The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the board

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KARL SCHRODINGER

Appeal No. 2007-0400
Application 10/788,054[1]
Technology Center 2600

Decided: June 7, 2007

Before JOHN C. MARTIN, LANCE LEONARD BARRY, and HOWARD B. BLANKENSHIP, *Administrative Patent Judges.*

MARTIN, *Administrative Patent Judge.*

DECISION ON APPEAL

This is an appeal from the Examiner's rejection of claims 1-4, 6-13, and 16-25, all of the pending claims, under 35 U.S.C. § 102(e).

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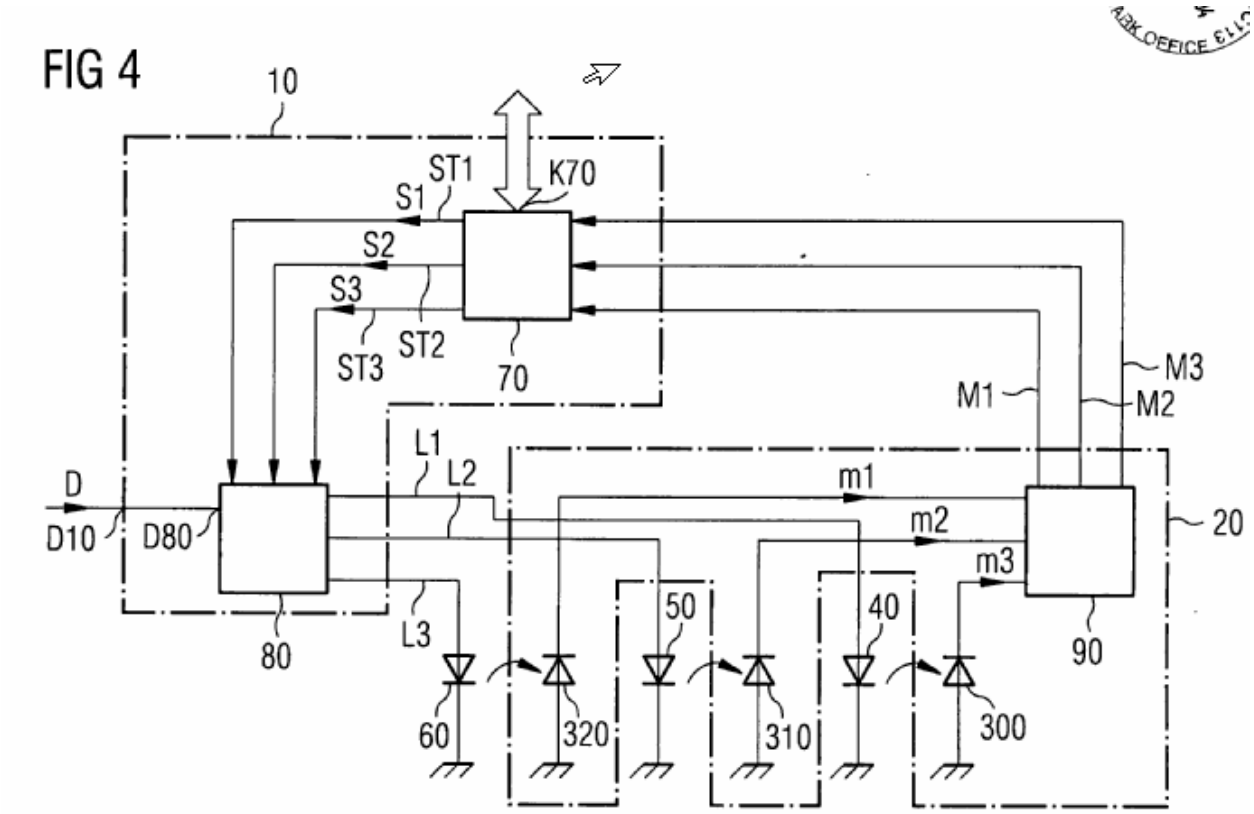
[1] Filed February 26, 2004.

We have jurisdiction under 35 U.S.C. §§ 6(b) and 134(a). We affirm.

APPELLANTS' INVENTION

Appellant's invention is an optical data transmission system that employs at least one redundant optical emitter which serves as a spare in the event of failure of another optical emitter. The claims are directed to the embodiment shown in Figure 4, which includes three optical emitters 40, 50, and 60 (two of which are spares) and respective monitor elements 300, 310, and 320 (part of monitor device 20).



Control module 70 in control device 10 may be configured to initially cause switching device 80 to apply incoming data signals D to emission element 40

(Specification 6:26-7:4) (discussing the operation of the same components in the embodiment depicted in Figure 1). Control module 70 is responsive to measurement output signals M1-M3 generated by monitor amplifier 90 in response to the monitor elements 300, 310, and 320 (*id*. at 7:20-31). If the control module ascertains that the optical output power generated by the emission element 40 is too low or that the operating current required to achieve the prescribed minimum optical emission power is too high, the control module deduces that the emission element 40 is defective, at which time it switches off emission element 40 and switches on one of emission elements 50 and 60 (*id*. at 7:33-8:3).

