

BESCHWERDEKAMMERN
DES EUROPÄISCHEN
PATENTAMTS

BOARDS OF APPEAL OF
THE EUROPEAN PATENT
OFFICE

CHAMBRES DE RECOURS
DE L'OFFICE EUROPEEN
DES BREVETS

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [] To Chairmen
(D) [X] No distribution

**Datasheet for the decision
of 21 November 2006**

Case Number: T 0587/04 - 3.4.02

Application Number: 95306617.2

Publication Number: 0704726

IPC: G02B 6/34

Language of the proceedings: EN

Title of invention:

Wavelength grating router with output coupler

Applicant:

AT&T Corp.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - claim 1 (no)"

Decisions cited:

-

Catchword:

-



Case Number: T 0587/04 - 3.4.02

D E C I S I O N
of the Technical Board of Appeal 3.4.02
of 21 November 2006

Appellant: AT&T Corp.
32 Avenue of the Americas
New York, NY 10013-2412 (US)

Representative: Sarup, David Alexander
Lucent Technologies EUR-IP UK Ltd
Unit 18, Core 3
Workzone
Innova Business Park
Electric Avenue
Enfield, EN3 7XB (GB)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 23 October 2003
refusing European application No. 95306617.2
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. Klein
Members: M. Rayner
M. Vogel

Summary of Facts and Submissions

I. The patent applicant appealed against the decision of the examining division refusing European patent application number 95 306 617.5 relating to wavelength grating routers. In the examination and/or appeal proceedings, reference was made to, amongst others, the following documents.

D1	EP-A-612 125
D2	US-A-5 136 671
D4	JP-A-59 170 815 (English language Abstract)

II. During the examination procedure, after its initial consideration of document D1, the examination division commented that the inventive idea of the application seemed to be the use of second order diffraction light in a wavelength grating router (see point 6 of the communication dated 14.05.2001). However, in point 3 of its later communication of 12.11.2001, the division stated that such a use claim would not involve an inventive step, referring in addition to document D4 then available to it. The decision itself was concerned with a claim 1 directed to a waveguide grating router assembly according to a main request, or, in the alternative, an auxiliary request. In its discussion of inventive step, the examining division again referred to documents D1 and D4 in reaching a negative conclusion relating to inventive step. In particular, document D4 discloses a diffraction grating type optical demultiplexer in which first order diffraction optical energy at wavelength λ_1 diffracted by grating 5 is received by fiber 4 and second order diffraction optical energy at wavelength λ_1 is detected by detector

6 to monitor the position of the input fiber 3 (see lines 7-12 of the abstract). It is therefore obvious for the skilled person to use second order diffraction optical energy in the router assembly according to D1 for monitoring purposes. This person would arrange one of the waveguides 16_1 to 16_N to receive second order diffraction optical energy at one of the wavelengths of the input signal.

Even though the structure according to document D4 is not monolithically integrated on a semiconductor substrate, the waveguide grating router according to the closest prior art, which is represented by document D1 is so integrated. Therefore a combination of the teachings of D1 and D4, starting from document D1, would lead to a router assembly which is monolithically integrated on a semiconductor substrate. The argument that the purpose of the arrangement to capture second order diffracted light is different in the present application and in document D4 is thus not persuasive as to inventive step. The purpose of the detector 6 according to document D4 is to capture second order diffracted light thereby to monitor wavelength shifts in the multiplexed light and correct the resulting displacement of the focal points (see abstract of document D4). The purpose of the waveguide 17 according to the application is to capture second order diffracted light for permitting additional coupling for monitoring or the like (see description page 9, line 19). The purpose of the means for capturing second order diffracted light is the same in the application and in D4.

A method of use claim (claim 4) was present in the claims upon which the decision of the examination division was based, but this claim was not dealt with in the decision under appeal.

III. In a communication consequent to its preliminary consideration of the case, the board informed the appellant that there may be a doubt about whether, if focussed blindly on starting from a tunable laser, it the skilled person would have turned from document D1 to document D4. This aspect was not, however, decisive because document D1 (see column 1, lines 37 and 38) merely teaches this specific use of the multiplexer or demultiplexer assembly known from say document D2, which is mentioned as prior art in both D1 and the present application. It thus seemed reasonable to start from the router assemblies in general according to the prior art prior art mentioned in document D1 (i.e. say document D2).

