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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	05/17/2011	RE42368	C2393-1106RE1	2616

48789 7590 04/27/2011

LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Tai Chen, San Jose, CA;
Jeffrey P. Wilde, Morgan Hill, CA;
Joseph E. Davis, Morgan Hill, CA;

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Change(s) applied to document,
/L.A.S./
3/31/2011

Application Number	Filed Herewith
Filing Date	Filed Herewith
First Named Inventor	Tai Chen et. al
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	C2393-1106RE1

/B.H./	9	6028689		2-22-2000 ~~2000-04-24~~	Michalicek et. al	all
/B.H./	10	5414540		1995-05-09	Patel et. al	all
/B.H./	11	5629790	A	1997-05-01	Neukermans et. al	all
/B.H./	12	5745271		1998-04-28	Ford et. al	all
/B.H./	13	5835458	A	1998-11-01	Bischel et. al	all
/B.H./	14	5960133	A	1999-09-01	Tomlinson	all
/B.H./	15	5974207	A	1999-10-01	Aksyuk et. al	all
/B.H./	16	6204946	B1	2001-03-01	Aksyuk et. al	all
/B.H./	17	6205269	B1	2001-03-01	Morton	all
/B.H./	18	6222954	B1	2001-04-01	Riza	all
/B.H./	19	6253135	B1	2001-07-01	Wade	all

EFS Web 2.1.17

/Brian Healy/ 02/10/2011

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

48759 7590 03/24/2011
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PALO ALTO, CA 94306

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Barry N. Young	(Depositor's name)
Barry N. Young	(Signature)
March 28, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	06/15/2010	Tai Chen	C2393-1106RE1	2616

TITLE OF INVENTION: RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	06/24/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
HEALY, BRIAN	2883	385-024000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 Barry N. Young
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Capella Photonics, Inc.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): San Jose, California

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached. (EFS-Web)
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form)

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature Barry N. Young
Typed or printed name Barry N. Young
Date March 28, 2011
Registration No. 27,744

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	12816084
Filing Date:	15-Jun-2010
Title of Invention:	RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES
First Named Inventor/Applicant Name:	Tai Chen
Filer:	Barry N. Young
Attorney Docket Number:	C2393-1106RE1
Filed as Large Entity	

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	1510

Electronic Acknowledgement Receipt	
EFS ID:	9756232
Application Number:	12816084
International Application Number:	
Confirmation Number:	2616
Title of Invention:	RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES
First Named Inventor/Applicant Name:	Tai Chen
Customer Number:	48789
Filer:	Barry N. Young
Filer Authorized By:	
Attorney Docket Number:	C2393-1106RE1
Receipt Date:	28-MAR-2011
Filing Date:	15-JUN-2010
Time Stamp:	17:59:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1510
RAM confirmation Number	5714
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Issue Fee Payment (PTO-85B)	PTOL-85.pdf	294880 9810f13e86995d36b8c1c5a1e7b65f38854e cdbc	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30398 5286b7360979676 3d08abf0150306a54611 0197c	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	325278		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

48789 7590 03/24/2011
LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

EXAMINER	
HEALY, BRIAN	
ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 03/24/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	06/15/2010	Tai Chen	C2393-1106RE1	2616

TITLE OF INVENTION: RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	06/24/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
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CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

48789 7590 03/24/2011
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PALO ALTO, CA 94306

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Certificate of Mailing or Transmission
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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	06/15/2010	Tai Chen	C2393-1106RE1	2616

TITLE OF INVENTION: RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$0	$0	$1510	06/24/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
HEALY, BRIAN	2883	385-024000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	06/15/2010	Tai Chen	C2393-1106RE1	2616

48789 7590 03/24/2011

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200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

EXAMINER	
HEALY, BRIAN	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 03/24/2011

Determination of Patent Term Extension or Adjustment under 35 U.S.C. 154 (b)

A reissue patent is for "the unexpired part of the term of the original patent." See 35 U.S.C. 251. Accordingly, the above-identified reissue application is not eligible for Patent Term Extension or Adjustment under 35 U.S.C. 154(b).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	12/816,084	CHEN ET AL.	
	Examiner	Art Unit	
	BRIAN M. HEALY	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the response filed 03/02/2011*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. ____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

/BRIAN M. HEALY/
PRIMARY EXAMINER
ART UNIT: 2883

DETAILED ACTION

Allowable Subject Matter

1. The following is an **examiner's statement of reasons for allowance**: The closet references of record are (Note these references were made of record on PTOL-1449) Bouevitch et. al., U.S.P. No. 6,498,872 which teaches (Figs.1-12) an optical device which is used in conjunction with configurable optical add/drop multiplexers (COADM) which includes optical fiber input/output ports 80a,80b,99a,99b which sends wavelength of light which are collimated through lens 90 to spherical reflector 10 which is incident of diffraction grating 20 to MEMS reflector(s) 51,52.which are movable in either the horizontal or vertical directions to return specific wavelengths lambda 1, lambda2 to the output ports 3. Bouevitch et. al., U.S.P. No. 6,498,872 does not teach or suggest using channel micromirrors which are both individually and continuously controllable to reflect received spectral channels to any one of the output ports and to control the power of the received spectral channels coupled to the output ports.

2. Additional secondary references Wagener et. al., U.S.P. No. 6,631,222 (Figs.1-4), Jin et. al., U.S.P. No. 6,256,430 (Figs.1-7) and Ma et. al., U.S.P. No. 6,567,574 (Figs.1-12) all teach that at the time the invention was made it was know that pivotable micro mirrors or MEMS can be used with wavelength multiplexers to switch or select wavelengths between input and output ports.

3. None of the aforementioned references, either taken alone or in combination with each other, teach or suggest the claimed optical add-drop device which includes an input port for an input multi-wavelength optical signal having first spectral channels; one or more ports for second spectral channels, an output port for an output multi-wavelength optical signal ; a wavelength-

selective device for spatially separating the spectral channels, a spatial array of beam deflecting elements such that each element receives a corresponding one of the spectral channels and each of the elements are **individually and continuously controllable in two dimensions** to reflect it's corresponding spectral channel to a selected one of the output ports and **to control the power of the received spectral channels reflected to the selected ports**. These limitations are recited in amended claim 1. **Therefore the patentability of amended claim 1 is confirmed.**

4. Dependent claims 2-14 are inclusive of the limitations of amended claim 1, as well as other additionally recited limitations. Please see the dependent claims for the specifics of these additionally recited limitations. **The patentability of dependent claims 2-14 is confirmed.**

5. In addition, none of the aforementioned references, either taken alone or in combination with each other, teach or suggest the claimed optical add-drop device which includes an input port for an input multi-wavelength optical signal having multiple spectral channels; an output port for an output multi-wavelength optical signal, one or more drop ports for selected spectral channels dropped from the multi-wavelength optical signal ; a wavelength-selective device for spatially separating the spectral channels, a spatial array of beam deflecting elements such that each element receives a corresponding one of the spectral channels and each of the elements are **individually and continuously controllable in two dimensions** to reflect it's corresponding spectral channel to a selected one of the output ports and **to control the power of the received spectral channels reflected to the selected ports, whereby a subset of the spectral channels is directed to the drop ports .** These limitations are recited in amended claim 15.

6. These limitations are recited in original claim 21. **Therefore the patentability of amended claim 15 is confirmed.**

7. None of the aforementioned references, either taken alone or in combination with each other, teach or suggest the claimed optical add-drop device which includes an input port for an input multi-wavelength optical signal having multiple spectral channels, an output port for an output multi-wavelength optical signal, one or more add ports for selected specral channels to be added to the output multi-wavelength optical signal ; a wavelength-selective device for reflecting the multiple and selected spectral channels and a spatial array of beam deflecting elements such that each element receives a corresponding one of the spectral channels and each of the elements are **individually and continuously controllable in two dimensions** to reflect it's corresponding spectral channel to a selected one of the output ports and **to control the power of the received spectral channels reflected to the selected port, whereby the spectral channels from the add ports are selectively provided to the output port.**. These limitations are recited in amended claim 16. **Therefore the patentability of amended claim 16 is confirmed.**

8. Finally, none of the aforementioned references, either taken alone or in combination with each other, teach or suggest the claimed method of performing dynamic add and drop in a WDM optical network comprising the steps of separating an input multi-wavelength optical signal into spectral channels; imaging each of the spectral channels in a beam deflecting element and controlling both **dynamically and continuously the beam deflecting elements in two dimensions** so as to combine the selected ones of the spectral channels into an output multi-wavelength optical signal and **to control the power of the spectral channels which are combined into the output multi-wavelength optical signal**. These limitations are recited in amended claim 17. **Therefore the patentability of amended claim 17 is confirmed.**

9. Dependent claims 18-22 are inclusive of the limitations of original claim 17, as well as other additionally recited limitations. Please see the dependent claims for the specifics of these additionally recited limitations. **The patentability of dependent claims 18-22 is confirmed.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

The reissue oath or declaration, filed 03/02/2011 is sufficient to overcome the rejection of claims based on 35 U.S.C. 251. See previous office action.

This reissue application is a reissue of U.S. Patent Application 10/745,364, filed 12/22/2003, now PAT 6,879,750, which is a CON of U.S. Patent Application 10/005,714, filed 11/07/2001, now U.S.P. No. 6,687,431 which is a CON of U.S. Patent Application No. 09/938,426, filed 08/23/2001 now, U.S.P. No. 6,625,346 which claims the benefit of 60/277,217, filed 03/19/2001.

The references which were made of record in USP No. 6,879,750, No. 6,625,346 and No. 6,687,431 will also be made of record in the present Application.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN M. HEALY whose telephone number is (571)272-2347. The examiner can normally be reached on M-F 6AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Robinson can be reached on (571)272-2319. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN M. HEALY/
Primary Examiner
Art Unit 2883

Notice of References Cited	Application/Control No. 12/816,084	Applicant(s)/Patent Under Reexamination CHEN ET AL.	
	Examiner BRIAN M. HEALY	Art Unit 2883	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,687,431	02-2004	Chen et al.	385/24
*	B	US-6,879,750	04-2005	Chen et al.	385/24
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Application Number	Application No.	Applicant(s)
	12816084	CHEN ET AL.
	Notice of Reissue Published in OG on 08/03/2010	

Original Patent Number of Patent To Be Reissued is 6,879,750	The Maintenance fee status is: ☒ up to date. ☐ not required.

This reissue patent is subject to A Terminal Disclaimer that:

☐ was filed during the prosecution of the reissue application.
☐ was of record prior to the filing of the reissue application.

Physical surrender of the letters patent

☐ was made.
☐ was not made, but a statement of loss/inaccessibility was provided.
☒ is not required

Final SPRE Review

(INITIALS)

3/21/11

(DATE)

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BIB DATA SHEET

CONFIRMATION NO. 2616

SERIAL NUMBER	FILING or 371(c) DATE / RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/816,084	06/15/2010	385	2883	C2393-1106RE1

APPLICANTS

Tai Chen, San Jose, CA;
Jeffrey P. Wilde, Morgan Hill, CA;
Joseph E. Davis, Morgan Hill, CA;

**** CONTINUING DATA ***************************

This application is a REI of 10/745,364 12/22/2003 PAT 6,879,750
which is a CON of 10/005,714 11/07/2001 PAT 6,687,431
which is a CON of 09/938,426 08/23/2001 PAT 6,625,346
which claims benefit of 60/277,217 03/19/2001

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
07/02/2010

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ Yes ☑ No	☐ Yes ☑ No	/BRIAN HEALY/ Examiner's Signature	☐ Initials	CA	12	22	4

ADDRESS

LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306
UNITED STATES

TITLE

Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1844	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

Issue Classification

Application/Control No.	Applicant(s)/Patent Under Reexamination
12816084	CHEN ET AL.
Examiner	**Art Unit**
BRIAN M HEALY	2883

ORIGINAL	
CLASS	SUBCLASS
385	24

CROSS REFERENCE(S)

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
385	10	33	37		
398	83				

INTERNATIONAL CLASSIFICATION					
CLAIMED					NON-CLAIMED
G	0	2	B	6 / 28 (2006.01.01)	
H	0	4	J	14 / 02 (2006.01.01)	

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
2	2	18	18												
3	3	19	19												
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5	5	21	21												
6	6	22	22												
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9	9														
10	10														
11	11														
12	12														
13	13														
14	14														
15	15														
16	16														

NONE		**Total Claims Allowed:** 22
(Assistant Examiner)	(Date)	
/BRIAN M HEALY/ Primary Examiner.Art Unit 2883	3082011	O.G. Print Claim(s): 1 and 17 / O.G. Print Figure: 1A
(Primary Examiner)	(Date)	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12816084	CHEN ET AL.
	Examiner	Art Unit
	BRIAN M HEALY	2883

SEARCHED			
Class	Subclass	Date	Examiner
385	24,11,10,37,34,33	3/8/2011	/BH/
398	79,82,83,84,88,87	3/8/2011	/BH/

SEARCH NOTES		
Search Notes	Date	Examiner
SEARCHED "EAST"(prior art and interference)(SEARCH TERMS, CLASS/SUBCLASSES AND DATABASES USED ARE LISTED ON PRINTOUT.)	3/8/2011	/BH/
PALM INVENTOR SEARCH	3/8/2011	/BH/
STIC LITIGATION SEARCH (NO LITIGATION FOUND)	3/9/2011	/BH/
CONSULTED PARENT CASES CORRESPONDING TO USP No.6,879,750; 6,687,431, 6,625,346.	3/8/2011	/BH/

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
385	24,11,10,37,34,33	3/8/2011	/BH/
398	79,82,83,84,88,87	3/8/2011	/BH/

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12816084	CHEN ET AL.
	Examiner	Art Unit
	BRIAN M HEALY	2883

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/10/2011	03/08/2011							
1	1	✓	=							
2	2	✓	=							
3	3	✓	=							
4	4	✓	=							
5	5	✓	=							
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19	19	✓	=							
20	20	✓	=							
21	21	✓	=							
22	22	✓	=							

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EIC 2800 SEARCH REPORT

SIRA Delivering Technologies for Patents

STIC Database Tracking Number: 358320

To: BRIAN HEALY	From: DIANE JACKSON
Location: JEF-4D05	Location: EIC2800
Art Unit: 2883	JEF-4B68
Wednesday, March 09, 2011	Phone: (571)272-3260
Case Serial Number: 12/816084	diane.jackson@uspto.gov

Search Notes

Hi,

Attached are litigation search results in Lexis Nexis, and CourtLink and Q-Pat/Orbit.

No Litigation was found for Serial Number 12/816084 and Patent Numbers 6879750, 6687431 and 6625346.

If you have any questions, please feel free to contact me.

Thanks,

Diane

Jackson, Diane MAR 9 2011 3 58320

From: Healy, Brian

Sent: Tuesday, March 08, 2011 8:51 AM

To: STIC-EIC2800

Subject: I need a litigation search for reissue case 12/816,084

Dear Sir or Madam, My name is Brian Healy (employee No 62975) and I am a Primary Examiner working on a reissue. I Need a litigation search for reissue 12/816,084 corresponding to 10/745,364, now, PAT 6,879,750 which is a CON of 10/005,714, now USP 6,687,431 which is a CON of 09/938,426, now USP No. 6,625,346 which claims benefit of 60/277,217. Thanks, Brian Healy, Primary Examiner, Art Unit: 2883 (571)272-2347

6,879,750

6,687,431

6,625,346

3/8/2011

Application Number Information

Application Number: **12/816084** Assignments
Filing or 371(c) Date: **06/15/2010** eDan
Effective Date: **06/15/2010**
Application Received: **06/15/2010**
Patent Number:
Issue Date: **00/00/0000**
Date of Abandonment: **00/00/0000**
Attorney Docket Number: **C2393-1106RE1**
Status: **71 /RESPONSE TO NON-FINAL OFFICE ACTION ENTERED AND FORWARDED TO EXAMINER**
Confirmation Number: **2616**
Title of Invention: **RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES**

Examiner Number: **62975 / HEALY, BRIAN**
Group Art Unit: **2883**
Class/Subclass: **385/024.000**
Lost Case: **NO**
Interference Number:
Unmatched Petition: **NO**
L&R Code: Secrecy Code:1
Third Level Review: **NO**
Oral Hearing: **NO**

IFW Madras

Secrecy Order: **NO**
Status Date: **03/03/2011**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location

Appln Info | Contents | Petition Info | Atty/Agent Info | Continuity/Reexam | Foreign Data | Inventors | Address | Fees | Post Info | Pre Gre

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http://EXPOWEB1:8001/cgi-bin/expo/GenInfo/snquery.pl?APPL_ID=12816084

Continuity/Reexam Information for 12/816084

Parent Data

12816084, filed 06/15/2010 is a reissue of 10745364, filed 12/22/2003 ,now U.S. Patent #6879750 and having 1 RCE-type filing therein
10745364 is a continuation of 10005714, filed 11/07/2001 ,now U.S. Patent #6687431
10005714 is a continuation of 09938426, filed 08/23/2001 ,now U.S. Patent #6625346 and having 1 RCE-type filing therein
09938426 Claims Priority from Provisional Application 60277217, filed 03/19/2001

Child Data

Appln Info | Contents | Petition Info | Atty/Agent Info | Continuity/Reexam | Foreign Data | Inventors | Address | Fees | Post Info | Pre Gra

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PCT / [ ] / [ ] Search or PG PUBS # [ ] Search
Attorney Docket # [ ] Search
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Application Number Information

Application Number: 10/745364 Assignments
Filing or 371(c) Date: 12/22/2003 eDan
Effective Date: 12/22/2003
Application Received: 12/24/2003
Pat. Num./Pub. Num: 6879750/20040136648
Issue Date: 04/12/2005
Date of Abandonment: 00/00/0000
Attorney Docket Number: 351909-991106
Status: 150 /PATENTED CASE
Confirmation Number: 1514

Examiner Number: 65907 / PALMER, PHAN
Group Art Unit: 2874
Class/Subclass: 385/024.000
Lost Case: NO
Interference Number:
Unmatched Petition: NO
L&R Code: Secrecy Code:1
Third Level Review: NO

Oral Hearing: NO

IFW Madras

Secrecy Order: NO
Status Date: 03/23/2005

Title of Invention: **RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location

Appln Info | Contents | Petition Info | Atty/Agent Info | Continuity/Reexam | Foreign Date | Inventors | Address | Fees | Post Info | Pre Gre

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http://EXPOWEB1:8001/cgi-bin/expo/GenInfo/snquery.pl?APPL_ID=10745364

Application Number Information

Application Number: 10/005714 Order This File Assignments
Filing or 371(c) Date: 11/07/2001 eDan
Effective Date: 11/07/2001
Application Received: 12/07/2001
Pat. Num./Pub. Num: 6687431/20020131688
Issue Date: 02/03/2004
Date of Abandonment: 00/00/0000
Attorney Docket Number: 2102393-991102
Status: 150 /PATENTED CASE
Confirmation Number: 8631

Examiner Number: 65417 / NGO, HUNG
Group Art Unit: 2633
Class/Subclass: 385/024.000
Lost Case: NO
Interference Number:
Unmatched Petition: NO
L&R Code: Secrecy Code:1
Third Level Review: NO
Oral Hearing: NO

Secrecy Order: NO
Status Date: 01/15/2004

Title of Invention: **RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES**

Bar Code	PALM Location	Location Date	Charge to Loc	Charge to Name	Employee Name	Location
10005714	9200	03/22/2010	No Charge to Location	No Charge to Name	BAIG,ABDUL	

Appln Info | Contents | Petition Info | Atty/Agent Info | Continuity/Reexam | Foreign Data | Inventors | Address | Fees | Post Info | Pre Gra

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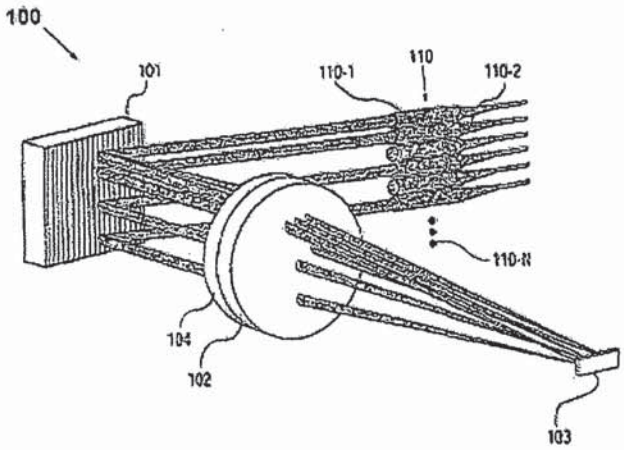