THE CLAIMS

Claims 1 and 22 are the only independent claims, of which claim 22 reads:

> 22. A method for operating a redundant optical emission module having at least two emission elements, comprising:
>
> measuring the optical power of each emission element by a solely assigned respective monitor element;
>
> switching at least one of the emission elements to an active state; and
>
> switching at least one of the other emission elements to a passive state in an emission mode of the emission module.

Because Appellant's arguments regarding claim 22 (Br. 6-7) are the same as the arguments regarding claim 1 (Br. 3-5) and both claims are rejected on the same ground, we will limit our consideration of those two claims to claim 1 pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii) (2005).

THE REFERENCE AND REJECTION

The sole reference relied on by the Examiner is:

Vujkovic-Cvijin	US 6,631,019 B1	Oct, 7, 2003 (filed Jul. 5, 2000)

Claims 1-4, 6-13, and 16-25 stand rejected under 35 U.S.C. § 102(e) as anticipated by the reference.

THE ISSUE

Does the reference disclose using respective photodiodes to monitor the output power of an active laser and of a passive laser, as required by claim 1?

PRINCIPLES OF LAW

Anticipation is a question of fact. *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). "To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently" (*id*).

An appellant's burden on appeal with respect to a rejection for anticipation is to identify at least one claimed element that the examiner has failed to show is expressly or inherently disclosed in the reference. *See Gechter v. Davidson*, 116 F.3d 1454, 1460, 43 USPQ2d 1030, 1035 (Fed. Cir. 1997) ("[W]e expect that the Board's anticipation analysis be conducted on a limitation by limitation basis, with specific fact findings for each *contested* limitation and satisfactory explanations for such findings.") (emphasis added). *Cf. In re Rouffet*, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1455 (Fed. Cir. 1998) ("On appeal to the Board, an

applicant can overcome a rejection [for obviousness] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”).

ANALYSIS

The reference discloses a reconfigurable DWDM (Dense Wavelength Division Multiplexing) optical transmitter that employs “n” active lasers and “k” spare lasers (col. 5, ll. 46-47) and typically employs two spare lasers for every eight active lasers (col. 13, ll. 7-8).

Referring to Figure 2, the transmitter employs a common gas cell 208 comprising a gas of a known spectral line frequency and one etalon (also called the grid generator) 212 to establish a frequency grid for “n” lasers 202 and therefore “n” channels (col. 7, ll. 15-23). More particularly, the etalon generates a comb of equally spaced laser wavelengths (col. 5, ll. 50-52; Fig. 4), also referred to as “successive fringes” (col. 7, ll. 22-23). A reference frequency control loop 228 initializes and tunes each laser to the reference spectral frequency derived from gas cell 208 (col. 7, ll. 23-25). A grid positioning control loop 226 sequentially tunes each laser 202 in the bank to a respective “fringe” of the frequencies of grid generator 212 (col. 7, ll. 20-28). The optical paths of all of the lasers, including the spare lasers, are always connected to the output of transmitter module 225 (col. 7, ll. 59-63).

As shown in Figure 1, which depicts only one of the lasers, a “Detector 1” (314) provides the control input for the reference frequency control loop 228

(col. 6, ll. 54-58), while a "Detector 2" (114) provides the control input for the grid positioning control loop 226 (col. 7, ll. 5-7). Figure 3 shows a transmitter having "n" lasers and a pair of such detectors for each laser. Specifically, this figure shows a common etalon (312), a common gas-filled reference cell (308), a plurality of lasers (#1 to #n), and, associated with each laser, a pair of photodiodes (314, 332) corresponding to detectors 114 and 132 of Figure 1.

Figure 5 is a flow chart showing the operation of the control of the laser path through its optical components (col. 9, ll. 34-35). When an active laser 502 fails, the detector 514 senses the failure and notifies the microprocessor/controller 530 of the failed comb number (col. 11, ll. 9-11). The microprocessor/controller then initializes a spare laser 504 to the properties of the failed laser 502, which are found in a lookup table (col. 11, ll. 13-15). The spare laser 504 is then tuned to the wavelength of the failed channel 502 and the modulated signal is vectored to the spare laser (col. 11, ll. 15-18). This can be accomplished by switching the laser modulation signal electronically to modulate the spare laser instead of the failed laser (col. 13, ll. 34-36).

Figure 6 shows a low-cost implementation using discrete optical elements mounted on a silicon optical micro-board 642 (col. 11, ll. 47-49). Gas cell 608 and etalon plate 612 correspond to elements 208 and 212 in Figure 2 and are common to all of the lasers, of which only one is depicted in Figure 6 together with its associated lenses 606 and 620 (col. 11, ll. 49-50).[2] Likewise, the only photodiodes

[2] The reference appears to be incorrect in stating that "[g]as cell 608 and
(Continued on next page.)

depicted in Figure 6 are the photodiodes 614and 632 associated with the single illustrated laser.