IV. The board further informed the appellant that it did not doubt from the file that the position of the examining division is that novelty over document D1 of a use claim was acknowledged but that inventive step was denied. Although this aspect was glossed over in the decision under appeal, the view of the examining division is therefore sufficiently clear as to render a remittal unnecessary. The boards of appeal tend to use the problem/solution approach to inventive step. In the present case, increasing efficiency is the general problem addressed, which in specific terms turns out to be not robbing the first order energy for monitoring purposes. First order energy is not robbed in a case where secondary order diffracted light at the

wavelength λ_1 is used in the demultiplexer shown in document D4. Monitoring wavelength based demultiplexing of a waveguide can be considered concerned, which is an application of an integrated router assembly. How the monitoring signal is used downstream is a further problem not addressed by the application. The board reached the preliminary view that it was not very likely that amendment of the application would lead to inventive subject matter.

- V. The appellant requests that the decision under appeal be set aside and a patent be granted on the basis of a set of claims filed with its response to the communication of the board. In support of its position, the appellant argues as follows.

Initially, with the statement of grounds for appeal, the appellant stressed that document D1 relates to a tunable laser rather than a routing assembly. Moreover, output couplers are added additionally according to the invention to capture only second order diffraction. Following the communication of the board, the appellant focussed on inventive step in the context of whether a combination of the teachings of documents D1 and D4 was proper, which it considered not to be the case, but if nevertheless so, whether the claimed subject matter would be reached. Document D1 is directed toward a frequency router formed in a semiconductive wafer for creating multiple frequency selective pathways through the wafer. Specifically, document D1 discloses a plurality of frequency selective pathways formed by light from optical amplifier 181 and incident on optical amplifiers 22 through 22N. The other cited document, document D4 is not directed toward capturing

secondary diffracted light for purposes of indirectly monitoring an optical signal without robbing any of the energy of the diffracted light. The purpose of document D4 is to monitor the physical position of secondary diffracted light on a photodetector array in order to adjust the physical position of the input fibre to ensure that the primary diffracted light is incident on the output optical fibre. Since document D4 solves a different problem to that of the Appellant's invention, a person skilled in the art starting from document D1 would not be motivated to turn to the teachings of document D4.

Moreover, document D4 is directed toward adjusting the physical position of an input fiber by detecting a shift in the position of secondary diffracted light on a photodetector array. As such, a combination of document D1 and document D4 would merely teach a system in which a shift of secondary diffracted light across the photodetector array is used to generate a control signal which may be used to physically reposition a component by which the light is input to frequency router 12. As taught in document D1, however, light propagates from optical amplifier 18 to frequency router 12 via a waveguide 14. The physical movement of optical amplifier 18 in response to such a control signal (assuming such physical movement is even possible) would merely prevent associated waveguide 14 from capturing the light from optical amplifier 18, thereby rendering frequency router 12 inoperable.

Furthermore, waveguide 14 is clearly disposed within the wafer such that physically moving the waveguide structure is not possible. As such, a combination of

the teachings of documents D1 and D4 would result in either an inoperable frequency router or a frequency router in which the benefits of Document D4 remain unutilized. Therefore, one skilled in the art would not be motivated to combine the teachings of document D1 and document D4.

The appellant also assumed, for argument's sake, that one skilled in the art could begin from document D4, in which case the invention would still exhibit an inventive step, as, for example, if one were to replace the photodetector array of document D4 with an output fiber, the positional information obtained by detecting the position of the secondary diffraction light on the photodetector array would be lost. As such, a skilled person would not make such a modification.

VI. Claim 1 is worded as follows:

"1. A method of using a waveguide grating router assembly having a plurality of first waveguides (14_1 to 14_N and 15) on one side of said router, a waveguide grating router (12), and a plurality of second waveguides (16_1 to 16_N and 17) on the opposite side of said router, comprising:
propagating, via the first waveguides, a composite optical signal having a plurality of wavelengths;
receiving the composite optical signal at the waveguide grating router, wherein the waveguide grating router is arranged to create frequency selective pathways (F1 to FN) from said first waveguides (14_1 to 14_N) to particular ones of said second waveguides (16_1 to 16_N), whereby first order diffraction optical energy of the optical signal at selected frequencies is transferred

from said first waveguides to the particular ones of said second waveguides; characterized by receiving from the first waveguides (14₁ to 14_N), at the particular ones of the second waveguides (16₁ to 16_N), the first order diffraction optical energy of the optical signal at the selected frequencies; and receiving, at a different one of the second waveguides (17), only second order diffraction optical energy at substantially the same wavelength as the first order diffraction optical energy of at least one of said first waveguides (14), wherein the second order diffraction optical energy is adapted for performing a monitoring function."