Reconfigurable optical add-drop multiplexers with servo control and dynamic spectral power management capabilities

IN CHEN TAI WILDE JEFFREY P

PA BINGHAM RAYMOND H
BLACK DIAMOND VENTURES XIV
BRENDAN JOSEPH CASSIN & ISABEL B CASSIN THE CASSIN FAMILY TRUST U D T DATED 1 31 96
BRENDAN JOSEPH CASSIN THE CASSIN 1997 CHARITABLE TRUST UTA DATED 1 28 97
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CAPELLA PHOTONICS
CASSIN FAMILY A CALIFORNIA PARTNERSHIP
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LVP III FUND
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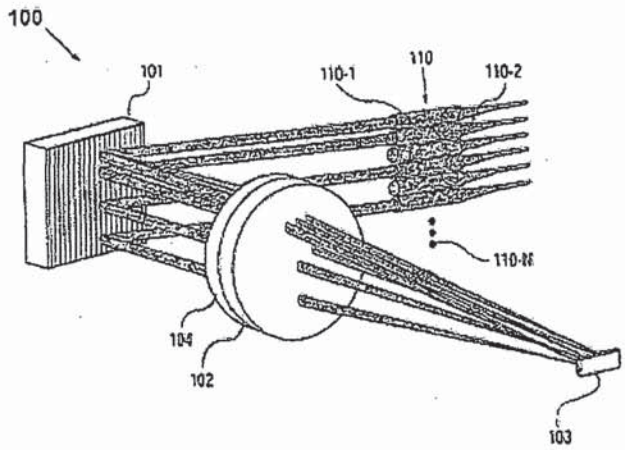
SAINTS CAPITAL FALCON
SAND HILL FINANCIAL
SILICON VALLEY BANK
TEATON CAPITAL
ZACCARIA BERT L

Published As

Publ. number	Pub. date	Appl. number	Appl. date	Publ. Stage
US2004136648	20040715	2003US-0745364	20031222	A1 - First published patent application
US6879750	20050412			B2 - Granted patent as second publication



Date Code Action

Alive: US2004136648 A1, US6879750 B2

20031222US/AS-A [NMC]	ASSIGNMENT OWNER: CAPELLA PHOTONICS 19 GREAT OAKS BLVD., SUITE 20SAN; EFFECTIVE DATE: 20011026 ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNORS:CHEN, TAI /AR;REEL/FRAME:014850/0562
20031222US/AS-A [NMC]	ASSIGNMENT OWNER: CAPELLA PHOTONICS, CALIFORNIA; EFFECTIVE DATE: 20011026 ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNORS:CHEN, TAI;WILDE, JEFFREY P.;REEL/FRAME:014850/0562
20031222US/API [EXM;POS]	FILING DETAILS US74536403 20031222 [2003US-0745364]
20040715US/A1 [EXM;POS]	First published patent application US2004136648 A1 20040715 [US20040136648]
20050208US/AS-A [NMC]	ASSIGNMENT OWNER: CAPELLA PHOTONICS, INC. 19 GREAT OAKS BLVD. SUITE; EFFECTIVE DATE: 20050124 ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:DAVIS, JOSEPH E. /AR;REEL/FRAME:016233/0550
20050208US/AS-A [NMC]	ASSIGNMENT OWNER: CAPELLA PHOTONICS, INC., CALIFORNIA; EFFECTIVE DATE: 20050124 ASSIGNMENT OF ASSIGNORS INTEREST;ASSIGNOR:DAVIS, JOSEPH E.;REEL/FRAME:016233/0550
20050412US/B2 [PIF;POS]	Granted patent as second publication US6879750 B2 20050412 [US6879750]
20090505US/AS-A [NMC]	ASSIGNMENT OWNER: SILICON VALLEY BANK, CALIFORNIA; EFFECTIVE DATE: 20090501 SECURITY AGREEMENT;ASSIGNOR:CAPELLA PHOTONICS, INC.;REEL/FRAME:022641/0593
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20090709US/AS-A [NMC]	ASSIGNMENT OWNER: TEATON CAPITAL COMPANY, CALIFORNIA; EFFECTIVE DATE: 20090501 SECURITY AGREEMENT;ASSIGNOR:CAPELLA PHONTONICS, INC.;REEL/FRAME:022932/0669
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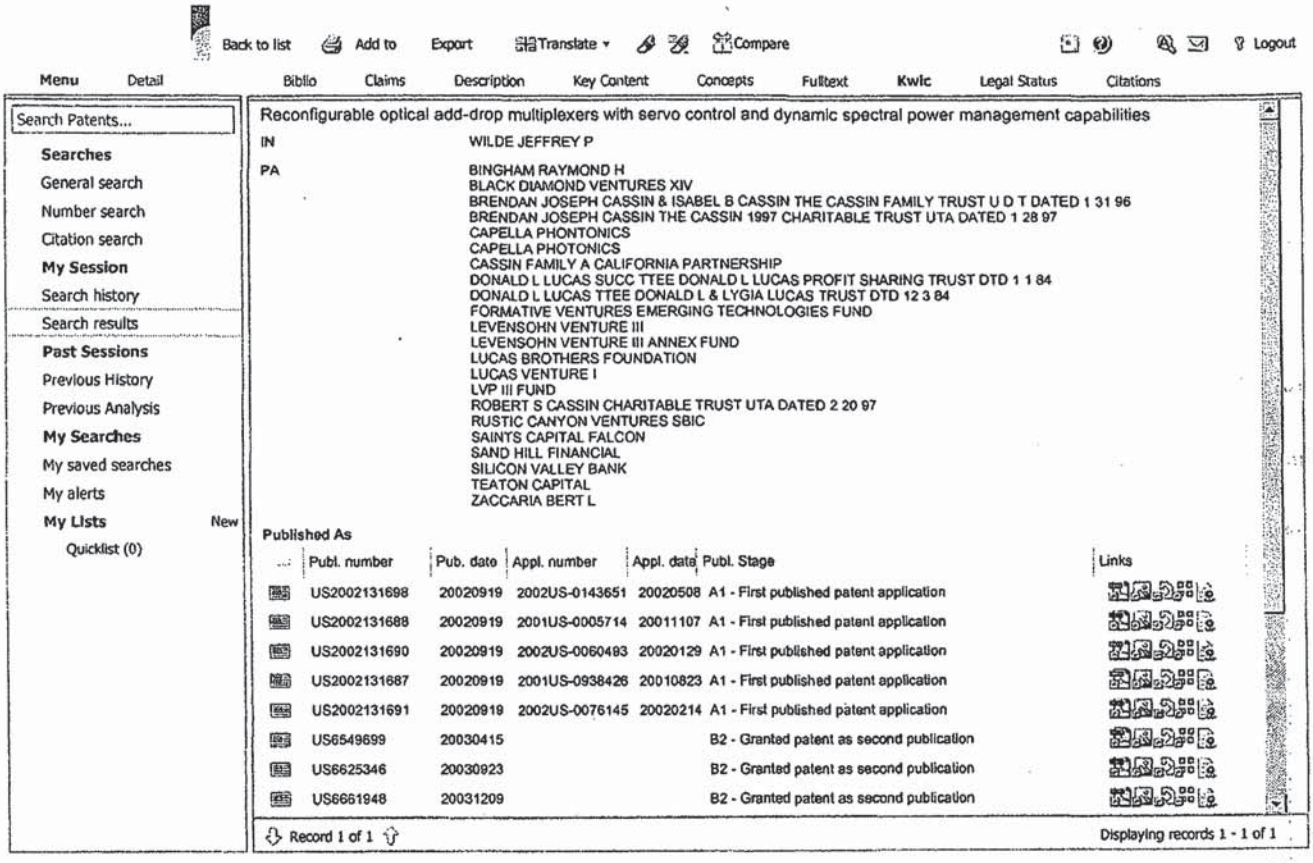
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Reconfigurable optical add-drop multiplexers with servo control and dynamic spectral power management capabilities
IN
WILDE JEFFREY P
PA
BINGHAM RAYMOND H
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BRENDAN JOSEPH CASSIN & ISABEL B CASSIN THE CASSIN FAMILY TRUST U D T DATED 1 31 96
BRENDAN JOSEPH CASSIN THE CASSIN 1997 CHARITABLE TRUST UTA DATED 1 28 97
CAPELLA PHONTONICS
CAPELLA PHOTONICS
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US2002131688 | 20020919 | 2001US-0005714 | 20011107 | A1 - First published patent application
US2002131690 | 20020919 | 2002US-0060493 | 20020129 | A1 - First published patent application
US2002131687 | 20020919 | 2001US-0938426 | 20010823 | A1 - First published patent application
US2002131691 | 20020919 | 2002US-0076145 | 20020214 | A1 - First published patent application
US6549699 | 20030415 | B2 - Granted patent as second publication
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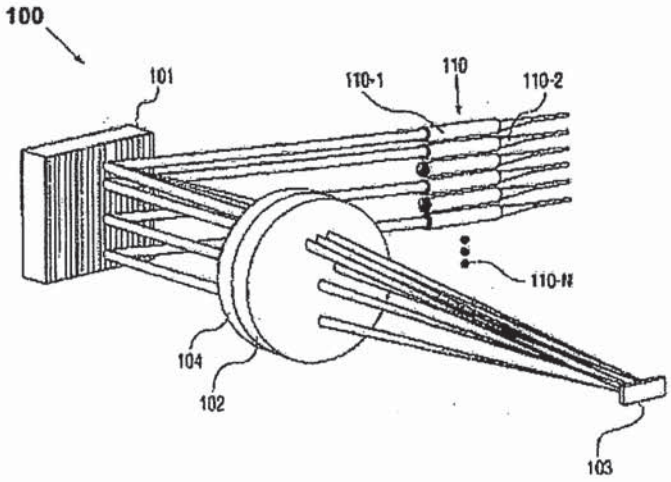

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Published As

Publ. number	Pub. date	Appl. number	Appl. date	Publ. Stage
US2002131698	20020919	2002US-0143651	20020508	A1 - First published patent application
US2002131688	20020919	2001US-0005714	20011107	A1 - First published patent application
US2002131690	20020919	2002US-0060493	20020129	A1 - First published patent application
US2002131687	20020919	2001US-0938426	20010823	A1 - First published patent application
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US6625346	20030923			B2 - Granted patent as second publication
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IN200748	20060602			B - Patent
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745364 (10) 6879750 April 12, 2005

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April 12, 2005

Reconfigurable optical add-drop multiplexers with servo control and dynamic spectral power management capabilities

INVENTOR: Chen, Tai - San Jose, California, United States (US)Wilde, Jeffrey P. - Morgan Hill, California, United States (US); Davis, Joseph E. - Morgan Hill, California, United States (US)

APPL-NO: 745364 (10)

FILED-DATE: December 22, 2003

GRANTED-DATE: April 12, 2005

ASSIGNEE-PRE-ISSUE: December 22, 2003 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., CAPELLA PHOTONICS 19 GREAT OAKS BLVD., SUITE 20 SAN JOSE CALIFORNIA 95119, Reel and Frame Number: 014850/0562
February 8, 2005 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., CAPELLA PHOTONICS, INC. 19 GREAT OAKS BLVD. SAN JOSE CALIFORNIA 95119, Reel and Frame Number: 016233/0550

ASSIGNEE-AT-ISSUE: Capella Photonics, Inc., San Jose, California, United States (US), United States company or corporation (02)

ASSIGNEE-AFTER-ISSUE: May 5, 2009 - SECURITY AGREEMENT, SILICON VALLEY BANK 3003 TASMAN DRIVE SANTA CLARA CALIFORNIA 95054, Reel and Frame Number: 022641/0593
July 9, 2009 - SECURITY AGREEMENT, TEATON CAPITAL COMPANY 3000 SAND HILL ROAD, SUITE 3-210 MENLO PARK CALIFORNIA 94025, Reel and Frame Number: 022932/0669

LEGAL-REP: Young, Barry N. -

PUB-TYPE: April 12, 2005 - Utility Patent having a previously published pre-grant publication (B2)

PUB-COUNTRY: United States (US)

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571401 (10) 6687431 February 3, 2004

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February 3, 2004

Reconfigurable optical add-drop multiplexers with servo control and dynamic spectral power management capabilities

REISSUE:
December 31, 2004 - Reissue Application filed Ex. Gp.: 2874; Re. S.N. 11/027,584 , (O.G. March 29, 2005)
October 10, 2006 - This patent was reissued as Reissue Patent RE 39,331 (O.G. October 10, 2006) ,

INVENTOR: Chen, Tai - San Jose, CALIFORNIA ; Wilde, Jeffrey P. - Morgan Hill, CALIFORNIA

APPL-NO: 571401 (10)

FILED-DATE: November 7, 2001

GRANTED-DATE: February 3, 2004

PRIORITY: November 7, 2001 - 09005714, United States of America (US) ; August 23, 2001 - 09938426, United States of America (US) ; March 19, 2001 - 60277217, United States of America (US)

ASSIGNEE-PRE-ISSUE:
April 11, 2002 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., CAPELLA PHOTONICS, INC. 19 GREAT OAKS BLVD., SUITE 20SAN JOSE, CALIFORNIA, 95119, Reel and Frame Number: 012797/0705

ASSIGNEE-AT-ISSUE:
Capella Photonics, Inc., San Jose, CALIFORNIA , United States company or corporation (02)

ASSIGNEE-AFTER-ISSUE:
May 5, 2009 - SECURITY AGREEMENT, ZACCARIA, BERT L., 475 SANSOME STREET, SUITE 1850, SANTA CLARA, CALIFORNIA, UNITED STATES OF AMERICA (US), 95054, Reel and Frame Number: 022641/0593
July 9, 2009 - SECURITY AGREEMENT, TEATON CAPITAL COMPANY, 3000 SAND HILL ROAD, SUITE 3-210, MENLO PARK, CALIFORNIA, UNITED STATES OF AMERICA (US), 94025, Reel and Frame Number: 022932/0669

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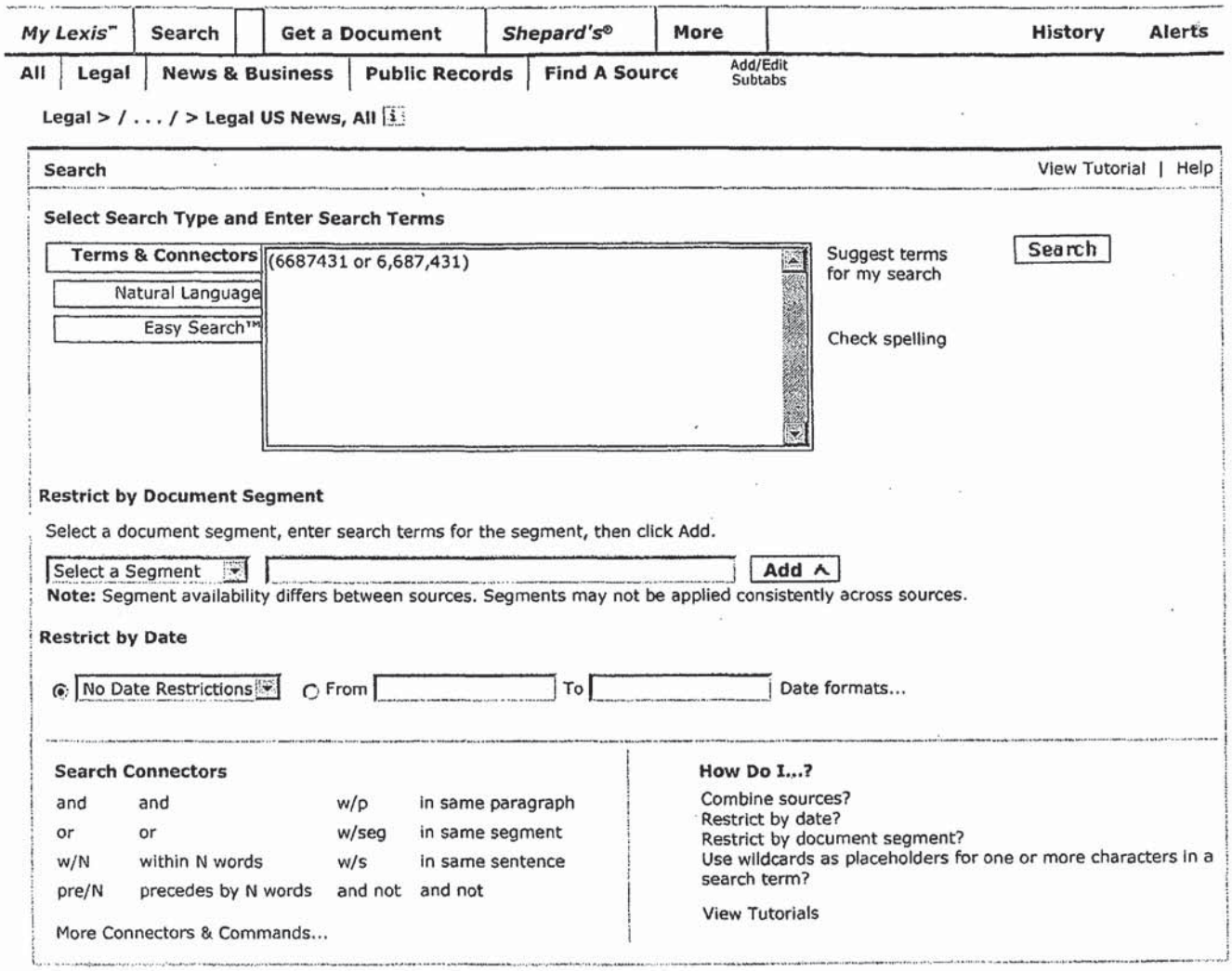

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938426 (09) 6625346 September 23, 2003

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6625346

September 23, 2003

Reconfigurable optical add-drop multiplexers with servo control and dynamic spectral power management capabilities

REISSUE:
December 31, 2004 - Reissue Application filed Ex. Gp.: 2874; Re. S.N. 11/027,586 , (O.G. March 15, 2005)
November 14, 2006 - This patent was reissued as Reissue Patent RE 39,397 (O.G. November 14, 2006) ,

INVENTOR: Wilde, Jeffrey P. - Los Gatos, CALIFORNIA

APPL-NO: 938426 (09)

FILED-DATE: August 23, 2001

GRANTED-DATE: September 23, 2003

PRIORITY: August 23, 2001 - 10938426, United States of America (US)

ASSIGNEE-PRE-ISSUE:
August 23, 2001 - ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS)., CAPELLA PHOTONICS, INC. 19 GREAT OAKS BLVD., SUITE 20SAN JOSE, CALIFORNIA, 95119, Reel and Frame Number: 012118/0994

ASSIGNEE-AT-ISSUE:
Capella Photonics, Inc., San Jose, CALIFORNIA , United States company or corporation (02)

ASSIGNEE-AFTER-ISSUE:
May 5, 2009 - SECURITY AGREEMENT, ZACCARIA, BERT L., 475 SANSOME STREET, SUITE 1850, SANTA CLARA, CALIFORNIA, UNITED STATES OF AMERICA (US), 95054, Reel and Frame Number: 022641/0593
July 9, 2009 - SECURITY AGREEMENT, TEATON CAPITAL COMPANY, 3000 SAND HILL ROAD, SUITE 3-210, MENLO PARK, CALIFORNIA, UNITED STATES OF AMERICA (US), 94025, Reel and Frame Number: 022932/0669

LEGAL-REP: Gray Cary Ware & Freidenrich LLP

PUB-TYPE: September 23, 2003 - Patent with a pre-grant publication (B2)

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1 - 51 of 51

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L1	4	(385/24,11,10,33,37,34.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 13:34

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L2	3	(385/24,11,10,33,37,34.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	USPAT; UPAD	OR	OFF	2011/03/08 13:34

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L1	2	"6879750".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:13
L2	2	"6687431".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:14
L3	2	"6625346".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:15
L4	2	"6498872".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:17
L5	2	"6567574".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:18
L6	2	"6256430".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:19

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L7	2	"6631222".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:19
L8	4	(385/24,11,37,34.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:35
L9	0	(398/79,82,83,84,88,87.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:36
L10	4	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:37
L11	4	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting) and (continuously nera5 controllable near5 two near5 dimensions)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:38
L12	4	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting) and (continuously nera5 controllable near5 2D)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:38
L13	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (servo near5 control)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:39

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L14	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (processing near5 unit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:39
L15	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (processing near5 unit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:40
L16	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (alignment near5 lenses)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:40
L17	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (alignment near5 mirrors)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:41
L18	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (telecentric near5 arrangement)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:41
L19	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and collimators	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:41

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L20	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (beam near5 focuser)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:42
L21	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (micromachined nera5 mirrors)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:42
L22	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (diffraction near5 grating near5 (ruled or holographic or echelle or curved))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:43
L23	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (dispersing near5 prisms)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:43
L24	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (reflective near5 membranes)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:44
L25	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop near5 dynamic near5 method) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2011/03/08 09:45

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L26	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop near5 dynamic near5 method) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions)	USPAT; UPAD	OR	OFF	2011/03/08 09:45
L27	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (reflective near5 membranes)	USPAT; UPAD	OR	OFF	2011/03/08 09:45
L28	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (dispersing near5 prisms)	USPAT; UPAD	OR	OFF	2011/03/08 09:45
L29	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and (diffraction near5 grating near5 (ruled or holographic or echelle or curved))	USPAT; UPAD	OR	OFF	2011/03/08 09:45
L30	0	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 selected near5 port) and (spatial near5 array near5 beam near5 deflecting) and (continuously near5 controllable near5 two near5 dimensions) and collimators	USPAT; UPAD	OR	OFF	2011/03/08 09:45
L31	3	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting) and (continuously nera5 controllable near5 2D)	USPAT; UPAD	OR	OFF	2011/03/08 09:46

EAST Search History (Interference)

L32	3	(wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (control near5 power near5 channels) and (spatial near5 array near5 beam near5 deflecting)	USPAT; UPAD	OR	OFF	2011/03/08 09:46
L33	0	(398/79,82,83,84,88,87.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	USPAT; UPAD	OR	OFF	2011/03/08 09:46
L34	3	(385/24,11,37,34.ccls.) and (wdm or (wavelength near5 multiplexing)) and (add near5 drop) and (spectral near5 channels) and (spatial near5 array near5 beam near5 deflecting)	USPAT; UPAD	OR	OFF	2011/03/08 09:46

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Appln. No.: 12/816,084 Group Art Unit: 2883

Filed: 06/15/2010 Examiner: Healy, Brian

(Reissue of U.S. Patent No. 6,879,750, Issued April 12, 2005, Patentee: Tai Chen et. al)

Title: Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power Management Capabilities

RESPONSE

Mail Stop REISSUE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

In response to the Office Action of February 15, 2011, rejecting the claims under 35 U.S.C. §251 as being based upon a defective reissue oath or declaration, enclosed is a Replacement Reissue Application Declaration by Assignee that corrects the defects in the original Declaration filed with this application. Please replace the originally filed Declaration with the enclosed Replacement Reissue Application Declaration.

