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THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

MAILED

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PAT.&T.M. OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

~~EX. DAVIS, JAMES M. DAVIS,  
COLIN J. BRYAN, HERBERT A. BERNICH,  
ARTHUR MAYHEW, and ANDREW P. SHAW.~~

Appeal No. 95-1578  
Application 07/359,697<sup>1</sup>

HEARD: February 15, 1996

Before THOMAS, BARRETT, and LEE, Administrative Patent Judges.  
BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 1 and 9-12. Claims 2-8 stand withdrawn subject to a restriction requirement. However, as noted in the

<sup>1</sup> Application for patent filed June 11, 1992, entitled "Wide Bandwidth RF Spectrum Analyser."

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restriction requirement (Paper No. 5, page 2), claims 2-8 depend directly or indirectly from claim 1 and the nonelected claims will be rejoined if claim 1 is found allowable. Accordingly, claims 1-12 remain in application.

The invention is directed to a radio-frequency (RF) spectrum analyzer using an optical RF modulator, such as a Bragg cell, in a resonant cavity which may be tuned to different wavelengths.

Claim 1, the sole independent claim, is reproduced below.

1. A broadband electrical signal spectrum analyzer comprising:

a spacial light modulating cell,

a frequency stable source of light providing a beam to illuminate the modulating cell,

means for connecting the signal to the modulating cell

at least one resonant cavity in which the modulating cell is located said cavity including means for tuning said cavity to different wavelengths for providing multiple channel, broadband frequency response.

The examiner relies upon admitted prior art in the specification and the following U.S. patents:

Lin (Lin '196)	4,531,196	July 23, 1985
Lin (Lin '197)	4,531,197	July 23, 1985
Mocker	4,707,835	November 17, 1987

Claims 11 and 12 stand rejected under 35 U.S.C. § 112, fourth paragraph, as being of improper dependent form for failing to further limit the subject matter of the claims from which it

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depends. In particular, in the remarks section of the amendment filed October 6, 1993 (Paper No. 8), appellants stated (page 5):

[A]pplicants' claimed invention makes no mention of changing the color or frequency of the source of light and, indeed, in a preferred embodiment, utilizes a stable laser source. To clarify this point, claim 1 has been amended to recite a "frequency stable source of light."

The examiner found the limitation "said source of light provides white light" in claim 11 to be a change from, and inconsistent with, the recitation of "a frequency stable source of light" in claim 1 if such limitation meant a laser and, hence, was not a further limitation under § 112, fourth paragraph (Final Rejection, Paper No. 9, page 2). Appellants admitted an error in stating that the "frequency stable source of light" was a "stable laser source" in the Request for Reconsideration filed April 4, 1994 (Paper No. 10), and explained that a stable source of light could be an arc light or a laser, as disclosed in the specification. The examiner maintains the rejection.

As noted by appellants (Reply Brief, page 2), it is not clear whether the rejection of claims 11 and 12 under 35 U.S.C. § 112, second paragraph, has been withdrawn. The examiner originally rejected claims 11 and 12 as indefinite because of the § 112, fourth paragraph problem (Final Rejection, page 2): "The change in nature for the limitation also introduces an element of confusion in interpreting the claims." The Supplemental Examiner's Answer states that "[n]o second paragraph objection

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applies" (page 1); however, inasmuch as a valid fourth paragraph rejection would probably give rise to a second paragraph rejection, it is not known why the rejection would be withdrawn. For completeness, we treat the § 112, second and fourth paragraph, rejections as related and as standing or falling together with the fourth paragraph rejection. It would clarify the issues if, in future actions, the examiner would expressly note when a rejection has been withdrawn.

Claims 1, 9 and 10 stand rejected under 35 U.S.C. § 103 as unpatentable over the two Lin patents. The examiner finds the claimed structure in both Lin patents. (Final Rejection, pages 2-3):

Contrary to applicant's assertion, the Lin references contain all of the substantive claimed limitations. Several variants are disclosed by Lin '197. Figure 6 appears to be the one showing the clearest picture. A tunable cavity is defined by mirrors 206, 218, 216 and 202. Mirror 202 is adjustable to fit laser wavelength by means of a piezo driver 204. . . .