Reasons for the Decision

1. The appeal is admissible.
2. *Patentability (Articles 54 and 56 EPC)*
 - 2.1 Document D1 explains that the inventors in that application have realised that integrated optical multiplexers and demultiplexers like those referred to in document D2 may be used to create a tunable laser. The board does not consider that document D1 teaches that a waveguide grating router assembly is restricted to use in a tunable laser but maintains the position set out in its communication (see section III of the Facts and Submissions above) that the closest prior art can be considered to be represented by assemblies of the type disclosed in document D1. In this case, the features of the preamble of claim 1 and the first feature down to "selected frequencies;" are known from

the closest prior art. Even if the rather artificial initial line of the appellant is followed that document D1 teaches specifically a tunable laser, there is no doubt that use of the router as a multiplexer or demultiplexer can also be considered obvious in view of the statements in document D1 relating to document D2. Either way, the essential issue on substantive patentability resolves down to whether the final section of the claim, from "and receiving, at a different one...", relating to the second order diffraction, which contains novel subject matter, can be considered to introduce an inventive step into the subject matter of the claim.

- 2.2 It has never been suggested that the skilled person does not know that a router should be monitored. The problem addressed by the novel features of the claim can thus, in general terms, be considered that of increasing efficiency, which in specific terms according to the application, turns out to be not robbing the first order energy for monitoring purposes.
- 2.3 An integrated router assembly finds application in wavelength based demultiplexing of a waveguide. Such demultiplexing is disclosed in document D4, this document does not however disclose an integrated assembly, but a concave diffraction grating which demultiplexes an input at a number of wavelengths from fibre 3 to a plurality of fibre outputs 4. Second order energy at one of the wavelengths is "detected" - or as the appellant says "monitored" - via a photodetector array 6 so that any shift of the light on the array 6 can be eliminated by shifting fibre 3. In doing this, first order energy is not robbed by the detecting as

the array is of course additional to the output fibres 4. The board does not therefore doubt that, according to document D4, a monitoring is effected using second order energy. In other words, the teaching of document D4 meets paragraph 2.2 above.

2.4 The board agrees, moreover, with the examining division that, as the starting point, i.e. document D1, is concerned with application of an integrated router, monitoring of second order energy would obviously be implemented in such a router at a second waveguide different to that for first order energy when following the teaching of document D4 because there the array is additional to the output fibres 4. Therefore, the board had to conclude that the subject matter of claim 1 cannot be considered to involve an inventive step within the meaning of Article 56 EPC.

2.5 The appellant produced essentially two lines of argument against this position, being (1) that the problem addressed in document D4 is not the same as that of the application so that a combination of the two teachings is not proper and (2) that even if the teachings were nonetheless forced together the claimed subject matter would not be reached. The key premise underlying both lines of argument is that document D4 deals not with a monitoring but with a positioning problem. As can be understood from the preceding paragraph, the board does not accept this premise because monitoring in the sense used in the application - said to be additional coupling for monitoring and the like (see last paragraph of the description of the application) - is indeed effected according to document D4. The language used there is "detected and converted

by a signal processing unit into a signal to shift the input fibre". Even the appellant itself uses the word "monitor" in connection with the purpose of document D4 (see for example, the penultimate line of the letter in reply to the communication of the board) but then jumps straight to what happens downstream subsequent to the monitoring, which is, however, a further issue. The board is not therefore persuaded that the skilled person is taught by document D4 that detecting (or monitoring) can only be effected if subsequently a positioning operation is performed. In fact, the present application is very generally worded and does not specify any downstream function at all. Of course, if some other - rather different - downstream function had been specified, it is possible that this might not be obvious. However, such is not the case and, in the present general and unrestricted situation, the board accordingly sees application of the teaching of monitoring to the disclosure of integrated demultiplexer as proper. Moreover, since the skilled person is not compelled to take teaching of positioning from document D4, the conjectured and not very functional idea described by the appellant and involving disruption of the semiconductor wafer for positioning was never a realistic possibility and amounts to no more than a somewhat artificial argument sidetracking away from the main issue.

- 2.6 The approach of the appellant starting from document D4 did not persuade the board because document D4 is not the document representing the closest prior art and therefore does not constitute the correct starting point for the problem solution approach to inventive step. Nevertheless, it can be said that since the

secondary energy is detected, if starting from document D4, it would be necessary to look closely at the other prior art in the context of monitoring and the like. However, it is not necessary to delve further into such arguments in the present case.

2.7 Accordingly, the appellant failed to convince the board that its position on inventive step as outlined in its communication and in line with that of the examining division is not correct, so that the subject matter of claim 1 cannot be considered to involve an inventive step within the meaning of Article 56 EPC.

3. *Article 111 (Remittal)*

3.1 Since the examining division had made its position clear in the first instance proceedings in dealing with the substance of inventive step and reaching a negative conclusion, the board did not, despite the refusal of the application not being specifically based on lack of inventive step of a method claim, see any convincing reason to remit the case to the first instance for further prosecution.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

M. Kiehl

A. G. Klein