Remarks

Applicant thanks the Examiner for his helpful suggestions as to changes to the reissue declaration to overcome the rejection of the claims under 35 U.S.C. §251. The enclosed Declaration adopts the Examiner's suggestions.

It is submitted that enclosed Replacement Reissue Application Declaration overcomes the rejection under 35 U.S.C. §251, and that this application is in condition for examination on its merits and for allowance. Accordingly, favorable reconsideration of this and early allowance of all claims are solicited.

Date: March 2, 2011

Respectfully Submitted,

/Barry N. Young/

Barry N. Young
Attorney for Assignee
Reg. No. 27,744

Customer No. 48789
Law Offices of Barry N. Young
200 Page Mill Road, Suite 102
Palo Alto, CA 94306-2061
Phone: (650) 326-2701
Fax: (650) 326-2799
byoung@young-iplaw.com

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Appln. No.: 12/816,084 Group Art Unit: 2883

Filed: 06/15/2010 Examiner: Healy, Brian

(Reissue of U.S. Patent No. 6,879,750, Issued April 12, 2005, Patentee: Tai Chen et. al)

Title: Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power Management Capabilities

REPLACEMENT REISSUE APPLICATION DECLARATION BY ASSIGNEE

I, Larry Schwerin, hereby declare that:

The residence, mailing address and citizenship of the Inventors of the above-identified patent for which reissue is sought are as stated below.

I am authorized to act on behalf of the following Assignee: CAPELLA PHOTONICS, INC., A DELAWARE CORPORATION, and my title with said assignee is President and Chief Executive Officer. The entire title and interest in said Patent is vested in said Assignee, and I consent on behalf of said Assignee to the filing of this Reissue Application for the above Patent.

Inventor's Full Name:	Tai Chen
Residence/Mailing Address:	3173 Linkfield Way San Jose, CA 95135
Citizenship:	US

Inventor's Full Name:	Jeffrey P. Wilde
Residence/Mailing Address:	2310 Rockwood Ranch Road Morgan Hill, CA 95037
Citizenship:	US

Inventor's Full Name:	Joseph E. Davis
Residence/Mailing Address:	18765 St. Marks Avenue Morgan Hill, CA 95037
Citizenship:	US

I believe said above named Inventors to be the original and first inventors of the subject matter which is described and claimed in said above identified Patent for which a reissue patent is sought, the specification of which:

was filed as Reissue Application No. 12/816,084 on 06/15/2010;

and was amended by Preliminary Amendment filed on 06/15/2010.

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 C.F.R. §1.56.

I verily believe the original Patent to be wholly or partially inoperative or invalid for the reason that the patentee claimed more than he had a right to claim in the Patent.

At least one error upon which reissue is based is described as follows: Claim 1 is deemed to be too broad and invalid in view of U.S. Patent No. 6,498,872 to Bouevitch and further in view of one or more of U.S. Patent No. 6,567,574 to Ma, U.S. Patent No. 6,256,430 to Jin, or U.S. Patent No. 6,631,222 to Wagener by failing to include limitations regarding the spatial array of beam deflecting elements being individually and continuously controllable in two dimensions to control the

power of the spectral channels reflected to selected output ports, as indicated by the amendments to Claim 1 in the Preliminary Amendment referred to above.

All errors corrected in this Reissue Application arose without deceptive intent on the part of the Applicant.

I hereby appoint the practitioners associated with **Customer No. 48489** as our attorneys or agents to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Please direct all communications to:

Barry N. Young
Reg. No. 27,744
200 Page Mill Road, Suite 102
Palo Alto, CA 94306
(650) 326-2701
Byoung@young-iplaw.com

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this Declaration is directed.

Dated: March 1, 2011

By: _____

Larry Schwerin
President and Chief Executive Officer
Capella Photonics, Inc.
5390 Hellyer Avenue
San Jose, CA 95138

Electronic Acknowledgement Receipt	
EFS ID:	9573533
Application Number:	12816084
International Application Number:	
Confirmation Number:	2616
Title of Invention:	Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities
First Named Inventor/Applicant Name:	Tai Chen
Customer Number:	48789
Filer:	Barry N. Young
Filer Authorized By:	
Attorney Docket Number:	C2393-1106RE1
Receipt Date:	02-MAR-2011
Filing Date:	15-JUN-2010
Time Stamp:	18:27:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	Resp_3-2-11.pdf	9373 f5e28a6bd4f90393999796e65e960dcd730bf700	no	3
Warnings:					
Information:					

2	Reissue dec filed in accordance with MPEP 1414.	Repl_Re_Declr-3-2-11.pdf	1659075 e46f17eb07315bfb2b95953d4bd818a00bf7d91e	no	3
Warnings:					
Information:					
			Total Files Size (in bytes):	1668448	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/816,084	06/15/2010	Tai Chen	C2393-1106RE1	2616

48789 7590 02/15/2011

LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

EXAMINER	
HEALY, BRIAN	
ART UNIT	PAPER NUMBER
2883	

NOTIFICATION DATE	DELIVERY MODE
02/15/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

BYOUNG@YOUNG-IPLAW.COM
BNYOUNG7@GMAIL.COM

Office Action Summary	Application No.	Applicant(s)	
	12/816,084	CHEN ET AL.	
	Examiner	Art Unit	
	BRIAN M. HEALY	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 June 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20100615*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *attached office action*.

DETAILED ACTION

Reissue Applications

1. Applicant is reminded of the continuing obligation under 37 CFR 1.178(b), to timely apprise the Office of any prior or concurrent proceeding in which Patent No. RE39,397 and USP No. 6,625,346 is or was involved. These proceedings would include interferences, reissues, reexaminations, and litigation.

Applicant is further reminded of the continuing obligation under 37 CFR 1.56, to timely appraise the Office of any information which is material to patentability of the claims under consideration in this reissue application.

These obligations rest with each individual associated with the filing and prosecution of this application for reissue. See also MPEP §§ 1404, 1442.01 and 1442.04.

2. The reissue oath/declaration filed with this application is defective because it fails to identify at least one error which is relied upon to support the reissue application. See 37 CFR 1.175(a)(1) and MPEP § 1414.

3. The reissue oath or declaration filed June 15, 2010 (6/15/2010), asserts that the patent was wholly or partially inoperative or invalid because the patentee claims more than he had a right to claim and identified the error that serves as basis for reissue being :

4. "Claims 1,15,16 and 17 may have claimed more than there was a right to claim in view of the cited prior art." The oath or declaration, as filed, lacks specificity because it merely states, "Claims 1,15,16 and 17 **may have claimed more** than there was a right to in view of **the cited prior art**.." This recitation does not include any specific language pointed out in at least one of the independent claims which provides the basis for reissue. The phrase "may have claimed

more" also lacks sufficient specificity because it is left to the reader to determine if the claimed subject matter "may have claimed more" in view of the cited art, which is also not identified, which is a task which lends itself to guessing or trail and error as to what claim language is too broad. Applicant must identify at least one specific piece of prior art (or combination of references) in order to specifically state at least one error.

5. In addition, the oath or declaration, as filed, was printed on paper which needed toner and as a result the oath or declaration is faded and partially illegible.

6. The current text of 37 CFR 1.175(a)(1) reads as follows: "The applicant believes the original patent to be wholly or partly inoperative or invalid by reason of a defective specification or drawing, or by reason of the patentee claiming more or less than the patentee had the right to claim in the patent, **stating at least one error** being relied upon as the basis for reissue."

7. The Examiner takes note of the fact that the word "state"(used as a verb) is defined by the current Merriam-Webster dictionary (current online edition) as "to express the particulars of especially in words." Thus it can be seem that to "state at least one error" would include "the particulars of (or specificity of) at least one error." While a dictionary definition is somewhat anecdotal the need for specificity of at least one error has been expanded upon in MPEP 1414 (c) which states : "It is not sufficient for an oath/declaration to merely state "this application is being filed to correct errors in the patent which may be noted from the changes made in the disclosure." Rather, the oath/declaration must specifically identify an error. In addition, it is not sufficient to merely reproduce the claims with brackets and underlining and state that such will identify the error. **See In re Constant, 827 F.2d 728,729, 3 USPQ 2d 1479 (Fed Cir.), cert.**

Denied, 484 U.S. 894 (1987). Any error in the claims must be identified by reference **to the specific claim(s) and the specific claim language wherein lies the error**."

8. The reissue oath or declaration also states the original patent to be wholly or partly inoperative or invalid by reasons of the patentee claiming more or less than he had a right to claim in the patent. The MPEP states in 1414 and 37 CFR 1.175; "A statement that the original patent is "wholly or partly inoperative or invalid" by reason of the patentee claiming more or less than the patentee had a right to **claim is improper, a claim cannot claim "more or less" at the same time."**

9. The Examiner would like to suggest some language which would be acceptable in the oath or declaration. This is not a requirement but a suggestion designed to advance the prosecution of the present application.

10. " **Claim 1 is** deemed to be too broad and invalid in view of [include at least one specific example of prior art], **by not including limitations regarding the spatial array of beam-deflecting elements being individually and continuously controllable in two dimensions to control of power of received spectral channels at selected ports**, as indicated by the amendments to **Claim 1** in the Preliminary Amendment referred to above and filed with this application. "

11. For further guidance regarding acceptable declaration language Applicant is referred to MPEP 1414 (II) (c).

12. Claims 1-22 are rejected as being based upon a defective reissue oath or declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the oath or declaration is set forth in the discussion above in this Office action (see above discussion).

A copy of PTO-1449 will be included in this office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN M. HEALY whose telephone number is (571)272-2347. The examiner can normally be reached on M-F 6AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Robinson can be reached on (571)272-2319. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRIAN M. HEALY/
Primary Examiner
Art Unit 2883

***

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	12816084	CHEN ET AL.
	Examiner	Art Unit
	BRIAN M HEALY	2883

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/10/2011								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								
	10	✓								
	11	✓								
	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								
	17	✓								
	18	✓								
	19	✓								
	20	✓								
	21	✓								
	22	✓								

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 2616

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/816,084	06/15/2010	385	2883	C2393-1106RE1

APPLICANTS

Tai Chen, San Jose, CA;
Jeffrey P. Wilde, Morgan Hill, CA;
Joseph E. Davis, Morgan Hill, CA;

**** CONTINUING DATA ***************************

This application is a REI of 10/745,364 12/22/2003 PAT 6,879,750
which is a CON of 10/005,714 11/07/2001 PAT 6,687,431
which is a CON of 09/938,426 08/23/2001 PAT 6,625,346
which claims benefit of 60/277,217 03/19/2001

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****

07/02/2010

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /BRIAN HEALY/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	12	22	4

ADDRESS

LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306
UNITED STATES

TITLE

Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1844	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	Filed Herewith
Filing Date	Filed Herewith
First Named Inventor	Tai Chen et. al
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	C2393-1106RE1

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/B.H./	1	7183633	B2	2007-02-27	Daneman et. al	all
/B.H./	2	6989921	B2	2006-01-24	Bernstein et. al	all
/B.H./	3	6810169	B2	2004-10-26	Bouevitch et. al	all
/B.H./	4	6631222	B1	2003-10-07	Wagener et. al	all
/B.H./	5	5600851	B2	2003-07-29	Aksyuk et. al	all
/B.H./	6	6567574	B1	2003-05-20	Ma et. al	all
/B.H./	7	6498872	B2	2002-12-24	Bouevitch et. al	all
/B.H./	8	6256430	B1	2001-07-03	Jin et. al	all

/Brian Healy/ 02/10/2011

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	Filed Herewith
Filing Date	Filed Herewith
First Named Inventor	Tai Chen et. al
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	C2393-1106RE1

/B.H./	9	6028689		2000-01-24	Michalicek et. al	all
/B.H./	10	5414540		1995-05-09	Patel et. al	all
/B.H./	11	5629790	A	1997-05-01	Neukermans et. al	all
/B.H./	12	5745271		1998-04-28	Ford et. al	all
/B.H./	13	5835458	A	1998-11-01	Bischel et. al	all
/B.H./	14	5960133	A	1999-09-01	Tomlinson	all
/B.H./	15	5974207	A	1999-10-01	Aksyuk et. al	all
/B.H./	16	6204946	B1	2001-03-01	Aksyuk et. al	all
/B.H./	17	6205269	B1	2001-03-01	Morton	all
/B.H./	18	6222954	B1	2001-04-01	Riza	all
/B.H./	19	6253135	B1	2001-07-01	Wade	all

EFS Web 2.1.17

/Brian Healy/ 02/10/2011

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	Filed Herewith
Filing Date	Filed Herewith
First Named Inventor	Tai Chen et. al
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	C2393-1106RE1

/B.H./	20	6289155	B1	2001-09-01	Wade	all
/B.H./	21	6307657	B1	2001-10-23	Ford	all
/B.H./	22	6416250	B1	2002-07-01	Corbosiero et. al	all
/B.H./	23	6625346		2003-09-23	Wilde et. al	
/B.H./	24	6634810	B1	2003-10-21	Ford et. al	all
/B.H./	25	6898348	B2	2005-05-24	Morozov et. al	all

If you wish to add additional U.S. Patent citation information please click the Add button.

U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code1	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/B.H./	1	20020131691	A1	2002-09-01	Garrett et al.	all
/B.H./	2	20030043471	A1	2003-03-01	Belser et. al	all

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FOREIGN PATENT DOCUMENTS

/Brian Healy/ 02/10/2011

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/816,084	06/15/2010	2883	1844	C2393-1106RE1	22	4

CONFIRMATION NO. 2616

CORRECTED FILING RECEIPT

48789
LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

OC000000042630576

Date Mailed: 07/19/2010

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Tai Chen, San Jose, CA;
Jeffrey P. Wilde, Morgan Hill, CA;
Joseph E. Davis, Morgan Hill, CA;

Assignment For Published Patent Application

Capella Photonics, Inc, San Jose, CA

Power of Attorney: The patent practitioners associated with Customer Number 48789

Domestic Priority data as claimed by applicant

This application is a REI of 10/745,364 12/22/2003 PAT 6,879,750
which is a CON of 10/005,714 11/07/2001 PAT 6,687,431
which is a CON of 09/938,426 08/23/2001 PAT 6,625,346
which claims benefit of 60/277,217 03/19/2001

Foreign Applications

If Required, Foreign Filing License Granted: 07/02/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/816,084**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

Preliminary Class

385

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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12/816,084	06/15/2010	2883	1844	C2393-1106RE1	22	4

CONFIRMATION NO. 2616

48789
LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

FILING RECEIPT

OC000000042418449

Date Mailed: 07/06/2010

Receipt is acknowledged of this reissue patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

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Capella Photonics, Inc, San Jose, CA

Power of Attorney: The patent practitioners associated with Customer Number 48789

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Foreign Applications

If Required, Foreign Filing License Granted: 07/02/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/816,084**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

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Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

Preliminary Class

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Appln. No.: 12/816,084 Group Art Unit: 2883

Filed: 06/15/2010 Examiner:

(Reissue of U.S. Patent No. 6,879,750, Issued April 12, 2005, Patentee: Tai Chen et. al)

Title: Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power Management Capabilities

REQUEST FOR CORRECTED FILING RECEIPT

Mail Stop REISSUE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

The Official Filing Receipt issued in this case fails to list all of the inventors of U.S. 6,879,750 of which this application is a reissue application. Attached is a copy of the incorrect Filing Receipt showing the missing inventor: The missing is inventor is:

Inventor's Full Name:	Joseph E. Davis
Residence/Mailing Address:	18765 St. Marks Avenue Morgan Hill, CA 95037
Citizenship:	US

The PDF copy of the Reissue Application Declaration By Assignee (PTO/SB/52) filed upon filing this application was incomplete in that it inadvertently failed to include the additional separately numbered sheet listing the above missing inventor, Joseph E. Davis, although the block indicating that additional inventors were listed on the separately numbered sheet on the original Declaration form was checked.

Attached is a complete copy of the originally signed Declaration form that includes the omitted sheet listing the additional inventor Joseph E. Davis.

Please issue a corrected filing receipt that includes the missing inventor, Joseph E. Davis.

Date: July 6, 2010

Respectfully Submitted,

/Barry N. Young/

Barry N. Young
Attorney for Assignee
Reg. No. 27,744

Customer No. 48789
Law Offices of Barry N. Young
200 Page Mill Road, Suite 102
Palo Alto, CA 94306-2061
Phone: (650) 326-2701
Fax: (650) 326-2799
byoung@young-iplaw.com

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY DOCKET NO	TOT CLAIMS	IND CLAIMS
12/816,084	06/15/2010	2883	1844	C2393-1106RE1	22	4

CONFIRMATION NO. 2616

48789
LAW OFFICES OF BARRY N. YOUNG
200 PAGE MILL ROAD
SUITE 102
PALO ALTO, CA 94306

FILING RECEIPT

OC000000042118449

Date Mailed: 07/06/2010

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Jeffrey P. Wilde, Morgan Hill, CA;

Assignment For Published Patent Application

Capella Photonics, Inc, San Jose, CA

Power of Attorney: The patent practitioners associated with Customer Number 48789

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which is a CON of 10/005,714 11/07/2001 PAT 6,687,431
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which claims benefit of 60/277,217 03/19/2001

Foreign Applications

If Required, Foreign Filing License Granted: 07/02/2010

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Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

Title

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Preliminary Class

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PTO/SB/53 (03-08)
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (optional) C2393-1106RE1

I hereby declare that:

The residence, mailing address and citizenship of the inventors are stated below.

I am authorized to act on behalf of the following assignee: Capella Photonics, Inc.

and the title of my position with said assignee is: President and Chief Executive Officer

The entire title to the patent identified below is vested in said assignee.

Inventor: Tai Chen	Citizenship: US
Residence/Mailing Address: 3173 Crandall Way, San Jose, CA 95135	
Inventor: Jeffrey P. Wilde	Citizenship: US
Residence/Mailing Address: 2310 Rockwood Ranch Road, Morgan Hill, CA 95037	

☐ Additional inventors are named on separately numbered sheets attached hereto.

Patent Number: 6,879,750	Date of Patent Issued: April 12, 2005

I believe said inventor(s) to be the original and first inventor(s) of the subject matter which is described and claimed in said patent, for which a reissue patent is sought on the invention entitled:

Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power Management Ca

the specification of which:

☑ is attached hereto.