In Lin '196, Figure 3, applicant would find the multimirror cavity containing the Bragg cell and a piezo driver to tune it (cols. 5 and 6). A further cavity modulation is applicable through element 133.

Claims 1, 9 and 10 stand further rejected under 35 U.S.C. § 103 as unpatentable over the admitted prior art and Mocker.

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OPINION

We reverse the rejections.

The claims are stated to stand or fall together with independent claim 1 (Brief, page 4).

35 U.S.C. § 112, fourth and second paragraphs

The original rejection of claims 11 and 12 in the Final Rejection (Paper No. 9) appears justified based on appellants' remarks in the amendment (Paper No. 8) and, indeed, is not challenged by appellants. Nevertheless, appellants admitted that an error was made in the remarks and, upon seeing the examiner's position, corrected the statement in their next response (Paper No. 10) (Reply Brief, pages 3-8). We see no reason why appellants should not be permitted to clarify or explain a misstatement in a timely manner.

The specification supports appellants' argument. There is nothing inconsistent about white light being frequency stable, because, as noted by appellants, "the amounts and amplitudes of the different frequencies which make up white light can be maintained in the exact relationship" (Reply Brief, page 5). We do not read "frequency stable" as meaning "a stable single frequency." Claim 1 covers both a laser and a white light source; therefore, there is no violation of § 112, fourth paragraph, by limiting the light source to a white light source in claim 11. The rejection of claims 11 and 12 is reversed.

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The examiner states that appellants "attempt[] to redefine the source [of light] in claim 1 in direct opposition to . . . the generally accepted meaning for the terms used in the claims" (Supp. Examiner's Answer, page 1). However, the examiner has not provided any factual evidence about the generally accepted meaning for the terms to support the allegation.

We are not persuaded by the examiner's argument that appellants are prevented from correcting their statement because examination was required to address the issue (Supp. Examiner's Answer, page 2). Rejections are made and withdrawn all the time in response to arguments; that is the nature of examination. Nor are we persuaded that appellants "also demonstrated a lack of diligence by waiting for almost six months between answers" (Supp. Examiner's Answer, page 2), and are somehow estopped from correcting a misstatement. Appellants replied in a timely manner in their next response after seeing the examiner's rejection.

35 U.S.C. § 103 -- Lin patents

Appellants argue that neither Lin patent discloses a "resonant cavity," as recited in claim 1, and have provided a declaration of Dr. Philip Sutton under 37 CFR § 1.132 (Sutton declaration). Based on Dr. Sutton's qualifications, we find him to be an expert in the field. Dr. Sutton states: (1) figure 6 of Lin '197 shows a beam splitting arrangement with no repetitive traversing of paths to provide a tunable cavity

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(Sutton declaration, ¶ 14(a)); (2) Lin '196 contains no teaching of a tuned cavity and that the piezo driver mentioned in columns 5 and 6 is used to modulate the defracted beam and not to tune any cavity (Sutton declaration, ¶ 14(b)); and (3) element 133 serves to modulate one of the beams, not to affect any tuned cavity (Sutton declaration, ¶ 14(c)). These statements agree with our reading of the Lin patents. Lin mentions nothing about a resonant cavity. The split light beams in Lin pass through the Bragg cell only once and do not resonate in a cavity. More than mirrors is required to form a resonant cavity. Accordingly, because neither Lin patent shows a resonant cavity, the rejection of claims 1, 9, and 10 over Lin '196 and Lin '197 is reversed.

35 U.S.C. § 103 -- admitted prior art and Mocker

The admitted prior art discloses a white light RF spectrum analyzer comprised of a Bragg cell in a two-mirror or four-mirror resonant cavity (specification, page 1, paragraphs 2 and 3). The examiner relies on this admitted prior art in stating that "[f]urther enhancements part of the prior art consist of having the Bragg cell inside a resonant cavity" (Paper No. 7, page 2) and "[t]he prior art does suggest the use of cavities as an enhancement for analyzers" (Paper No. 7, page 3). The examiner also relies on figure 1 (Paper No. 9, page 3), which does not show a resonant cavity. In summary, the admitted prior art discloses an RF spectrum analyzer comprised of a Bragg cell in a

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resonant cavity. The prior art does not disclose "said cavity including means for tuning said cavity to different wavelengths for providing multiple channel, broadband frequency response," as recited in the last subparagraph of claim 1.

