are merely repeated for each of claims 10, 11, 12, 15, 17 and 18 (App. Br. 9-23) and effectively repeated in the Reply Brief. (Reply Br. 2-17). Therefore, our determination below applies equally to each of independent claims 1, 10, 11, 12, 15, 17 and 18. Since Appellants' arguments for each claim grouping is identical, we do not find it necessary to address each claim separately.

The issue on appeal arising from the contentions of Appellants and the Examiner is: Have Appellants demonstrated that the Examiner reversibly erred in rejecting the claims as obvious over the teachings of Jette? We answer this question in the negative.

Upon review of the record, we set forth the following Findings of Facts (FF):

1. Appellants' Brief Description of the Drawings describes Figure 3 as follows "[f]igure 3 illustrates a channel waveguide with non-uniform sidewall gratings according to the concepts of the present invention." (Spec. 9, ll. 8-9; Fig. 3).

2. The Specification also describes Figure 3 as follows:

> As noted above, it is desirable that an optical waveguide include a non-uniform grating wherein the non-uniform grating is placed in one or both of the sidewalls of the optical waveguide. Figures 3 and 4 illustrate examples of such optical waveguides according to the concepts of the present invention.
>
> As shown in Figure 3, the optical waveguide is a channel optical waveguide that includes a channel shaped silicon region 42 with non-uniform sidewall gratings 44 formed upon a silicon-dioxide layer 41. The variation of the grating width is

> representative of an apodized reflection filter as described above.

(Spec. 12, ll. 13-19; Fig. 3).

3. The Brief Description of the Drawings of Jette states that "FIGS. 13(a) and 13(b) are plan views of an apodized-uniform and unapodized periodic grating respectively formed by a series of cells each comprising two waveguide sections having different widths and lengths; FIG. 13(a) illustrates the sine apodized uniform periodic grating [sic, ;] FIG. 13(b) illustrates the unapodized uniform periodic grating." (Jette, col. 5, ll. 19-24; Figs. 13(a) and 13(b)).

4. Jette further describes Figure 13(a) as follows:

> FIGS. 13(a) and 13(b) illustrate an example of an apodized uniformly periodic grating 132E embodying this invention. It is composed of a series of cells 134E each composed of two waveguide sections, 100E and 100E'. As shown in FIG. 13(a), the contour of the grating follows a predefined apodization function which varies the widths of the waveguide sections 100E and 100E' as compared to a unapodized cell 134E shown in FIG. 13(b), that takes the form of an 8 μm wide strip and a 1 μm wide strip, respectively. As an example, the apodization function used is a sine profile given by
>
> $$f(x) = \sin\left(\frac{\pi x}{L}\right) \qquad (6)$$
>
> where L is the length of the grating and f(x) takes a value between 0 and 1.

(Jette, col. 19, l. 57-col. 20, l. 6; Figs. 13(a) and 13(b)).

We agree with the cogent reasoning provided in the Examiner's Answer, which we find to be well supported by the prior art, that

> [t]he structure disclosed by Jette et al. (in the specification and figures) clearly comprises a first grating formed in a first sidewall and a second grating formed in a second sidewall inasmuch as Applicant's waveguide comprises a first grating formed in a first sidewall and a second grating formed in a second sidewall. Additionally, the structures relied upon by the Examiner to read upon the claimed waveguide and gratings are also consistent with Applicant's descriptions of waveguide and gratings.

(Ans. 7, FF 1-4). Other than identifying the differences in the terminology between the claims and the prior art, Appellants fail to demonstrate how the "grating 132E" taught by Jette structurally differs from the claimed waveguide.

Elements 100E and 100E' effectively result in corrugations or teeth in a first and second sidewall of "grating 132E," which the Examiner refers to as "waveguide 132E." (Ans. 7, FF 3-4). Though called a "grating 132E" in the terminology used by Jette, the feature 132E of Jette is made up of a series of repeating "waveguide sections" 100E and 100E'. (FF 4). As the Examiner cogently notes, if "grating 132E" is made up of a series of "waveguide sections," the series of "waveguide sections" must also form a "waveguide." (Ans. 5-6). Thus, the Examiner provided a sound rationale as to why one of ordinary skill in the art would equate the "grating 132E" of Jette with the term "waveguide" as claimed.

As the Examiner explains on page 6 of the Answer, "[i]dentity of the terminology between the prior art and the claims is not requisite to render the claims unpatentable." *See In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990)(anticipation does not involve an "ipsissimis verbis" test, i.e., identity of terminology is not necessary); *In re Skoner,* 517 F.2d 947, 950 (CCPA

1975) (merely choosing to describe an invention in different terms than the prior art does not render patentable what appears to be inherently present in the prior art).

Therefore, we determine the Examiner has established that, *prima facie*, the claimed invention would have been obvious to one of ordinary skill in the art based on the teachings of Jette. We are of the opinion Appellants have not overcome the *prima facie* case of obviousness merely by establishing that the prior art uses alternative terminology.

III. CONCLUSION

The totality of the evidence weighs in favor of a conclusion of obviousness. The Appellants have not demonstrated that the Examiner reversibly erred in determining that claims 1-30, 40 and 41 are obvious. Accordingly, we sustain the Examiner's rejections under 35 U.S.C. § 103(a).

IV. DECISION

The decision of the Examiner is affirmed.

V. TIME PERIOD FOR RESPONSE

No time period for taking any subsequent action in connection with this appeal maybe extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

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