☐ was filed on _____ as reissue application number: _____ / _____

and was amended on herewith (if applicable)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

☐ I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b). Attached is form PTO/SB/02B (or equivalent) listing the foreign applications.

I verily believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☑ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

PTO/SB/52 (09-08)
Approved for use through 04/30/2010. OMB 0651-0033
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE | Docket Number (Optional) C2393 1106[illegible]

At least one error upon which reissue is based is described as follows:

Claims 1, 15, 16 and 17 may have claimed more than there was a right to claim in view of the cited prior art.

(Attach additional sheets, if needed.)

All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant.

I hereby appoint
☑ Practitioners associated with Customer Number: 48789
OR
☐ Practitioner(s) named below:

Name	Registration Number

as my/our attorney(s) or agent(s) to prosecute this application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Correspondence Address: Direct all communications about the application to:

☑ The address associated with Customer Number: 48789

OR

☐ Firm or Individual Name

Address			
City		State	Zip
Country			
Telephone		Email	

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

Signature: [signature] Date: 06/11/10

Full name of person signing (given name, family name): Larry Schwerin

Address of Assignee: 5380 Hellyer Avenue
San Jose, CA 95138

Reissue of U.S. Pat. No. 6,879,750
Title: Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power management Capabilities

Continuation Sheet of PTO/SB/52 - Reissue Declaration By The Assignee

Additional Inventors:

Inventor: Joseph E. Davis Citizenship: US

Residence/Mailing Address: 18765 St. Marks Avenue, Morgan Hill, CA 95037

Electronic Acknowledgement Receipt	
EFS ID:	7955858
Application Number:	12816084
International Application Number:	
Confirmation Number:	2616
Title of Invention:	Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities
First Named Inventor/Applicant Name:	Tai Chen
Customer Number:	48789
Filer:	Barry N. Young
Filer Authorized By:	
Attorney Docket Number:	C2393-1106RE1
Receipt Date:	06-JUL-2010
Filing Date:	15-JUN-2010
Time Stamp:	13:51:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Corrected Filing Receipt	Req_Corr_Fil_Rcpt.pdf	17596 a8b81a97c513a44947d07db6f10781dbee2d1ecb	no	2
Warnings:					
Information:					

2	Request for Corrected Filing Receipt	Corr_Fil_Rcpt.pdf	548325 73cbeca3bb2a0aafd7b40c0199dbc6f208e5112f	no	3
Warnings:					
Information:					
3	Reissue dec filed in accordance with MPEP 1414.	SB-52_Decl_PoA2.pdf	442851 e986e7efa1dbe163a2c708ef3edc1f3fd1ef62f6	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	1008772		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/50 (08-08)
Approved for use through 08/31/2010. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE PATENT APPLICATION TRANSMITTAL

Address to:

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Alexandria, VA 22313-1450

Attorney Docket No.	C2393-1106RE1
First Named Inventor	Tai CHEN, et. al
Original Patent Number	6,879,750
Original Patent Issue Date (Month/Day/Year)	04/12/2005
Express Mail Label No.	EFS-Web

APPLICATION FOR REISSUE OF: (*Check applicable box*) ☑ Utility Patent ☐ Design Patent ☐ Plant Patent

APPLICATION ELEMENTS (37 CFR 1.173)

1. ☑ Fee Transmittal Form (PTO/SB/56)
2. ☐ Applicant claims small entity status. See 37 CFR 1.27.
3. ☑ Specification and Claims in double column copy of patent format *(amended, if appropriate)*
4. ☑ Drawing(s) *(proposed amendments, if appropriate)*
5. ☑ Reissue Oath/Declaration (original or copy) (37 C.F.R. 1.175) (PTO/SB/51 or 52)
6. ☑ Power of Attorney
7. ☑ Original U.S. Patent currently assigned? ☑ Yes ☐ No *(If Yes, check applicable box(es))*
   - ☑ Written Consent of all Assignees (PTO/SB/53)
   - ☑ 37 CFR 3.73(b) Statement (PTO/SB/96)
8. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   - ☐ Landscape Table on CD
9. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, items a. – c. are required))*
   - a. ☐ Computer Readable Form (CRF)
   - b. Specification Sequence Listing on:
     - i ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
     - ii ☐ paper
   - c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

10. ☑ Statement of status and support for all changes to the claims. See 37 CFR 1.173(c).
11. ☐ Foreign Priority Claim (35 U.S.C. 119) *(if applicable)*
12. ☑ Information Disclosure Statement (IDS) PTO/SB/08 or PTO-1449
    - ☐ Copies of citations attached
13. ☐ English Translation of Reissue Oath/Declaration *(if applicable)*
14. ☑ Preliminary Amendment
15. ☐ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
16. ☐ Other:

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Signature	/Barry N. Young/	Date	June 14, 2010
Name (Print/Type)	Barry N. Young	Registration No. (Attorney/Agent)	27,744

This collection of information is required by 37 CFR 1.173. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Reissue, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/56 (02-10)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

REISSUE APPLICATION FEE TRANSMITTAL FORM

Docket Number (Optional): C2393-1106RE1

Application as Filed – Part 1

	(1) Claims in Patent	(2) Claims Filed in Reissue Application	(3) Number Extra	Small Entity Rate ($)	Small Entity Fee ($)		Other than a Small Entity Rate ($)	Other than a Small Entity Fee ($)
Total Claims (37 CFR 1.16(i))	(A) 22	(B) 22	**** 2 =	x =			x 52 =	104
Independent Claims (37 CFR 1.16(h))	(C) 4	(D) 4	* 1 =	x =			x 220 =	220
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).					or		0
			Filing Fee (37 CFR 1.16(e))					330
			Search Fee (37 CFR 1.16(n))					540
			Examination Fee (37 CFR 1.16(r))					650
			Total Filing Fee					1844

Application as Amended – Part 2

	(1) Claims Remaining After Amendment		(2) Highest Number Previously Paid For	(3) Extra Claims Present	Small Entity Rate ($)	Small Entity Fee ($)		Other than a Small Entity Rate ($)	Other than a Small Entity Fee ($)
Total Claims (37 CFR 1.16(i))	***	MINUS	**	=	X =			x =	
Independent Claims (37 CFR 1.16(h))	***	MINUS	*****	=	x =		or	x =	
Application Size Fee (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $270 ($135 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
				Total Additional Fee					

* Enter (D) minus 3, or enter "0" if (D) is less than 3.
** If the "Highest Number of Total Claims Previously Paid For" is less than 20, enter "20" in this space.
*** After any cancellation of claims.
**** Enter (B) – 20, or enter "0" if (B) is less than 20.
***** If the "Highest Number of Independent Claims Previously Paid For" is less than 3, enter "3" in this space.

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ Please charge Deposit Account No. _____ in the amount of _____.

☐ The Director is hereby authorized to charge any additional fees under 37 CFR 1.16 or 1.17 which may be required, or credit any overpayment to Deposit Account No. _____.

☐ A check in the amount of $ _____ to cover the filing/additional fee is enclosed.

■ Payment by credit card. Form PTO-2038 is attached. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

EFS-Web /Barry N. Young/ — Signature

6/14/2010 — Date

Barry N. Young — Typed or printed name

27,744 — Registration Number, if applicable

(650) 326-2701 — Telephone Number

US006879750B2

(12) **United States Patent**
Chen et al.

(10) **Patent No.: US 6,879,750 B2**
(45) **Date of Patent: *Apr. 12, 2005**

(54) **RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES**

(75) Inventors: **Tai Chen**, San Jose, CA (US); **Jeffrey P. Wilde**, Morgan Hill, CA (US); **Joseph E. Davis**, Morgan Hill, CA (US)

(73) Assignee: **Capella Photonics, Inc.**, San Jose, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/745,364**

(22) Filed: **Dec. 22, 2003**

(65) **Prior Publication Data**

US 2004/0136648 A1 Jul. 15, 2004

Related U.S. Application Data

(63) Continuation of application No. 10/005,714, filed on Nov. 7, 2001, now Pat. No. 6,687,431, which is a continuation of application No. 09/938,426, filed on Aug. 23, 2001, now Pat. No. 6,625,346.

(60) Provisional application No. 60/277,217, filed on Mar. 19, 2001.

(51) **Int. Cl.**[7] **G02B 6/28**

(52) **U.S. Cl.** **385/24**; 385/10; 385/33; 385/37

(58) **Field of Search** 385/10, 11, 24, 385/33–34, 37

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,625,346 B2 * 9/2003 Wilde 385/24
6,687,431 B2 * 2/2004 Chen et al. 385/24

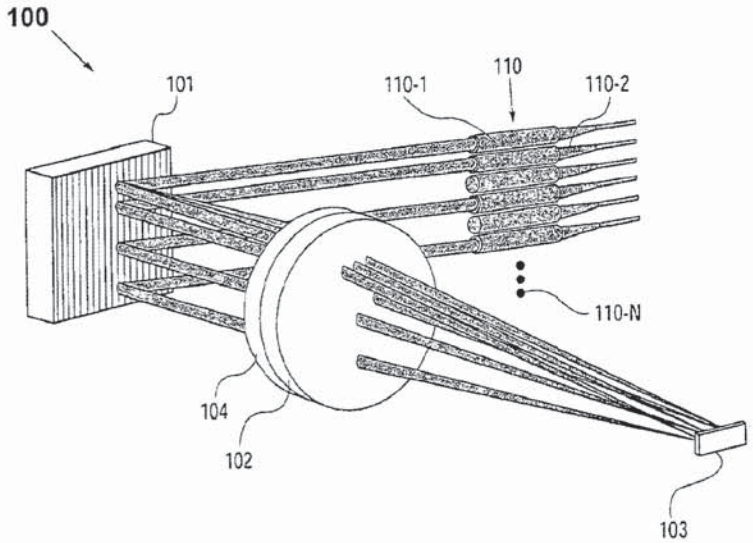
* cited by examiner

Primary Examiner—Phan T. H. Palmer
(74) *Attorney, Agent, or Firm*—Barry N. Young

(57) **ABSTRACT**

This invention provides a novel wavelength-separating-routing (WSR) apparatus that uses a diffraction grating to separate a multi-wavelength optical signal by wavelength into multiple spectral channels, which are then focused onto an array of corresponding channel micromirrors. The channel micromirrors are individually controllable and continuously pivotable to reflect the spectral channels into selected output ports. As such, the inventive WSR apparatus is capable of routing the spectral channels on a channel-by-channel basis and coupling any spectral channel into any one of the output ports. The WSR apparatus of the present invention may be further equipped with servo-control and spectral power-management capabilities, thereby maintaining the coupling efficiencies of the spectral channels into the output ports at desired values. The WSR apparatus of the present invention can be used to construct a novel class of dynamically reconfigurable optical add-drop multiplexers (OADMs) for WDM optical networking applications.

22 Claims, 12 Drawing Sheets



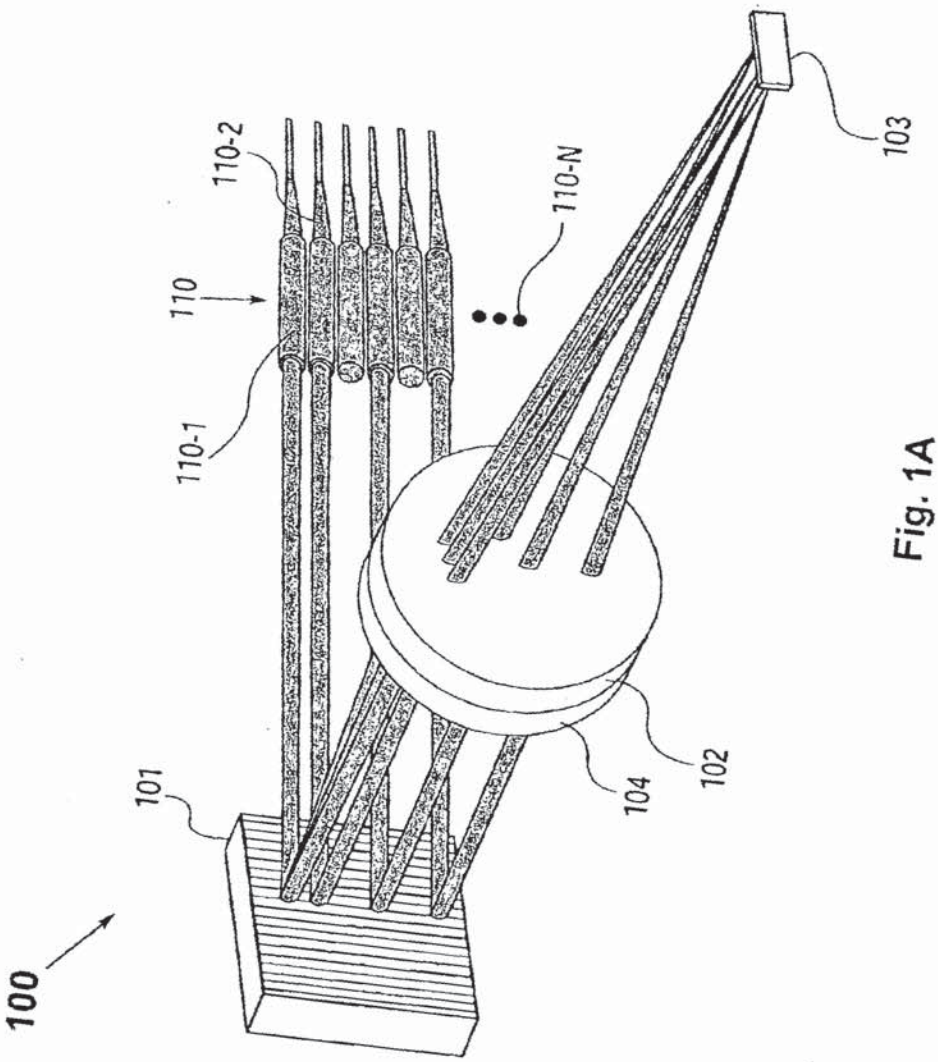


Fig. 1A

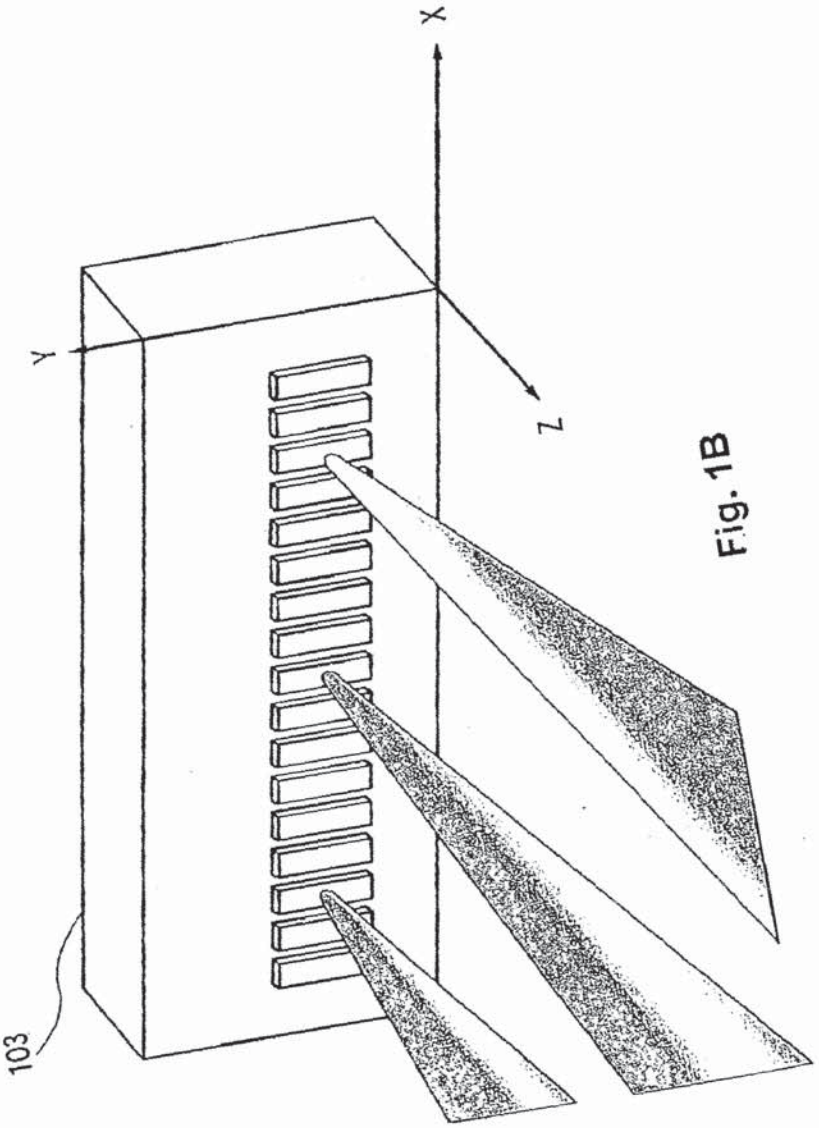


Fig. 1B

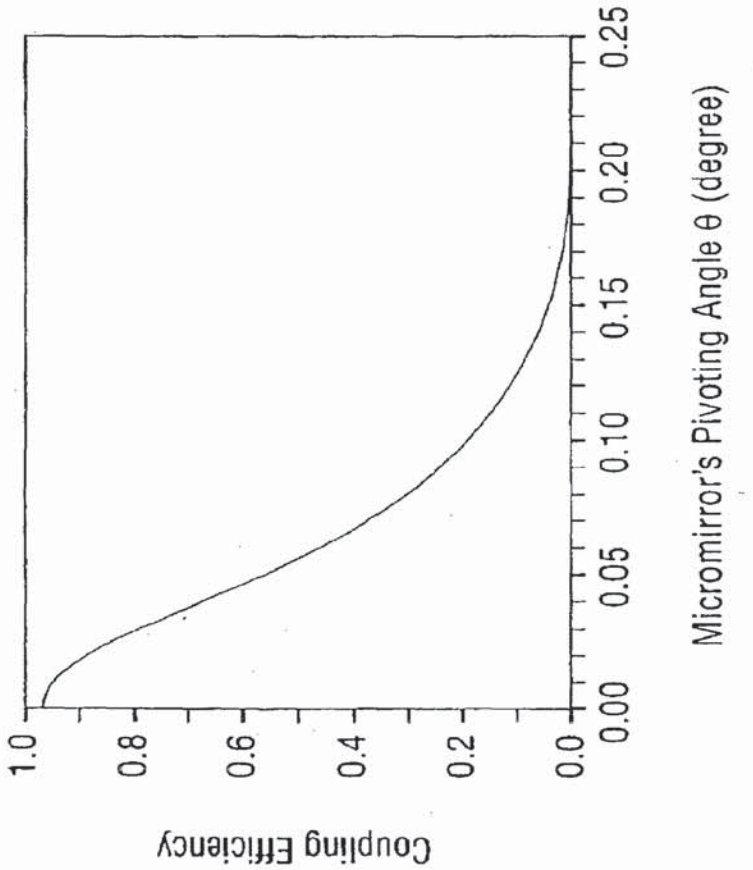

Coupling Efficiency
1.0
0.8
0.6
0.4
0.2
0.0
0.00
0.05
0.10
0.15
0.20
0.25
Micromirror's Pivoting Angle θ (degree)