Mocker discloses an apparatus for rapidly scanning discrete wavelengths within the output spectrum of a laser. The apparatus comprises two resonant cavities. A Bragg cell is located in the secondary cavity and is driven by a RF driver. "For any given drive frequency of Bragg cell 17, a specific laser output wavelength between 9 and 11 micrometers will have feedback into the ring laser along the line as shown at 24 and will thus provide the frequency condition of oscillation in the main ring laser" (column 4, lines 31-35). A feedback loop consisting of detector 26 adjusts the phase of the injection signal to be measured by means of a piezoelectric controller 30 and mirror 20 (column 4, lines 59-64). Thus, the Bragg cell provides a control of the laser wavelength and the piezoelectric controller provides adjustment of the phase of the injection signal. Mocker states that "[i]t has been found that such a system [of the invention] would be particularly useful in spectrographic analyses, such as for use in combination with diagnostic laboratory instruments . . ." (column 2, lines 65-67).

The limitation in question, "means for tuning said cavity to different wavelengths," is in means-plus-function format and

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requires us to interpret that language in light of the specification. In re Donaldson Co., 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1848 (Fed. Cir. 1994) (in banc) ("The plain and unambiguous meaning of paragraph six is that one construing means-plus-function language in a claim must look to the specification and interpret that language in light of the corresponding structure, material, or acts described therein, and equivalents thereof, to the extent that the specification provides such disclosure."). The disclosed structure for performing the function includes mirror 23 which "is vibrated with an amplitude sufficient to change the cavity resonance frequency through the required spectral range" (specification, page 4) and a fiber optic array having a plurality of fiber optic channels, where each optical fiber "forms one fibre ring cavity where the cavity length can be tuned by appropriate selection of the length of the optical fibre 50" (specification, page 6).

We find no structure in Mocker for performing the function of tuning the cavity to different wavelengths corresponding to the disclosed structure, or equivalents thereof. Tuning the cavity is a matter of adjusting the geometry of the cavity to provide resonance, either by adjusting the spacing between mirrors or the length of the optical fiber cables. The piezoelectric controller 30 and mirror 20 adjust the phase of injection signal, and do not tune the cavity to different



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wavelengths. The Bragg cell acts to provide a wavelength-selective feedback injection signal to the system, which will provide the frequency condition of oscillation in the main ring laser (column 4, lines 28-35). The Bragg cell in Mocker does change the wavelength of the system by adjusting the injection control signal, but does not tune the cavity to change the wavelength in the sense of changing the geometry of the cavity. In addition, in claim 1, the signal to be analyzed is input to the modulating cell and, therefore, there must be some structure other than the cell to tune the cavity to different frequencies. We find that Mocker does not disclose "means for tuning said cavity to different wavelengths" which are the same as, or equivalents of, the structure disclosed in the specification. Accordingly, the rejection of claims 1, 9, and 10 over the admitted prior art and Mocker is reversed.

Dr. Sutton's declaration has not been as helpful with respect to the rejection over the admitted prior art and Mocker as it was with the Lin patents. However, we understand that this is partially caused by the fact that the examiner shifted away from the prior art resonant cavity on page 1 of the specification in the Office action of Paper No. 7, to the non-resonant cavity embodiment of figure 1 in the Final Rejection of Paper No. 9, and that Dr. Sutton's declaration was based on the examiner's reasons in the Final Rejection. As a consequence, the closest prior art

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has not been discussed. Dr. Sutton's declaration also does not address Mocker's statement that "such a system would be particularly useful in spectrographic analyses" (column 2, lines 66-67); however, that point was not noted by the examiner. We note Dr. Sutton's statement that "the Mocker reference teaches away from such a combination [of a tunable cavity surrounding a Bragg cell] for the purpose of spectrum analyzers as Mocker is concerned only with the problem of latching on to wavelengths present in a laser cavity" (Sutton declaration, ¶ 14(i)), and consider this as further evidence supporting our conclusion that Mocker does not make obvious the claimed subject matter.



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