The Examiner held that the "n" lasers depicted in Figure 3 necessarily include the spare lasers as well as the initially active lasers and that, as a result, each active laser and each spare laser has an associated pair of photodiodes 314 and 332 (Answer 7). Appellant contends that in view of the reference's explanation in column 8, lines 48-63 that "n" is the number of active channels, all of the "n" lasers depicted in Figure 3 necessarily are active lasers (Br. 4). Although not relied on by Appellant, interpretation of "n" is also consistent with the reference's explanation that the disclosed optical transmitter employs "n" initially active lasers and "k" spare lasers (col. 5, ll. 46-47). However, the effect of limiting the "n" lasers depicted in Figure 3 to active lasers would be to ignore the reference's principle teaching of providing spare lasers for automatically replacing failed lasers, which implies that the total number of initially active and spare lasers exceeds the number of channels. The Examiner is therefore correct to hold that the "n" lasers depicted in Figure 3 necessarily include spare lasers as well as initially active lasers and respective pairs of photodiodes 314 and 332 are assigned to each spare laser and also each initially active laser. The Examiner is also correct to hold that the v grooves in Figure 6 are intended to support lasers of both types and that a

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etalon plate 614 are all discrete, components mounted in the v grooves 642" (col. 11, ll. 50-52).

different pair of photodiodes 614 and 632 will be associated with each laser (Answer 8).

The recited "monitor element" assigned to each "emission element" reads on at least photodiode 314 in Figure 3 or on at least photodiode 614 in Figure 6. Those photodiodes correspond to photodiode 514 in Figure 5, which determines whether the associated laser has failed and needs to be replaced by a spare laser, whose output power thereafter is monitored by its own associated photodiode 314 (col. 11, ll. 9-26).

Appellant's argument (Br. 4-5) that Figure 5 shows an active laser 502 and a spare laser 504 sharing a single pair of photodiodes (514 and 532) rather than having respective pairs of photodiodes is also unconvincing. Figure 5 is described as showing the operation of the control of the laser path through its optical components (col. 9, ll. 34-35), not as showing the structural details of the transmitter. Those structural details are instead provided by Figures 3 and 6, which fail to show any structure that would permit two lasers to share a single pair of photodiodes.

Appellant does not deny that claims 1 and 22 are anticipated by the reference if, as we have held, it discloses assigning a respective pair of photodiodes 314 and 332 (or 614 and 632) to each initially active and spare laser. The rejection is therefore affirmed as to claims 1 and 22.

The only dependent claims separately argued in the Brief are claims 11 and 20 (Br. 5-6). Claim 11 specifies that the control device comprises a memory for storing which of the emission elements are defective. In the Final Office

Action, the Examiner read this limitation on the lookup table discussed at column 10, lines 56-67 (Final Office Action 4). In the Answer, the Examiner modified the explanation of the rejection by noting that microprocessor/controller 530 (Fig. 5) inherently includes a memory for storing, at least temporarily, any failure notification that the microprocessor/controller receives from photodiode 514 (Answer 12). The Reply Brief fails to address claim 11 at all, let alone point out any error in the Examiner's modified position, which is the function of a reply brief. The rejection is therefore affirmed with respect to Claim 11.

Claim 20 specifies that the control device comprises a fault signal output interface that is used to transmit fault signals to an external system connected to the emission module. In the Final Office Action, the Examiner held that "the control device (reference numeral 530 in Figure 5) comprises a fault signal output interface (inherent from column 10 lines 56 - column 11 line 8), which is to transmit fault signals to an external system connected to the emission module" (Final Office Action 5). Appellant responded by arguing, correctly in our view, that "there is no teaching in the reference that such failure is communicated externally" (Br. 6). In the Answer, the Examiner changed position by reading the recited "external computer system" on either microprocessor/controller 530 or a human operator (*id*.). The Reply Brief fails to address claim 20, let alone either of these rationales. We are therefore affirming the rejection with respect to claim 20.

At page 5 of the Reply Brief, Appellant separately argues the merits of dependent claim 18, which was not separately argued in the Brief. This belated argument will not be considered, because it is not responsive to a new point made

in the Answer, which at page 6 simply repeats the position previously stated at page 5 of the Final Office Action. *See Carbino v. West*, 168 F.3d 32, 34 (Fed. Cir. 1999) ("courts have consistently concluded that the failure of an appellant to include an issue or argument in the opening brief will be deemed a waiver of the issue or argument.") (citing *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 800 (Fed. Cir. 1990)). The rejection is therefore also affirmed with respect to Claim 18. Finally, the rejection is also affirmed with respect to the remaining, unargued dependent claims, i.e., claims 2-10, 12-17, 19, 21, and 23-25. *See In re Young*, 927 F.2d 588, 590, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); 37 C.F.R. § 41.37(c)(1)(vii)(2005).

DECISION

The rejection of claims 1-4, 6-13, and 16-25 under 35 U.S.C. § 102(e) for anticipation by Vujkovic-Cvijin is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. §§ 41.50(f) and 41.52(b).

AFFIRMED

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