Fig. 1C

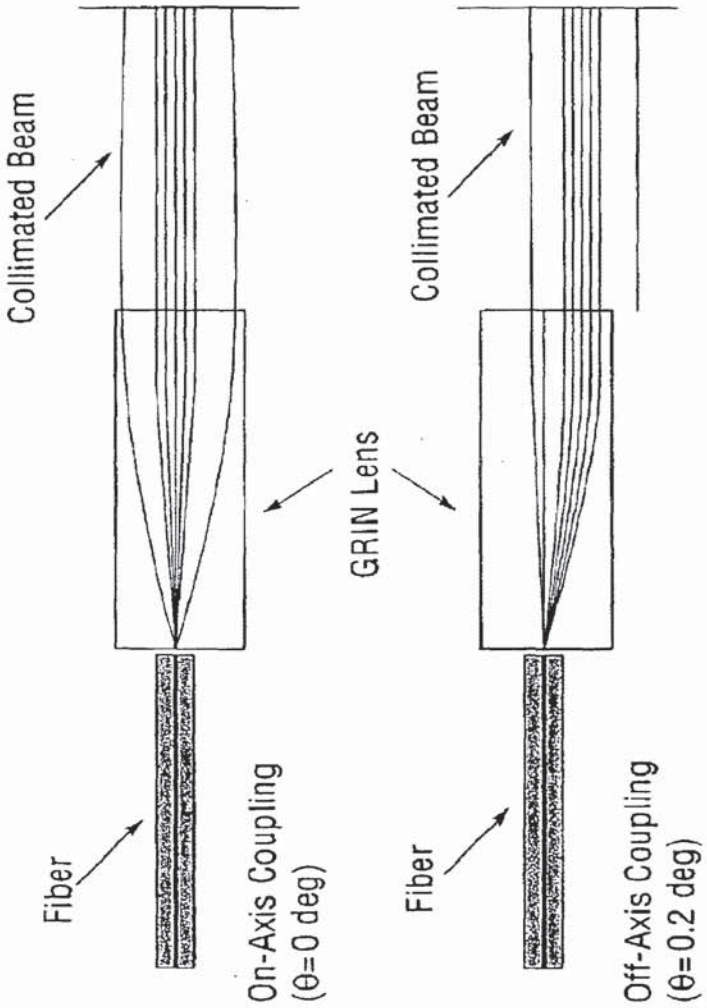

Collimated Beam
GRIN Lens
Fiber
On-Axis Coupling
(θ=0 deg)
Collimated Beam
Fiber
Off-Axis Coupling
(θ=0.2 deg)

Fig. 1D

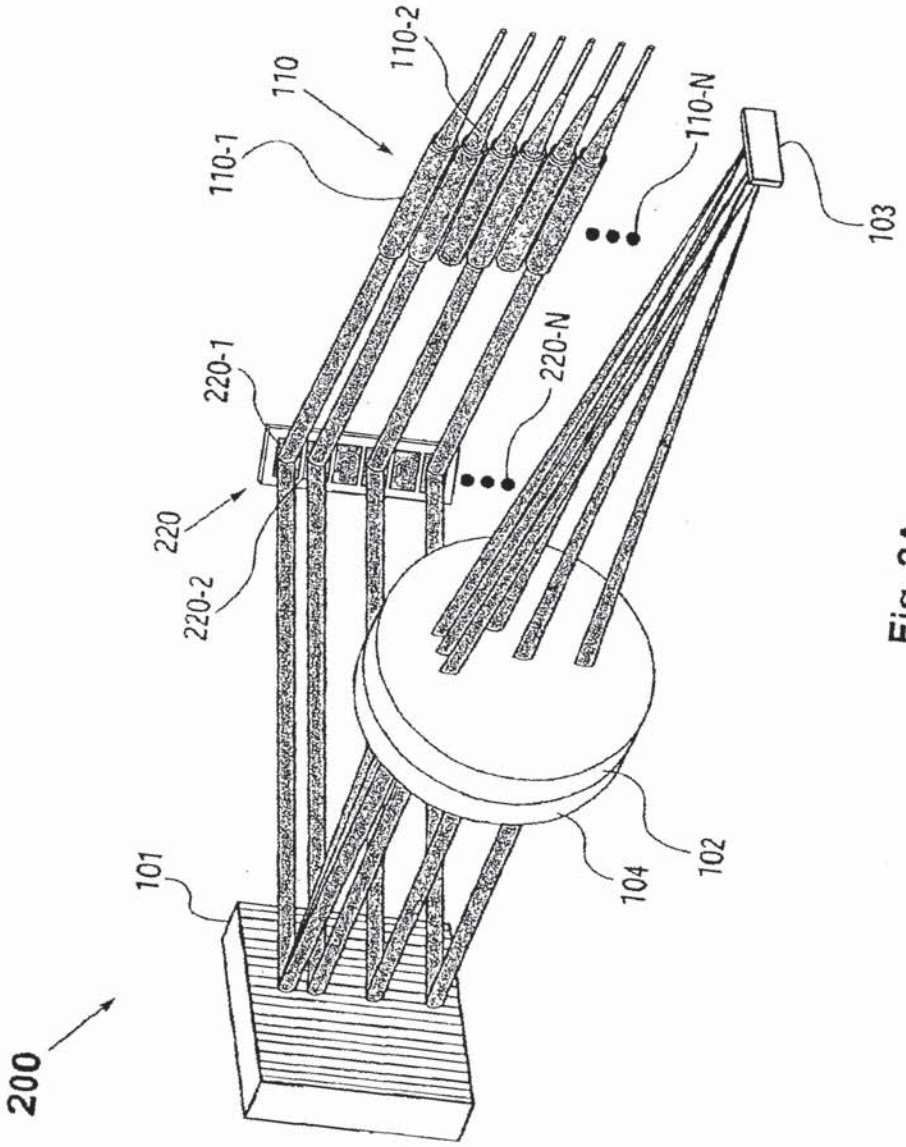


Fig. 2A

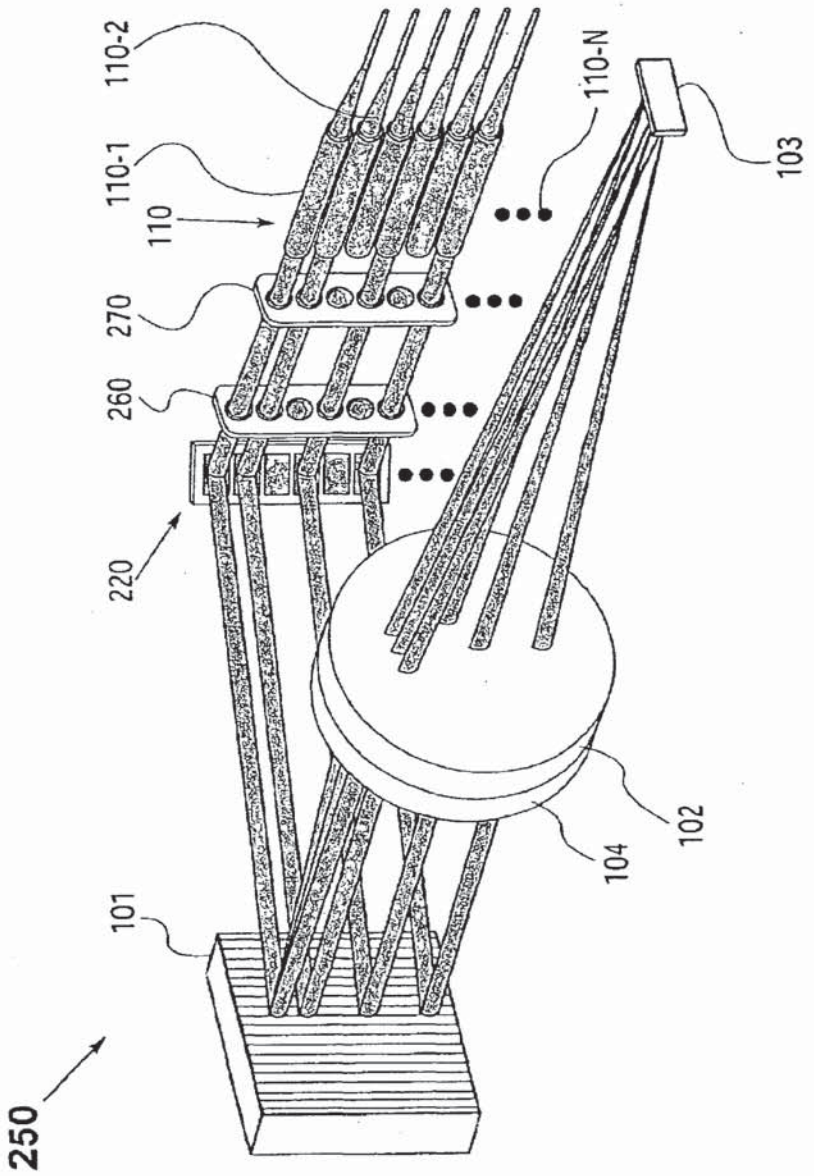


Fig. 2B

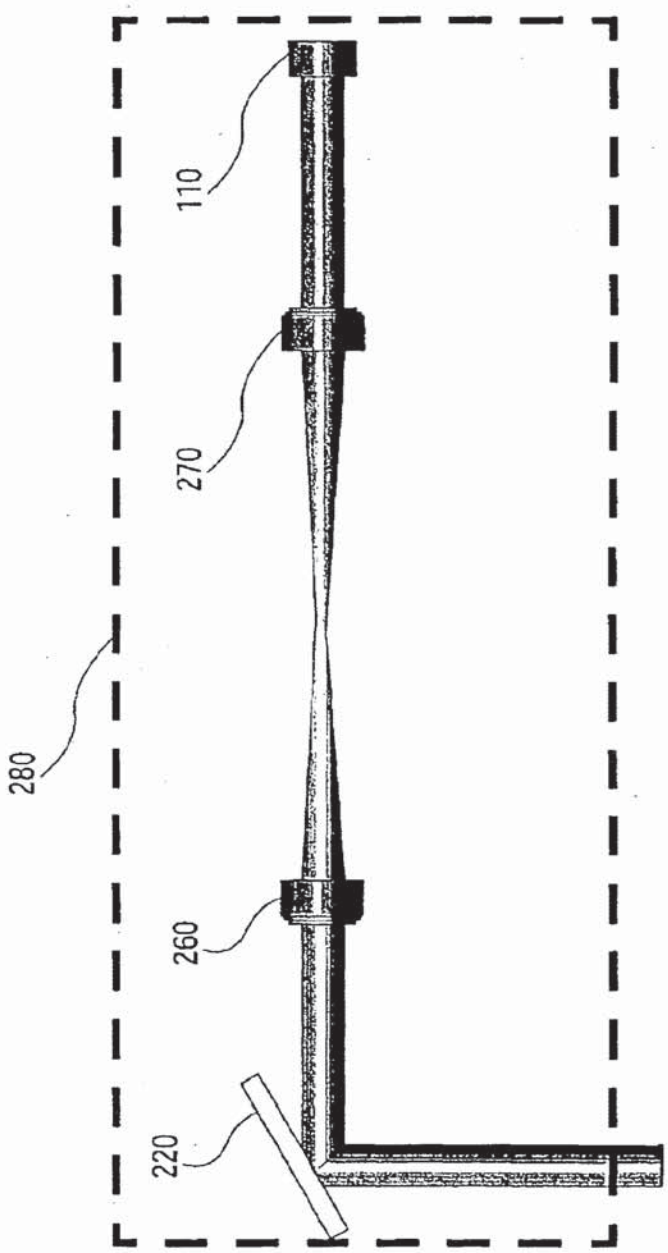


Fig. 2C

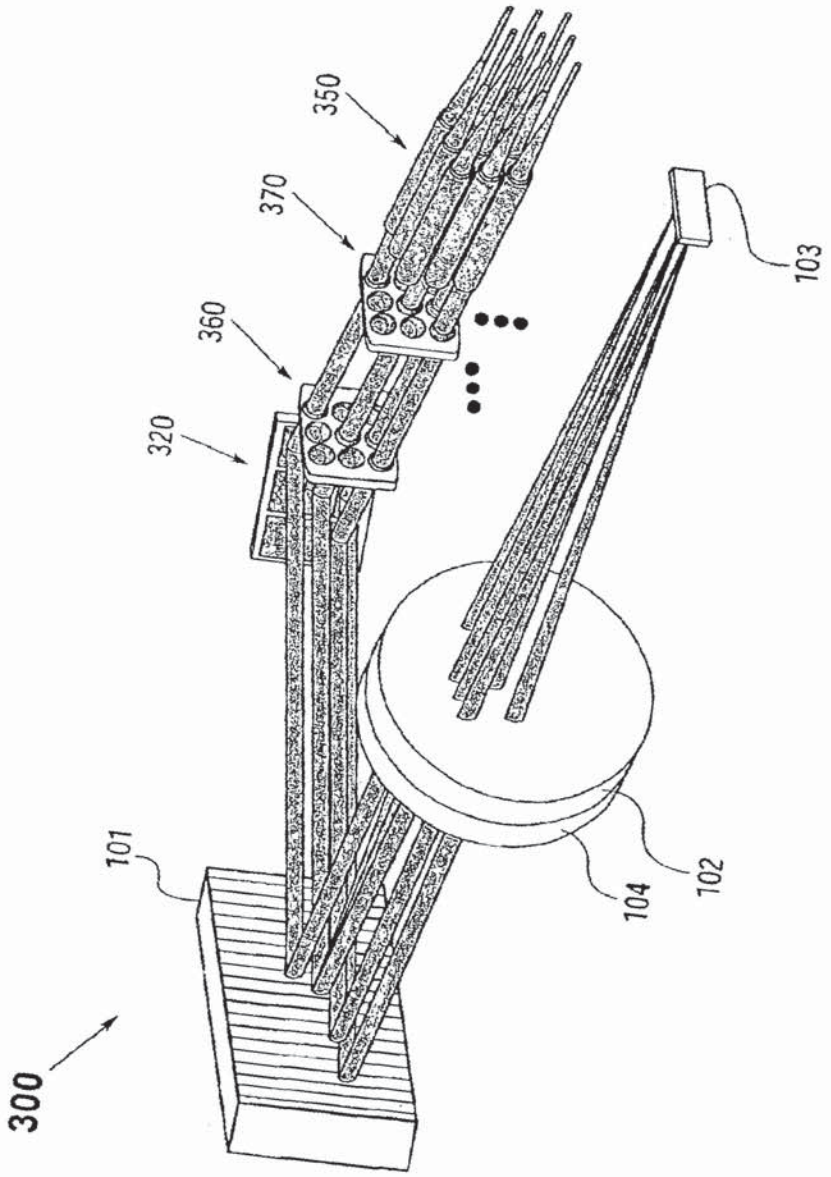


Fig. 3

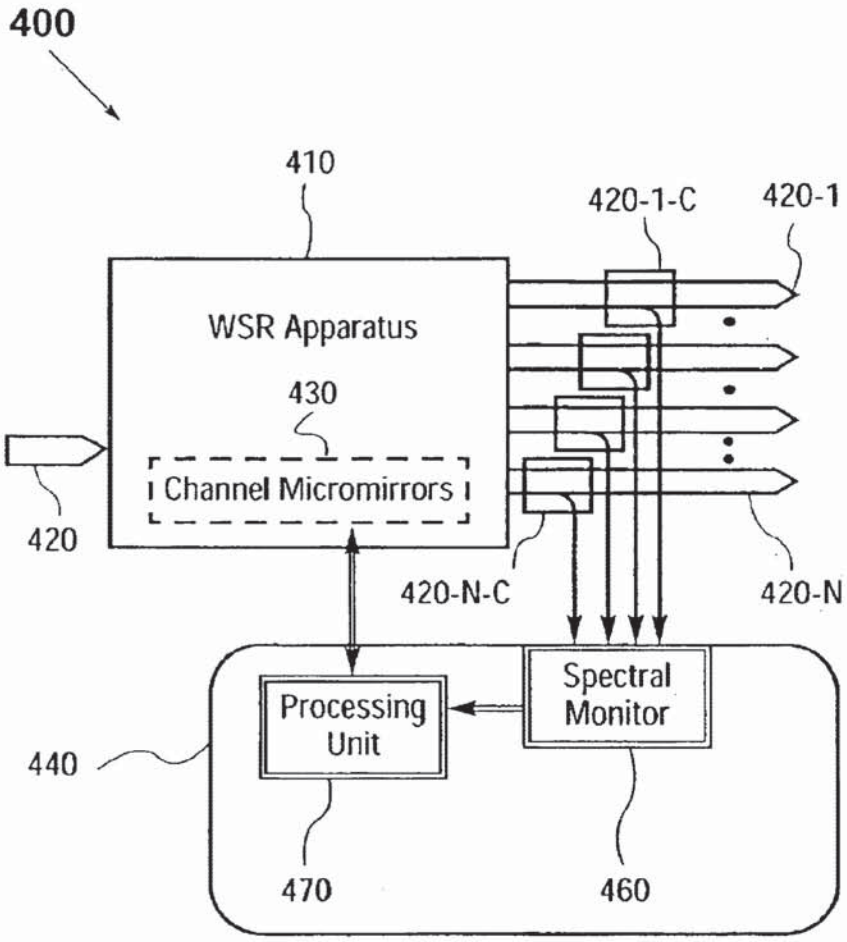

400
410
420-1-C
420-1
WSR Apparatus
430
Channel Micromirrors
420
420-N-C
420-N
Spectral Monitor
Processing Unit
440
470
460

Fig. 4A

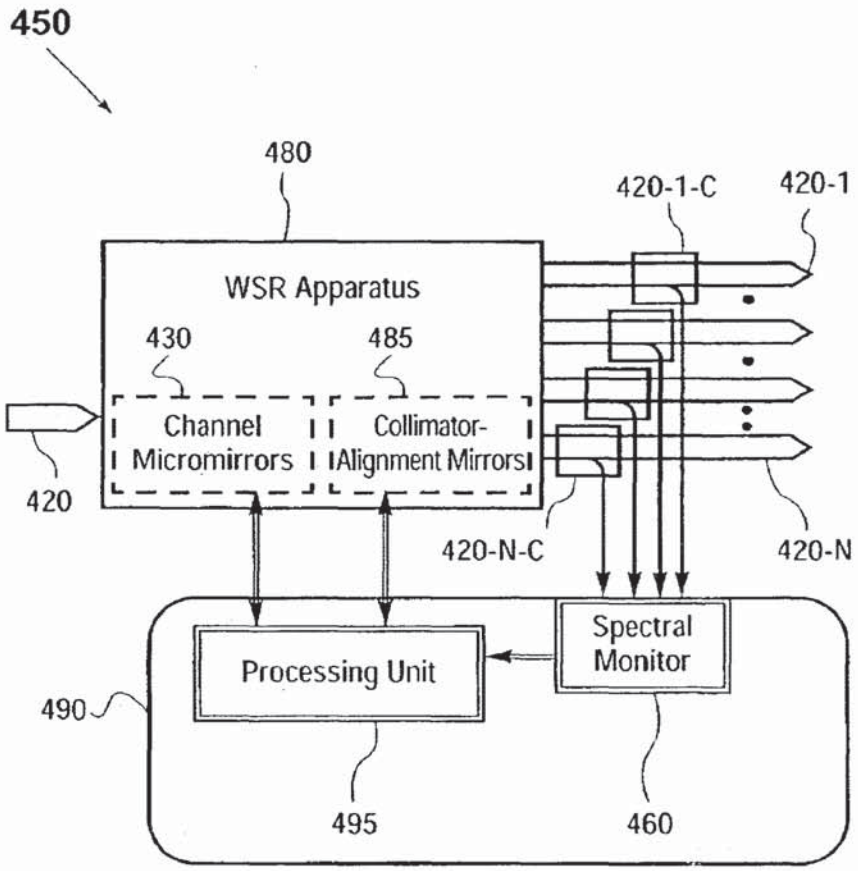

450
480
420-1-C
420-1
WSR Apparatus
430
485
Channel Micromirrors
Collimator-Alignment Mirrors
420
420-N-C
420-N
Spectral Monitor
Processing Unit
490
495
460

Fig. 4B

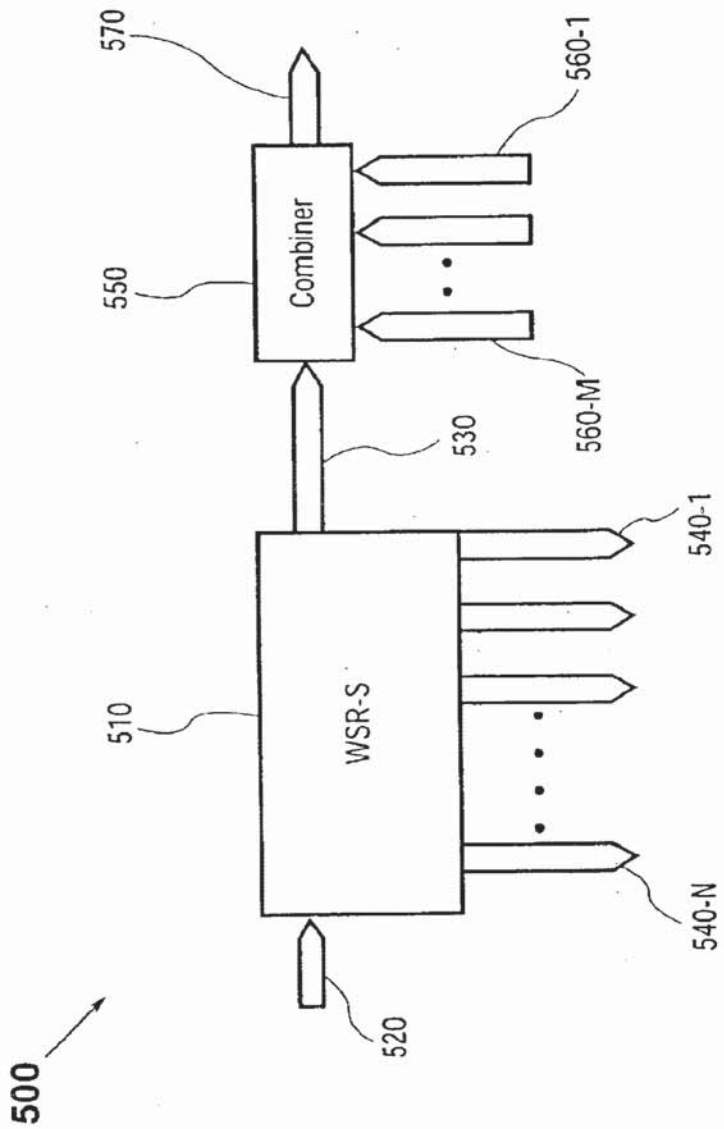


Fig. 5

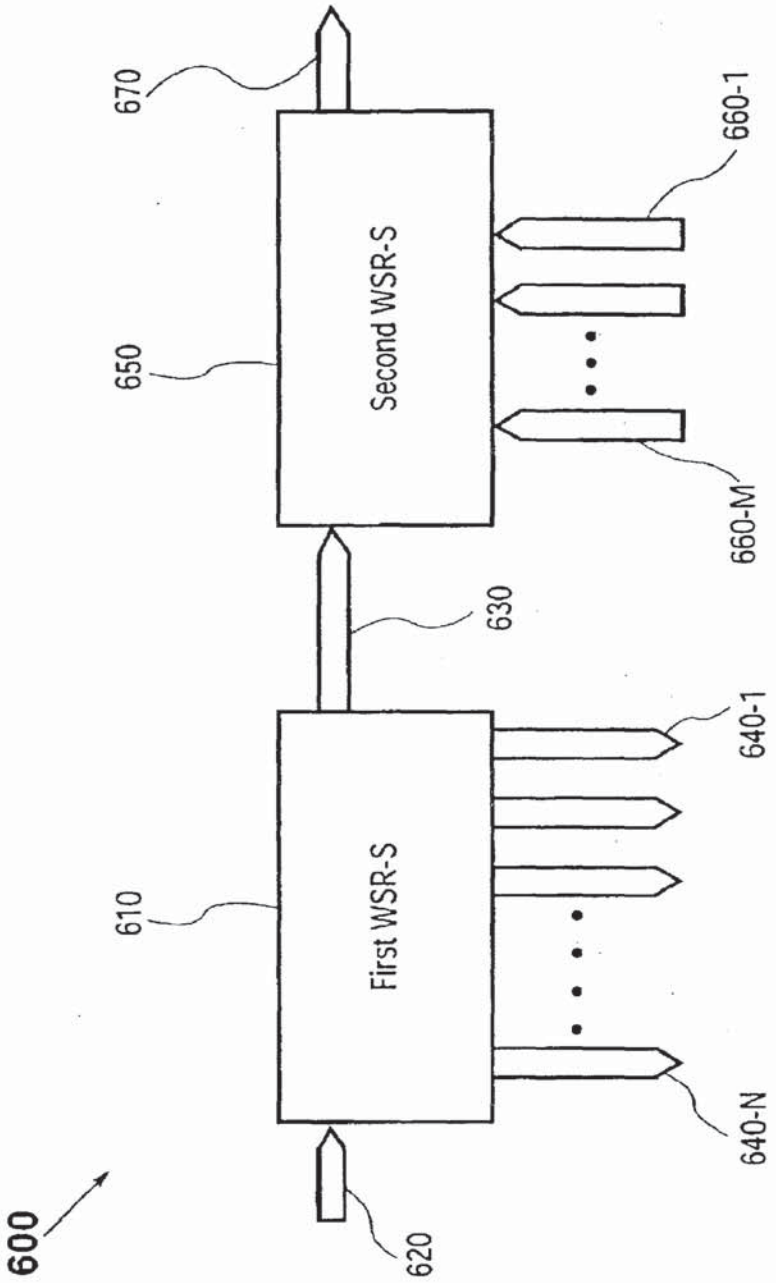

600
620
First WSR-S
610
640-N
640-1
630
Second WSR-S
650
660-M
660-1
670

Fig. 6

RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 10/005,714, filed Nov. 7, 2001 now U.S. Pat. No. 6,687,431, which is a continuation of U.S. application Ser. No. 09/938,426, filed Aug. 23, 2001, now U.S. Pat No. 6,625,346 which claims the benefit of U.S. application Ser. No. 60/277,217, filed Mar. 19, 2001.

FIELD OF THE INVENTION

This invention relates generally to optical communication systems. More specifically, it relates to a novel class of dynamically reconfigurable optical add-drop multiplexers (OADMs) for wavelength division multiplexed optical networking applications.

BACKGROUND

As fiber-optic communication networks rapidly spread into every walk of modern life, there is a growing demand for optical components and subsystems that enable the fiber-optic communications networks to be increasingly scalable, versatile, robust, and cost-effective.

Contemporary fiber-optic communications networks commonly employ wavelength division multiplexing (WDM), for it allows multiple information (or data) channels to be simultaneously transmitted on a single optical fiber by using different wavelengths and thereby significantly enhances the information bandwidth of the fiber. The prevalence of WDM technology has made optical add-drop multiplexers indispensable building blocks of modern fiber-optic communication networks. An optical add-drop multiplexer (OADM) serves to selectively remove (or drop) one or more wavelengths from a multiplicity of wavelengths on an optical fiber, hence taking away one or more data channels from the traffic stream on the fiber. It further adds one or more wavelengths back onto the fiber, thereby inserting new data channels in the same stream of traffic. As such, an OADM makes it possible to launch and retrieve multiple data channels (each characterized by a distinct wavelength) onto and from an optical fiber respectively, without disrupting the overall traffic flow along the fiber. Indeed, careful placement of the OADMs can dramatically improve an optical communication network's flexibility and robustness, while providing significant cost advantages.

Conventional OADMs in the art typically employ multiplexers/demultiplexers (e.g, waveguide grating routers or arrayed-waveguide gratings), tunable filters, optical switches, and optical circulators in a parallel or serial architecture to accomplish the add and drop functions. In the parallel architecture, as exemplified in U.S. Pat. No. 5,974,207, a demultiplexer (e.g., a waveguide grating router) first separates a multi-wavelength signal into its constituent spectral components. A wavelength switching/routing means (e.g., a combination of optical switches and optical circulators) then serves to drop selective wavelengths and add others. Finally, a multiplexer combines the remaining (i.e., the pass-through) wavelengths into an output multi-wavelength optical signal. In the serial architecture, as exemplified in U.S. Pat. No. 6,205,269, tunable filters (e.g., Bragg fiber gratings) in combination with optical circulators

are used to separate the drop wavelengths from the pass-through wavelengths and subsequently launch the add channels into the pass-through path. And if multiple wavelengths are to be added and dropped, additional multiplexers and demultiplexers are required to demultiplex the drop wavelengths and multiplex the add wavelengths, respectively. Irrespective of the underlying architecture, the OADMs currently in the art are characteristically high in cost, and prone to significant optical loss accumulation. Moreover, the designs of these OADMs are such that it is inherently difficult to reconfigure them in a dynamic fashion.

U.S. Pat. No. 6,204,946 to Askyuk et al. discloses an OADM that makes use of free-space optics in a parallel construction. In this case, a multi-wavelength optical signal emerging from an input port is incident onto a ruled diffraction grating. The constituent spectral channels thus separated are then focused by a focusing lens onto a linear array of binary micromachined mirrors. Each micromirror is configured to operate between two discrete states, such that it either retroreflects its corresponding spectral channel back into the input port as a pass-through channel, or directs its spectral channel to an output port as a drop channel. As such, the pass-through signal (i.e., the combined pass-through channels) shares the same input port as the input signal. An optical circulator is therefore coupled to the input port, to provide necessary routing of these two signals. Likewise, the drop channels share the output port with the add channels. An additional optical circulator is thereby coupled to the output port, from which the drop channels exit and the add channels are introduced into the output port. The add channels are subsequently combined with the pass-through signal by way of the diffraction grating and the binary micromirrors.

Although the aforementioned OADM disclosed by Askyuk et al. has the advantage of performing wavelength separating and routing in free space and thereby incurring less optical loss, it suffers a number of limitations. First, it requires that the pass-through signal share the same port/fiber as the input signal. An optical circulator therefore has to be implemented, to provide necessary routing of these two signals. Likewise, all the add and drop channels enter and leave the OADM through the same output port, hence the need for another optical circulator. Moreover, additional means must be provided to multiplex the add channels before entering the system and to demultiplex the drop channels after exiting the system. This additional multiplexing/demultiplexing requirement adds more cost and complexity that can restrict the versatility of the OADM thus-constructed. Second, the optical circulators implemented in this OADM for various routing purposes introduce additional optical losses, which can accumulate to a substantial amount. Third, the constituent optical components must be in a precise alignment, in order for the system to achieve its intended purpose. There are, however, no provisions provided for maintaining the requisite alignment; and no mechanisms implemented for overcoming degradation in the alignment owing to environmental effects such as thermal and mechanical disturbances over the course of operation.

U.S. Pat. No. 5,906,133 to Tomlinson discloses an OADM that makes use of a design similar to that of Aksyuk et al. There are input, output, drop and add ports implemented in this case. By positioning the four ports in a specific arrangement, each micromirror, notwithstanding switchable between two discrete positions, either reflects its corresponding channel (coming from the input port) to the output port, or concomitantly reflects its channel to the drop

port and an incident add channel to the output port. As such, this OADM is able to perform both the add and drop functions without involving additional optical components (such as optical circulators used in the system of Aksyuk et al.). However, because a single drop port is designated for all the drop channels and a single add port is designated for all the add channels, the add channels would have to be multiplexed before entering the add port and the drop channels likewise need to be demutiplexed upon exiting from the drop port. Moreover, as in the case of Askyuk et al., there are no provisions provided for maintaining requisite optical alignment in the system, and no mechanisms implemented for combating degradation in the alignment due to environmental effects over the course of operation.

As such, the prevailing drawbacks suffered by the OADMs currently in the art are summarized as follows:

1) The wavelength routing is intrinsically static, rendering it difficult to dynamically reconfigure these OADMs.
2) Add and/or drop channels often need to be multiplexed and/or demultiplexed, thereby imposing additional complexity and cost.
3) Stringent fabrication tolerance and painstaking optical alignment are required. Moreover, the optical alignment is not actively maintained, rendering it susceptible to environmental effects such as thermal and mechanical disturbances over the course of operation.
4) In an optical communication network, OADMs are typically in a ring or cascaded configuration. In order to mitigate the interference amongst OADMs, which often adversely affects the overall performance of the network, it is essential that the power levels of spectral channels entering and exiting each OADM be managed in a systematic way, for instance, by introducing power (or gain) equalization at each stage. Such a power equalization capability is also needed for compensating for non-uniform gain caused by optical amplifiers (e.g., erbium doped fiber amplifiers) in the network. There lacks, however, a systematic and dynamic management of the power levels of various spectral channels in these OADMs.
5) The inherent high cost and heavy optical loss further impede the wide application of these OADMs.

In view of the foregoing, there is an urgent need in the art for optical add-drop multiplexers that overcome the aforementioned shortcomings in a simple, effective, and economical construction.

SUMMARY

The present invention provides a wavelength-separating-routing (WSR) apparatus and method which employ an array of fiber collimators serving as an input port and a plurality of output ports; a wavelength-separator; a beam-focuser; and an array of channel micromirrors.

In operation, a multi-wavelength optical signal emerges from the input port. The wavelength-separator separates the multi-wavelength optical signal into multiple spectral channels, each characterized by a distinct center wavelength and associated bandwidth. The beam-focuser focuses the spectral channels into corresponding spectral spots. The channel micromirrors are positioned such that each channel micromirror receives one of the spectral channels. The channel micromirrors are individually controllable and movable, e.g., continuously pivotable (or rotatable), so as to reflect the spectral channels into selected ones of the output ports. As such, each channel micromirror is assigned to a specific spectral channel, hence the name "channel micromirror". And each output port may receive any number of the reflected spectral channels.

A distinct feature of the channel micromirrors in the present invention, in contrast to those used in the prior art, is that the motion, e.g., pivoting (or rotation), of each channel micromirror is under analog control such that its pivoting angle can be continuously adjusted. This enables each channel micromirror to scan its corresponding spectral channel across all possible output ports and thereby direct the spectral channel to any desired output port.

In the WSR apparatus of the present invention, the wavelength-separator may be provided by a ruled diffraction grating, a holographic diffraction grating, an echelle grating, a curved diffraction grating, a dispersing prism, or other wavelength-separating means known in the art. The beam-focuser may be a single lens, an assembly of lenses, or other beam-focusing means known in the art. The channel micromirrors may be provided by silicon micromachined mirrors, reflective ribbons (or membranes), or other types of beam-deflecting means known in the art. And each channel micromirror may be pivotable about one or two axes. The fiber collimators serving as the input and output ports may be arranged in a one-dimensional or two-dimensional array. In the latter case, the channel micromirrors must be pivotable biaxially.

The WSR apparatus of the present invention may further comprise an array of collimator-alignment mirrors, in optical communication with the wavelength-separator and the fiber collimators, for adjusting the alignment of the input multi-wavelength signal and directing the spectral channels into the selected output ports by way of angular control of the collimated beams. Each collimator-alignment mirror may be rotatable about one or two axes. The collimator-alignment mirrors may be arranged in a one-dimensional or two-dimensional array. First and second arrays of imaging lenses may additionally be optically interposed between the collimator-alignment mirrors and the fiber collimators in a telecentric arrangement, thereby "imaging" the collimator-alignment mirrors onto the corresponding fiber collimators to ensure an optimal alignment.

The WSR apparatus of the present invention may further include a servo-control assembly, in communication with the channel micromirrors and the output ports. The servo-control assembly serves to monitor the power levels of the spectral channels coupled into the output ports and further provide control of the channel micromirrors on an individual basis, so as to maintain a predetermined coupling efficiency of each spectral channel in one of the output ports. As such, the servo-control assembly provides dynamic control of the coupling of the spectral channels into the respective output ports and actively manages the power levels of the spectral channels coupled into the output ports. (If the WSR apparatus includes an array of collimator-alignment mirrors as described above, the servo-control assembly may additionally provide dynamic control of the collimator-alignment mirrors.) Moreover, the utilization of such a servo-control assembly effectively relaxes the requisite fabrication tolerances and the precision of optical alignment during assembly of a WSR apparatus of the present invention, and further enables the system to correct for shift in optical alignment over the course of operation. A WSR apparatus incorporating a servo-control assembly thus described is termed a WSR-S apparatus, thereinafter in the present invention.

Accordingly, the WSR-S (or WSR) apparatus of the present invention may be used to construct a variety of optical devices, including a novel class of dynamically reconfigurable optical add-drop multiplexers (OADMs), as exemplified in the following embodiments.

One embodiment of an OADM of the present invention comprises an aforementioned WSR-S (or WSR) apparatus

and an optical combiner. The output ports of the WSR-S apparatus include a pass-through port and one or more drop ports, each carrying any number of the spectral channels. The optical combiner is coupled to the pass-through port, serving to combine the pass-through channels with one or more add spectral channels. The combined optical signal constitutes an output signal of the system. The optical combiner may be an N×1 (N≧2) broadband fiber-optic coupler, for instance, which also serves the purpose of multiplexing a multiplicity of add spectral channels to be coupled into the system.

In another embodiment of an OADM of the present invention, a first WSR-S (or WSR) apparatus is cascaded with a second WSR-S (or WSR) apparatus. The output ports of the first WSR-S (or WSR) apparatus include a pass-through port and one or more drop ports. The second WSR-S (or WSR) apparatus includes a plurality of input ports and an exiting port. The configuration is such that the pass-through channels from the first WSR-S apparatus and one or more add channels are directed into the input ports of the second WSR-S apparatus, and consequently multiplexed into an output multi-wavelength optical signal directed into the exiting port of the second WSR-S apparatus. That is to say that in this embodiment, one WSR-S apparatus (e.g., the first one) effectively performs a dynamic drop function, whereas the other WSR-S apparatus (e.g., the second one) carries out a dynamic add function. And there are essentially no fundamental restrictions on the wavelengths that can be added or dropped, other than those imposed by the overall communication system. Moreover, the underlying OADM architecture thus presented is intrinsically scalable and can be readily extended to any number of the WSR-S (or WSR) systems, if so desired for performing intricate add and drop functions in a network environment.

Those skilled in the art will recognize that the aforementioned embodiments provide only two of many embodiments of a dynamically reconfigurable OADM according to the present invention. Various changes, substitutions, and alternations can be made herein, without departing from the principles and the scope of the invention. Accordingly, a skilled artisan can design an OADM in accordance with the present invention, to best suit a given application.

All in all, the OADMs of the present invention provide many advantages over the prior art devices, notably:

1) By advantageously employing an array of channel micromirrors that are individually and continuously controllable, an OADM of the present invention is capable of routing the spectral channels on a channel-by-channel basis and directing any spectral channel into any one of the output ports. As such, its underlying operation is dynamically reconfigurable, and its underlying architecture is intrinsically scalable to a large number of channel counts.
2) The add and drop spectral channels need not be multiplexed and demultiplexed before entering and after leaving the OADM respectively. And there are not fundamental restrictions on the wavelengths to be added or dropped.
3) The coupling of the spectral channels into the output ports is dynamically controlled by a servo-control assembly, rendering the OADM less susceptible to environmental effects (such as thermal and mechanical disturbances) and therefore more robust in performance. By maintaining an optimal optical alignment, the optical losses incurred by the spectral channels are also significantly reduced.
4) The power levels of the spectral channels coupled into the output ports can be dynamically managed according to demand, or maintained at desired values (e.g., equalized at a predetermined value) by way of the servo-control assembly. This spectral power-management capability as an integral part of the OADM will be particularly desirable in WDM optical networking applications.
5) The use of free-space optics provides a simple, low loss, and cost-effective construction. Moreover, the utilization of the servo-control assembly effectively relaxes the requisite fabrication tolerances and the precision of optical alignment during initial assembly, enabling the OADM to be simpler and more adaptable in structure, lower in cost and optical loss.
6) The underlying OADM architecture allows a multiplicity of the OADMs according to the present invention to be readily assembled (e.g., cascaded) for WDM optical networking applications.

The novel features of this invention, as well as the invention itself, will be best understood from the following drawings and detailed description.

BRIEF DESCRIPTION OF THE FIGURES

FIGS. **1**A–1D show a first embodiment of a wavelength-separating-routing (WSR) apparatus according to the present invention, and the modeling results demonstrating the performance of the WSR apparatus;

FIGS. **2**A–**2**C depict second and third embodiments of a WSR apparatus according to the present invention;

FIG. **3** shows a fourth embodiment of a WSR apparatus according to the present invention;

FIGS. **4**A–**4**B show schematic illustrations of two embodiments of a WSR-S apparatus comprising a WSR apparatus and a servo-control assembly, according to the present invention;

FIG. **5** depicts an exemplary embodiment of an optical add-drop multiplexer (OADM) according to the present invention; and

FIG. **6** shows an alternative embodiment of an OADM according to the present invention.

DETAILED DESCRIPTION

In this specification and appending claims, a "spectral channel" is characterized by a distinct center wavelength and associated bandwidth. Each spectral channel may carry a unique information signal, as in WDM optical networking applications.

FIG. **1**A depicts a first embodiment of a wavelength-separating-routing (WSR) apparatus according to the present invention. By way of example to illustrate the general principles and the topological structure of a wavelength-separating-routing (WSR) apparatus of the present invention, the WSR apparatus **100** comprises multiple input/output ports which may be in the form of an array of fiber collimators **110**, providing an input port **110-1** and a plurality of output ports **110-2** through **110-N** (N≧3); a wavelength-separator which in one form may be a diffraction grating **101**; a beam-focuser in the form of a focusing lens **102**; and an array of channel micromirrors **103**.

In operation, a multi-wavelength optical signal emerges from the input port **110-1**. The diffraction grating **101** angularly separates the multi-wavelength optical signal into multiple spectral channels, which are in turn focused by the focusing lens **102** into a spatial array of distinct spectral spots (not shown in FIG. **1**A) in a one-to-one correspondence. The channel micromirrors **103** are positioned in accordance with the spatial array formed by the spectral spots, such that each channel micromirror receives one of

the spectral channels. The channel micromirrors **103** are individually controllable and movable, e.g., pivotable (or rotatable) under analog (or continuous) control, such that, upon reflection, the spectral channels are directed into selected ones of the output ports **110-2** through **110**-N by way of the focusing lens **102** and the diffraction grating **101**. As such, each channel micromirror is assigned to a specific spectral channel, hence the name "channel micromirror". Each output port may receive any number of the reflected spectral channels.

For purposes of illustration and clarity, only a selective few (e.g., three) of the spectral channels, along with the input multi-wavelength optical signal, are graphically illustrated in FIG. **1**A and the following figures. It should be noted, however, that there can be any number of the spectral channels in a WSR apparatus of the present invention (so long as the number of spectral channels does not exceed the number of channel mirrors employed in the system). It should also be noted that the optical beams representing the spectral channels shown in FIG. **1**A and the following figures are provided for illustrative purpose only. That is, their sizes and shapes may not be drawn according to scale. For instance, the input beam and the corresponding diffracted beams generally have different cross-sectional shapes, so long as the angle of incidence upon the diffraction grating is not equal to the angle of diffraction, as is known to those skilled in the art.

In the embodiment of FIG. **1**A, it is preferable that the diffraction grating **101** and the channel micromirrors **103** are placed respectively at the first and second (i.e., the front and back) focal points (on the opposing sides) of the focusing lens **102**. Such a telecentric arrangement allows the chief rays of the focused beams to be parallel to each other and generally parallel to the optical axis. In this application, the telecentric configuration further allows the reflected spectral channels to be efficiently coupled into the respective output ports, thereby minimizing various translational walk-off effects that may otherwise arise. Moreover, the input multi-wavelength optical signal is preferably collimated and circular in cross-section. The corresponding spectral channels diffracted from the diffraction grating **101** are generally elliptical in cross-section; they may be of the same size as the input beam in one dimension and elongated in the other dimension.

It is known that the diffraction efficiency of a diffraction grating is generally polarization-dependent. That is, the diffraction efficiency of a grating in a standard mounting configuration may be considerably higher for P-polarization that is perpendicular to the groove lines on the grating than for S-polarization that is orthogonal to P-polarization, especially as the number of groove lines (per unit length) increases. To mitigate such polarization-sensitive effects, a quarter-wave plate **104** may be optically interposed between the diffraction grating **101** and the channel micromirrors **103**, and preferably placed between the diffraction grating **101** and the focusing lens **102** as is shown in FIG. 1A. In this way, each spectral channel experiences a total of approximately 90-degree rotation in polarization upon traversing the quarter-wave plate **104** twice. (That is, if a beam of light has P-polarization when first encountering the diffraction grating, it would have predominantly (if not all) S-polarization upon the second encountering, and vice versa.) This ensures that all the spectral channels incur nearly the same amount of round-trip polarization dependent loss.

In the WSR apparatus **100** of FIG. **1**A, the diffraction grating **101**, by way of example, is oriented such that the focused spots of the spectral channels fall onto the channel micromirrors **103** in a horizontal array, as illustrated in FIG. **1**B.

Depicted in FIG. **1**B is a close-up view of the channel micromirrors **103** shown in the embodiment of FIG. 1A. By way of example, the channel micromirrors **103** are arranged in a one-dimensional array along the x-axis (i.e., the horizontal direction in the figure), so as to receive the focused spots of the spatially separated spectral channels in a one-to-one correspondence. (As in the case of FIG. **1**A, only three spectral channels are illustrated, each represented by a converging beam.) Let the reflective surface of each channel micromirror lie in the x-y plane as defined in the figure and be movable, e.g., pivotable (or deflectable) about the x-axis in an analog (or continuous) manner. Each spectral channel, upon reflection, is deflected in the y-direction (e.g., downward) relative to its incident direction, so to be directed into one of the output ports **110-2** through **110**-N shown in FIG. **1**A.

As described above, a unique feature of the present invention is that the motion of each channel micromirror is individually and continuously controllable, such that its position, e.g., pivoting angle, can be continuously adjusted. This enables each channel micromirror to scan its corresponding spectral channel across all possible output ports and thereby direct the spectral channel to any desired output port. To illustrate this capability, FIG. **1**C shows a plot of coupling efficiency as a function of a channel micromirror's pivoting angle θ, provided by a ray-tracing model of a WSR apparatus in the embodiment of FIG. **1**A. As used herein, the coupling efficiency for a spectral channel is defined as the ratio of the amount of optical power coupled into the fiber core in an output port to the total amount of optical power incident upon the entrance surface of the fiber (associated with the fiber collimator serving as the output port). In the ray-tracing model, the input optical signal is incident upon a diffraction grating with 700 lines per millimeter at a grazing angle of 85 degrees, where the grating is blazed to optimize the diffraction efficiency for the "−1" order. The focusing lens has a focal length of 100 mm. Each output port is provided by a quarter-pitch GRIN lens (2 mm in diameter) coupled to an optical fiber (see FIG. **1**D). As displayed in FIG. **1**C, the coupling efficiency varies with the pivoting angle θ, and it requires about a 0.2-degree change in θ for the coupling efficiency to become practically negligible in this exemplary case. As such, each spectral channel may practically acquire any coupling efficiency value by way of controlling the pivoting angle of its corresponding channel micromirror. This is also to say that variable optical attenuation at the granularity of a single wavelength can be obtained in a WSR apparatus of the present invention. FIG. **1**D provides ray-tracing illustrations of two extreme points on the coupling efficiency vs. θ curve of FIG. **1**C: on-axis coupling corresponding to θ=0, where the coupling efficiency is maximum; and off-axis coupling corresponding to θ=0.2 degrees, where the representative collimated beam (representing an exemplary spectral channel) undergoes a significant translational walk-off and renders the coupling efficiency practically negligible. All in all, the exemplary modeling results thus described demonstrate the unique capabilities of the WSR apparatus of the present invention.

FIG. **1**A provides one of many embodiments of a WSR apparatus according to the present invention. In general, the wavelength-separator is a wavelength-separating means that may be a ruled diffraction grating, a holographic diffraction grating, an echelle grating, a dispersing prism, or other types of spectral-separating means known in the art. The beam-

focuser may be a focusing lens, an assembly of lenses, or other beam-focusing means known in the art. The focusing function may also be accomplished by using a curved diffraction grating as the wavelength-separator. The channel micromirrors may be provided by silicon micromachined mirrors, reflective ribbons (or membranes), or other types of beam-deflecting elements known in the art. And each micromirror may be pivoted about one or two axes. What is important is that the pivoting (or rotational) motion of each channel micromirror be individually controllable in an analog manner, whereby the pivoting angle can be continuously adjusted so as to enable the channel micromirror to scan a spectral channel across all possible output ports. The underlying fabrication techniques for micromachined mirrors and associated actuation mechanisms are well documented in the art, see U.S. Pat. No. 5,629,790 for example. Moreover, a fiber collimator is typically in the form of a collimating lens (such as a GRIN lens) and a ferrule-mounted fiber packaged together in a mechanically rigid stainless steel (or glass) tube. The fiber collimators serving as the input and output ports may be arranged in a one-dimensional array, a two-dimensional array, or other desired spatial pattern. For instance, they may be conveniently mounted in a linear array along a V-groove fabricated on a substrate made of silicon, plastic, or ceramic, as commonly practiced in the art. It should be noted, however, that the input port and the output ports need not necessarily be in close spatial proximity with each other, such as in an array configuration (although a close packing would reduce the rotational range required for each channel micromirror). Those skilled in the art will know how to design a WSR apparatus according to the present invention, to best suit a given application.

A WSR apparatus of the present invention may further comprise an array of collimator-alignment mirrors, for adjusting the alignment of the input multi-wavelength optical signal and facilitating the coupling of the spectral channels into the respective output ports, as shown in FIGS. **2**A–**2**B and **3**.

Depicted in FIG. **2**A is a second embodiment of a WSR apparatus according to the present invention. By way of example, WSR apparatus **200** is built upon and hence shares a number of the elements used in the embodiment of FIG. **1**A, as identified by those labeled with identical numerals. Moreover, a one-dimensional array **220** of collimator-alignment mirrors **220-1** through **220**-N is optically interposed between the diffraction grating **101** and the fiber collimator array **110**. The collimator-alignment mirror **220-1** is designated to correspond with the input port **110-1**, for adjusting the alignment of the input multi-wavelength optical signal and therefore ensuring that the spectral channels impinge onto the corresponding channel micromirrors. The collimator-alignment mirrors **220-2** through **220**-N are designated to the output ports **110-2** through **110**-N in a one-to-one correspondence, serving to provide angular control of the collimated beams of the reflected spectral channels and thereby facilitating the coupling of the spectral channels into the respective output ports according to desired coupling efficiencies. Each collimator-alignment mirror may be rotatable about one axis, or two axes.

The embodiment of FIG. **2**A is attractive in applications where the fiber collimators (serving as the input and output ports) are desired to be placed in close proximity to the collimator-alignment mirror array **220**. To best facilitate the coupling of the spectral channels into the output ports, arrays of imaging lenses may be implemented between the collimator-alignment mirror array **220** and the fiber collimator array **110**, as depicted in FIG. **2**B. By way of example, WSR apparatus **250** of FIG. **2**B is built upon and hence shares many of the elements used in the embodiment of FIG. **2**A, as identified by those labeled with identical numerals. Additionally, first and second arrays **260**, **270** of imaging lenses are placed in a 4-f telecentric arrangement with respect to the collimator-alignment mirror array **220** and the fiber collimator array **110**. The dashed box **280** shown in FIG. **2**C provides a top view of such a telecentric arrangement. In this case, the imaging lenses in the first and second arrays **260**, **270** all have the same focal length f. The collimator-alignment mirrors **220-1** through **220**-N are placed at the respective first (or front) focal points of the imaging lenses in the first array **260**. Likewise, the fiber collimators **110-1** through 110-N are placed at the respective second (or back) focal points of the imaging lenses in the second array **270**. And the separation between the first and second arrays **260**, **270** of imaging lenses is 2f. In this way, the collimator-alignment mirrors **220-1** through **220**-N are effectively imaged onto the respective entrance surfaces (i.e., the front focal planes) of the GRIN lenses in the corresponding fiber collimators **110-1** through **110**-N. Such a telecentric imaging system substantially eliminates translational walk-off of the collimated beams at the output ports that may otherwise occur as the mirror angles change.

FIG. **3** shows a fourth embodiment of a WSR apparatus according to the present invention. By way of example, WSR apparatus **300** is built upon and hence shares a number of the elements used in the embodiment of FIG. **2**B, as identified by those labeled with identical numerals. In this case, the one-dimensional fiber collimator array **110** of FIG. **2**B is replaced by a two-dimensional array **350** of fiber collimators, providing for an input-port and a plurality of output ports. Accordingly, the one-dimensional collimator-alignment mirror array **220** of FIG. **2**B is replaced by a two-dimensional array **320** of collimator-alignment mirrors, and first and second one-dimensional arrays **260**, **270** of imaging lenses of FIG. **2**B are likewise replaced by first and second two-dimensional arrays **360**, **370** of imagining lenses respectively. As in the case of the embodiment of FIG. **2**B, the first and second two-dimensional arrays **360**, **370** of imaging lenses are placed in a 4-f telecentric arrangement with respect to the two-dimensional collimator-alignment mirror array **320** and the two-dimensional fiber collimator array **350**. The channel micromirrors **103** must be pivotable biaxially in this case (in order to direct its corresponding spectral channel to any one of the output ports). As such, the WSR apparatus **300** is equipped to support a greater number of the output ports.

In addition to facilitating the coupling of the spectral channels into the respective output ports as described above, the collimator-alignment mirrors in the above embodiments also serve to compensate for misalignment (e.g., due to fabrication and assembly errors) in the fiber collimators that provide for the input and output ports. For instance, relative misalignment between the fiber cores and their respective collimating lenses in the fiber collimators can lead to pointing errors in the collimated beams, which may be corrected for by the collimator-alignment mirrors. For these reasons, the collimator-alignment mirrors are preferably rotatable about two axes. They may be silicon micromachined mirrors, for fast rotational speeds. They may also be other types of mirrors or beam-deflecting elements known in the art.

To optimize the coupling of the spectral channels into the output ports and further maintain the optimal optical alignment against environmental effects such as temperature variations and mechanical instabilities over the course of

operation, a WSR apparatus of the present invention may incorporate a servo-control assembly, for providing dynamic control of the coupling of the spectral channels into the respective output ports on a channel-by-channel basis. A WSR apparatus incorporating a servo-control assembly is termed a WSR-S apparatus, thereinafter in this specification.

FIG. **4**A depicts a schematic illustration of a first embodiment of a WSR-S apparatus according to the present invention. The WSR-S apparatus **400** comprises a WSR apparatus **410** and a servo-control assembly **440**. The WSR **410** may be in the embodiment of FIG. **1**A, or any other embodiment in accordance with the present invention. The servo-control assembly **440** includes a spectral monitor **460**, for monitoring the power levels of the spectral channels coupled into the output ports **420-1** through **420**-N of the WSR apparatus **410**. By way of example, the spectral monitor **460** is coupled to the output ports **420-1** through **420**-N by way of fiber-optic couplers **420-1**-C through **420**-N-C, wherein each fiber-optic coupler serves to tap off a predetermined fraction of the optical signal in the corresponding output port. The servo-control assembly **440** further includes a processing unit **470**, in communication with the spectral monitor **460** and the channel micromirrors **430** of the WSR apparatus **410**. The processing unit **470** uses the power measurements from the spectral monitor **460** to provide feedback control of the channel micromirrors **430** on an individual basis, so as to maintain a desired coupling efficiency for each spectral channel into a selected output port. As such, the servo-control assembly **440** provides dynamic control of the coupling of the spectral channels into the respective output ports on a channel-by-channel basis and thereby manages the power levels of the spectral channels coupled into the output ports. The power levels of the spectral channels in the output ports may be dynamically managed according to demand, or maintained at desired values (e.g., equalized at a predetermined value) in the present invention. Such a spectral power-management capability is essential in WDM optical networking applications, as discussed above.

FIG. **4**B depicts a schematic illustration of a second embodiment of a WSR-S apparatus according to the present invention. The WSR-S apparatus **450** comprises a WSR apparatus **480** and a servo-control assembly **490**. In addition to the channel micromirrors **430** (and other elements identified by the same numerals as those used in FIG. **4**A), the WSR apparatus **480** further includes a plurality of collimator-alignment mirrors **485**, and may be configured according to the embodiment of FIGS. **2**A, **2**B, **3**, or any other embodiment in accordance with the present invention. By way of example, the servo-control assembly **490** includes the spectral monitor **460** as described in the embodiment of FIG. **4**A, and a processing unit **495**. In this case, the processing unit **495** is in communication with the channel micromirrors **430** and the collimator-alignment mirrors **485** of the WSR apparatus **480**, as well as the spectral monitor **460**. The processing unit **495** uses the power measurements from the spectral monitor **460** to provide dynamic control of the channel micromirrors **430** along with the collimator-alignment mirrors **485**, so to maintain the coupling efficiencies of the spectral channels into the output ports at desired values.

In the embodiment of FIG. **4**A or **4**B, the spectral monitor **460** may be one of spectral power monitoring devices known in the art that is capable of detecting the power levels of spectral components in a multi-wavelength optical signal. Such devices are typically in the form of a wavelength-separating means (e.g., a diffraction grating) that spatially separates a multi-wavelength optical signal by wavelength into constituent spectral components, and one or more optical sensors (e.g., an array of photodiodes) that are configured such to detect the power levels of these spectral components. The processing unit **470** in FIG. **4**A (or the processing unit **495** in FIG. **4**B) typically includes electrical circuits and signal processing programs for processing the power measurements received from the spectral monitor **460** and generating appropriate control signals to be applied to the channel micromirrors **430** (and the collimator-alignment mirrors **485** in the case of FIG. **4**B), so to maintain the coupling efficiencies of the spectral channels into the output ports at desired values. The electronic circuitry and the associated signal processing algorithm/software for such processing unit in a servo-control system are known in the art. A skilled artisan will know how to implement a suitable spectral monitor along with an appropriate processing unit to provide a servo-control assembly in a WSP-S apparatus according to the present invention, for a given application.

The incorporation of a servo-control assembly provides additional advantages of effectively relaxing the requisite fabrication tolerances and the precision of optical alignment during initial assembly of a WSR apparatus of the present invention, and further enabling the system to correct for shift in the alignment over the course of operation. By maintaining an optimal optical alignment, the optical losses incurred by the spectral channels are also significantly reduced. As such, the WSR-S apparatus thus constructed is simpler and more adaptable in structure, more robust in performance, and lower in cost and optical loss. Accordingly, the WSR-S (or WSR) apparatus of the present invention may be used to construct a variety of optical devices and utilized in many applications.

For instance, by directing the spectral channels into the output ports in a one-channel-per-port fashion and coupling the output ports of a WSR-S (or WSR) apparatus to an array of optical sensors (e.g., photodiodes), or a single optical sensor that is capable of scanning across the output ports, a dynamic and versatile spectral power monitor (or channel analyzer) is provided, which would be highly desired in WDM optical networking applications. Moreover, a novel class of optical add-drop multiplexers (OADMs) may be built upon the WSR-S (or WSR) apparatus of the present invention, as exemplified in the following embodiments.

FIG. **5** depicts an exemplary embodiment of an optical add-drop multiplexer (OADM) according to the present invention. By way of example, OADM **500** comprises a WSR-S (or WSR) apparatus **510** and an optical combiner **550**. An input port **520** of the WSR-S apparatus **510** transmits a multi-wavelength optical signal. The constituent spectral channels are subsequently separated and routed into a plurality of output ports, including a pass-through port **530** and one or more drop ports **540-1** through **540**-N ($N \geq 1$). The pass-through port **530** may receive any number of the spectral channels (i.e., the pass-through spectral channels). Each drop port may also receive any number of the spectral channels (i.e., the drop spectral channels). The pass-through port **530** is optically coupled to the optical combiner **550**, which serves to combine the pass-through spectral channels with one or more add spectral channels provided by one or more add ports **560-1** through **560**-M ($M \geq 1$). The combined optical signal is then routed into an existing port **570**, providing an output multi-wavelength optical signal.

In the above embodiment, the optical combiner **550** may be a K×1 ($K \geq 2$) broadband fiber-optic coupler, wherein there are K input-ends and one output-end. The pass-through spectral channels and the add spectral channels are fed into the K input-ends (e.g., in a one-to-one correspondence) and

the combined optical signal exits from the output-end of the K×1 fiber-optic coupler as the output multi-wavelength optical signal of the system. Such a multiple-input coupler also serves the purpose of multiplexing a multiplicity of add spectral channels to be coupled into the OADM **500**. If the power levels of the spectral channels in the output multi-wavelength optical signal are desired to be actively managed, such as being equalized at a predetermined value, two spectral monitors may be utilized. As a way of example, the first spectral monitor may receive optical signals tapped off from the pass-through port **530** and the drop ports **540-1** through **540**-N (e.g., by way of fiber-optic couplers as depicted in FIG. **4**A or **4**B). The second spectral monitor receives optical signals tapped off from the exiting port **570**. A servo-control system may be constructed accordingly for monitoring and controlling the pass-through, drop and add spectral channels. As such, the embodiment of FIG. **5** provides a versatile optical add-drop multiplexer in a simple and low-cost assembly, while providing multiple physically separate drop/add ports in a dynamically reconfigurable fashion.

FIG. **6** depicts an alternative embodiment of an optical add-drop multiplexer (OADM) according to the present invention. By way of example, OADM **600** comprises a first WSR-S apparatus **610** optically coupled to a second WSR-S apparatus **650**. Each WSR-S apparatus may be in the embodiment of FIG. **4**A or **4**B. (A WSR apparatus of the embodiment of FIG. **1**A, **2**A, **2**B, or **3** may be alternatively implemented.) The first WSR-S apparatus **610** includes an input port **620**, a pass-through port **630**, and one or more drop ports **640-1** through **640**-N (N≧1). The pass-through spectral channels from the pass-through port **630** are further coupled to the second WSR-S apparatus **650**, along with one or more add spectral channels emerging from add ports **660-1** through **660**-M (M≧1). In this exemplary case, the pass-through port **630** and the add ports **660-1** through **660**-M constitute the input ports for the second WSR-S apparatus **650**. By way of its constituent wavelength-separator (e.g., a diffraction grating) and channel micromirrors (not shown in FIG. **6**), the second WSR-S apparatus **650** serves to multiplex the pass-through spectral channels and the add spectral channels, and route the multiplexed optical signal into an exiting port **770** to provide an output signal of the system.

In the embodiment of FIG. **6**, one WSR-S apparatus (e.g., the first WSR-S apparatus **610**) effectively performs dynamic drop function, whereas the other WSR-S apparatus (e.g., the second WSR-S apparatus **650**) carries out dynamic add function. And there are essentially no fundamental restrictions on the wavelengths that can be added or dropped (other than those imposed by the overall communication system). Moreover, the underlying OADM architecture thus presented is intrinsically scalable and can be readily extended to any number of cascaded WSR-S (or WSR) systems, if so desired for performing intricate add and drop functions. Additionally, the OADM of FIG. **6** may be operated in reverse direction, by using the input ports as the output ports, the drop ports as the add ports, and vice versa.

Those skilled in the art will recognize that the aforementioned embodiments provide only two of many embodiments of a dynamically reconfigurable OADM according to the present invention. Those skilled in the art will also appreciate that various changes, substitutions, and alternations can be made herein without departing from the principles and the scope of the invention as defined in the appended claims. Accordingly, a skilled artisan can design an OADM in accordance with the principles of the present invention, to best suit a given application.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions, and alternations can be made herein without departing from the principles and the scope of the invention. Accordingly, the scope of the present invention should be determined by the following claims and their legal equivalents.

What is claimed is:

1. An optical add-drop apparatus comprising an input port for an input multi-wavelength optical signal having first spectral channels; one or more other ports for second spectral channels; an output port for an output multi-wavelength optical signal; a wavelength-selective device for spatially separating said spectral channels; and a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable to reflect its corresponding spectral channel to a selected one of said ports.

2. The optical add-drop apparatus of claim **1** further comprising a control unit for controlling each of said beam-deflecting elements.

3. The optical add-drop apparatus of claim **2**, wherein the control unit further comprises a servo-control assembly, including a spectral monitor for monitoring power levels of selected ones of said spectral channels, and a processing unit responsive to said power levels for controlling said beam-deflecting elements.

4. The optical add-drop apparatus of claim **3**, wherein said servo-control assembly maintains said power levels at predetermined values.

5. The optical add-drop apparatus of claim **2**, wherein the control unit controls said beam-deflecting elements to direct selected ones of said first spectral channels to one or more of said second ports to be dropped as second spectral channels from said output multi-wavelength optical signal.

6. The optical add-drop apparatus of claim **2**, wherein the control unit controls said beam-deflecting elements to direct selected ones of said second spectral channels to said output port to be added to said output multi-wavelength optical signal.

7. The optical add-drop apparatus of claim **1** further comprising alignment mirrors for adjusting alignment of said input and output multi-wavelength optical signals and said second spectral channels with said wavelength-selective device.

8. The optical add-drop apparatus of claim **7** further comprising collimators associated with said alignment mirrors, and imaging lenses in a telecentric arrangement with said alignment mirrors and said collimators.

9. The optical add-drop apparatus of claim **1**, wherein said wavelength selective device further combines selected ones of said spectral channels reflected from said beam-deflecting elements to form said output multi-wavelength optical signal.

10. The optical add-drop apparatus of claim **1**, wherein said one or more other ports comprise an add port and a drop port for respectively adding second and dropping first spectral channels.

11. The optical add-drop apparatus of claim **1** further comprising a beam-focuser for focusing said separated spectral channels onto said beam deflecting elements.

12. The optical add-drop apparatus of claim **1**, wherein said wavelength-selective device comprises a device selected from the group consisting of ruled diffraction gratings, holographic diffraction gratings, echelle gratings, curved diffraction gratings, and dispersing prisms.

13. The optical add-drop apparatus of claim 1, wherein said beam-deflecting elements comprise micromachined mirrors.

14. The optical add-drop apparatus of claim 1, wherein said beam-deflecting elements comprise reflective membranes.

15. An optical add-drop apparatus, comprising an input port for an input multi-wavelength optical signal having multiple spectral channels; an output port for an output multi-wavelength optical signal; one or more drop ports for selected spectral channels dropped from said multi-wavelength optical signal; a wavelength-selective device for spatially separating said multiple spectral channels; and a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable to reflect its corresponding spectral channel to a selected one of said ports, whereby a subset of said spectral channels is directed to said drop ports.

16. An optical add-drop apparatus, comprising an input port for an input multi-wavelength optical signal having multiple spectral channels; an output port for an output multi-wavelength optical signal; one or more add ports for selected spectral channels to be added to said output multi-wavelength optical signal; a wavelength-selective device for reflecting said multiple and said selected spectral channels; and a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable to reflect its corresponding spectral channel to a selected one of said ports, whereby said spectral channels from said add ports are selectively provided to said output port.

17. A method of performing dynamic add and drop in a WDM optical network, comprising separating an input multi-wavelength optical signal into spectral channels; imaging each of said spectral channels onto a corresponding beam-deflecting element; and controlling dynamically and continuously said beam-deflecting elements so as to combine selected ones of said spectral channels into an output multi-wavelength optical signal.

18. The method of claim 17, wherein said selected ones of said spectral channels comprises a subset of said spectral channels, such that other non-selected ones of said spectral channels are dropped from said output multi-wavelength optical signal.

19. The method of claim 18, wherein said controlling comprises reflecting said non-selected ones of said spectral channels to one or more drop ports.

20. The method of claim 17 further comprising imaging other spectral channels onto other corresponding beam-deflecting elements, and controlling dynamically and continuously said other beam-deflecting elements so as to combine said other spectral channels with said selected ones of said spectral channels into said output multi-wavelength optical signal.

21. The method of claim 17, wherein said imaging comprises focusing said spectral channels onto said beam-deflecting elements.

22. The method of claim 17 further comprising monitoring a power level in one or more of said selected ones of said spectral channels, and controlling an alignment between said input multi-wavelength optical signal and corresponding beam-deflecting elements in response to said monitoring.

* * * * *

PTO/SB/52 (05-08)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE	Docket Number (optional) C2393-1106RE1

I hereby declare that:

The residence, mailing address and citizenship of the inventors are stated below.

I am authorized to act on behalf of the following assignee: Capella Photonics, Inc.

and the title of my position with said assignee is: President and Chief Executive Officer

The entire title to the patent identified below is vested in said assignee.

Inventor: Tai Chen	Citizenship: US
Residence/Mailing Address: 3173 Linkfield Way; San Jose, CA 95135	
Inventor: Jeffrey P. Wilde	Citizenship: US
Residence/Mailing Address: 2310 Rockwood Ranch Road; Morgan Hill, CA 95037	

☑ Additional inventors are named on separately numbered sheets attached hereto.

Patent Number: 6,879,750	Date of Patent Issued: April 12, 2005

I believe said inventor(s) to be the original and first inventor(s) of the subject matter which is described and claimed in said patent, for which a reissue patent is sought on the invention entitled:

Reconfigurable Optical Add-Drop Multiplexers With Servo Control and Dynamic Spectral Power Management Ca

the specification of which

☑ is attached hereto.

☐ was filed on _____ as reissue application number _____ / _____

and was amended on herewith
(If applicable)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

☐ I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b). Attached is form PTO/SB/02B (or equivalent) listing the foreign applications.

I verily believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

☐ by reason of a defective specification or drawing.

☑ by reason of the patentee claiming more or less than he had the right to claim in the patent.

☐ by reason of other errors.

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REISSUE APPLICATION DECLARATION BY THE ASSIGNEE | Docket Number (Optional) C2393-1106

At least one error upon which reissue is based is described as follows:

Claims 1, 15, 16 and 17 may have claimed more than there was a right to claim in view of the cited prior art.

(Attach additional sheets, if needed.)

All errors corrected in this reissue application arose without any deceptive intention on the part of the applicant.

I hereby appoint

[✓] Practitioners associated with Customer Number: 48789

OR

[ ] Practitioner(s) named below:

Name	Registration Number

as my/our attorney(s) or agent(s) to prosecute the application identified above, and to transact all business in the United States Patent and Trademark Office connected therewith.

Correspondence Address: Direct all communications about the application to:

[✓] The address associated with Customer Number: 48789

OR

[ ] Firm or Individual Name

Address

City | State | Zip

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Telephone | Email

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this declaration is directed.

Signature | Date 06/11/10

Full name of person signing (given name, family name): Larry Schwerin

Address of Assignee: 5390 Hellyer Avenue
San Jose, CA 95138

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REISSUE APPLICATION: CONSENT OF ASSIGNEE; STATEMENT OF NON-ASSIGNMENT	Docket Number (Optional) C2393-1106RE1

This is part of the application for a reissue patent based on the original patent identified below.

Name of Patentee(s)
Tai Chen, et. al

Patent Number	Date Patent Issued
6,879.750	April 12, 2005

Title of Invention
Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Cap

1. ☑ Filed herein is a statement under 37 CFR 3.73(b). (Form PTO/SB/96)

2. ☐ Ownership of the patent is in the inventor(s), and no assignment of the patent is in effect.

One of boxes 1 or 2 above must be checked. If multiple assignees, complete this form for each assignee. If box 2 is checked, skip the next entry and go directly to "Name of Assignee".

The written consent of all assignees and inventors owning an undivided interest in the original patent is included in this application for reissue.

The assignee(s) owning an undivided interest in said original patent is/are Capella Photonics, Inc. and the assignee(s) consents to the accompanying application for reissue.

Name of assignee/inventor (if not assigned)

Signature	Date
Larry Schwerin	06/11/10

Typed or printed name and title of person signing for assignee (if assigned)

Larry Schwerin, President and Chief Executive Officer of Assignee, Capella Photonics, Inc.

PTO/SB/96 (07-09)
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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Capella Photonics, Inc.

Application No./Patent No.: 6,879,750 Filed/Issue Date: April 12, 2005

Titled: Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

Capella Photonics, Inc. , a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel , Frame , or for which a copy therefore is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Tai Chen & Jeffrey P. Wilde To: Assignee, Capella Photonics, Inc.

The document was recorded in the United States Patent and Trademark Office at Reel 014850, Frame 0562, or for which a copy thereof is attached.

2. From: Joseph E. Davis To: Assignee, Capella Photonics, Inc.

The document was recorded in the United States Patent and Trademark Office at Reel 016233, Frame 0550 or for which a copy thereof is attached.

3. From: To:

The document was recorded in the United States Patent and Trademark Office at Reel , Frame , or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature Date: 06/11/10

Larry Schwerin — Printed or Typed Name

President and CEO — Title

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue of:

Patent No.: 6,879,750

Issued: April 12, 2005

Patentee: Tai Chen, et. al

Reissue Appln. No.: Group Art Unit:

Filed: herewith Examiner:

Title: Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities

PRELIMINARY AMENDMENT

and

STATEMENT OF STATUS AND SUPPORT FOR ALL CHANGES TO CLAIMS

Mail Stop REISSUE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

Please amend this application as follows:

Amendments to Claims

1. (Amended) An optical add-drop apparatus comprising

an input port for an input multi-wavelength optical signal having first spectral channels;

one or more other ports for second spectral channels; an output port for an output multi-wavelength optical signal;

a wavelength-selective device for spatially separating said spectral channels; ~~and~~

a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable in two dimensions to reflect its corresponding spectral channel to a selected one of said ports and to control the power of the spectral channel reflected to said selected port.

2. (Original) The optical add-drop apparatus of claim 1 further comprising a control unit for controlling each of said beam-deflecting elements.

3. (Original) The optical add-drop apparatus of claim 2, wherein the control unit further comprises a servo-control assembly, including a spectral monitor for monitoring power levels of selected ones of said spectral channels, and a processing unit responsive to said power levels for controlling said beam-deflecting elements.

4. (Original) The optical add-drop apparatus of claim 3, wherein said servo-control assembly maintains said power levels at predetermined values.

5. (Original) The optical add-drop apparatus of claim 2, wherein the control unit controls said beam-deflecting elements to direct selected ones of said first spectral channels to one or more of said second ports to be dropped as second spectral channels from said output multi-wavelength optical signal.

6. (Original) The optical add-drop apparatus of claim 2, wherein the control unit controls said beam-deflecting elements to direct selected ones of said second spectral channels to said output port to be added to said output multi-wavelength optical signal.

7. (Original) The optical add-drop apparatus of claim 1 further comprising alignment mirrors for adjusting alignment of said input and output multi-wavelength optical signals and said second spectral channels with said wavelength-selective device.

8. (Original) The optical add-drop apparatus of claim 7 further comprising collimators associated with said alignment mirrors, and imaging lenses in a telecentric arrangement with said alignment mirrors and said collimators.

9. (Original) The optical add-drop apparatus of claim 1, wherein said wavelength selective device further combines selected ones of said spectral channels reflected from said beam-deflecting elements to form said output multi-wavelength optical signal.

10. (Original) The optical add-drop apparatus of claim 1, wherein said one or more other ports comprise an add port and a drop port for respectively adding second and dropping first spectral channels.

11. (Original) The optical add-drop apparatus of claim 1 further comprising a beam-focuser for focusing said separated spectral channels onto said beam deflecting elements.

12. (Original) The optical add-drop apparatus of claim 1, wherein said wavelength-selective device comprises a device selected from the group consisting of ruled diffraction gratings, holographic diffraction gratings, echelle gratings, curved diffraction gratings, and dispersing prisms.

13. (Original) The optical add-drop apparatus of claim 1, wherein said beam-deflecting elements comprise micromachined mirrors.

14. (Original) The optical add-drop apparatus of claim 1, wherein said beam-deflecting elements comprise reflective membranes.

15. (Amended) An optical add-drop apparatus, comprising

an input port for an input multi-wavelength optical signal having multiple spectral channels;

an output port for an output multi-wavelength optical signal;

one or more drop ports for selected spectral channels dropped from said multi-wavelength optical signal;

a wavelength-selective device for spatially separating said multiple spectral channels; and

a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable in two dimensions to reflect its corresponding spectral channel to a selected one of said ports and to control the power of the spectral channel reflected to said selected port, whereby a subset of said spectral channels is directed to said drop ports.

16. (Amended) An optical add-drop apparatus, comprising

an input port for an input multi-wavelength optical signal having multiple spectral channels;

an output port for an output multi-wavelength optical signal;

one or more add ports for selected spectral channels to be added to said output multi-wavelength optical signal;

a wavelength-selective device for reflecting said multiple and said selected spectral channels; and

a spatial array of beam-deflecting elements positioned such that each element receives a corresponding one of said spectral channels, each of said elements being individually and continuously controllable in two dimensions to reflect its corresponding spectral channel to a selected one of said ports and to control the power of the spectral channel reflected to said selected port, whereby said spectral channels from said add ports are selectively provided to said output port.

17. (Amended) A method of performing dynamic add and drop in a WDM optical network, comprising

separating an input multi-wavelength optical signal into spectral channels;

imaging each of said spectral channels onto a corresponding beam-deflecting element; and

controlling dynamically and continuously said beam-deflecting elements in two dimensions so as to combine selected ones of said spectral channels into an output multi-wavelength optical signal and to control the power of the spectral channels combined into said output multi-wavelength optical signal.

18. (Original) The method of claim 17, wherein said selected ones of said spectral channels comprises a subset of said spectral channels, such that other non-selected ones of said spectral channels are dropped from said output multi-

wavelength optical signal.

19. (Original) The method of claim 18, wherein said controlling comprises reflecting said non-selected ones of said spectral channels to one or more drop ports.

20. (Original) The method of claim 17 further comprising imaging other spectral channels onto other corresponding beam-deflecting elements, and controlling dynamically and continuously said other beam-deflecting elements so as to combine said other spectral channels with said selected ones of said spectral channels into said output multi-wavelength optical signal.

21. (Original) The method of claim 17, wherein said imaging comprises focusing said spectral channels onto said beam-deflecting elements.

22. (Original) The method of claim 17 further comprising monitoring a power level in one or more of said selected ones of said spectral channels, and controlling an alignment between said input multi-wavelength optical signal and corresponding beam-deflecting elements in response to said monitoring.

Remarks

Independent apparatus Claims 1, 15 and 16 have been amended similarly to recite that the beam deflecting elements are individually and continuously controllable "in two dimensions to reflect its corresponding spectral channel to a selected one of said ports and to control the power of the spectral channel reflected to said selected port". (These amended Claims 1, 15 and 16 have also been written with sub-paragraphing to improve their readability.)

Independent method Claim 17 has been amended somewhat similarly to the apparatus claims to recite "controlling dynamically and continuously said beam-deflecting elements in two dimensions so as to combine selected ones of said spectral channels into an output multi-wavelength optical signal and to control the power of the spectral channels combined into said output multi-wavelength optical signal". (Claim 17 has also been written with sub-paragraphing to improve its readability.)

The basis for these amendments is in the specification at Col. 3, line 58 – Col. 4, line 22; Col. 6, line 65 – Col. 7, line 6; Col. 8, lines 20-36; Col. 9, lines 4-13 and Col. 10, lines 44-48.

The amendments correct errors and ensure that the amended claims distinguish over the prior art.

Date: June 11, 2010

Respectfully Submitted,

/Barry N. Young/

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PTO/SB/08a (01-10)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	Filed Herewith
Filing Date	Filed Herewith
First Named Inventor	Tai Chen et. al
Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	C2393-1106RE1

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7183633	B2	2007-02-27	Daneman et. al	all
	2	6989921	B2	2006-01-24	Bernstein et. al	all
	3	6810169	B2	2004-10-26	Bouevitch et. al	all
	4	6631222	B1	2003-10-07	Wagener et. al	all
	5	5600851	B2	2003-07-29	Aksyuk et. al	all
	6	6567574	B1	2003-05-20	Ma et. al	all
	7	6498872	B2	2002-12-24	Bouevitch et. al	all
	8	6256430	B1	2001-07-03	Jin et. al	all

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	Filed Herewith
	Filing Date	Filed Herewith
	First Named Inventor	Tai Chen et. al
	Art Unit	Unknown
	Examiner Name	Unknown
	Attorney Docket Number	C2393-1106RE1

	9	6028689		2000-01-24	Michalicek et. al	all
	10	5414540		1995-05-09	Patel et. al	all
	11	5629790	A	1997-05-01	Neukermans et. al	all
	12	5745271		1998-04-28	Ford et. al	all
	13	5835458	A	1998-11-01	Bischel et. al	all
	14	5960133	A	1999-09-01	Tomlinson	all
	15	5974207	A	1999-10-01	Aksyuk et. al	all
	16	6204946	B1	2001-03-01	Aksyuk et. al	all
	17	6205269	B1	2001-03-01	Morton	all
	18	6222954	B1	2001-04-01	Riza	all
	19	6253135	B1	2001-07-01	Wade	all

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	Filed Herewith
	Filing Date	Filed Herewith
	First Named Inventor	Tai Chen et. al
	Art Unit	Unknown
	Examiner Name	Unknown
	Attorney Docket Number	C2393-1106RE1

	20	6289155	B1	2001-09-01	Wade	all
	21	6307657	B1	2001-10-23	Ford	all
	22	6416250	B1	2002-07-01	Corbosiero et. al	all
	23	6625346		2003-09-23	Wilde et. al	
	24	6634810	B1	2003-10-21	Ford et. al	all
	25	6898348	B2	2005-05-24	Morozov et. al	all

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code1	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20020131691	A1	2002-09-01	Garrett et al.	all
	2	20030043471	A1	2003-03-01	Belser et. al	all

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FOREIGN PATENT DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	Filed Herewith
	Filing Date	Filed Herewith
	First Named Inventor	Tai Chen et. al
	Art Unit	Unknown
	Examiner Name	Unknown
	Attorney Docket Number	C2393-1106REI

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

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NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	Filed Herewith
	Filing Date	Filed Herewith
	First Named Inventor	Tai Chen et. al
	Art Unit	Unknown
	Examiner Name	Unknown
	Attorney Docket Number	C2393-1106RE1

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ Fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

XX None

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Barry N. Young/	Date (YYYY-MM-DD)	2010-06-14
Name/Print	Barry N. Young	Registration Number	27,744

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities
First Named Inventor/Applicant Name:	Tai Chen
Filer:	Barry N. Young
Attorney Docket Number:	C2393-1106RE1
Filed as Large Entity	

Reissue (Utility) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility Reissue Basic	1014	1	330	330
Design and utility Reissue Basic	1114	1	540	540
Design and utility Reissue Basic	1314	1	650	650
Pages:				
Claims:				
Reissue claims in excess of 20 for large	1205	2	52	104
Independent claims reissue large	1204	1	220	220
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		1844

Electronic Acknowledgement Receipt	
EFS ID:	7819473
Application Number:	12816084
International Application Number:	
Confirmation Number:	2616
Title of Invention:	Reconfigurable Optical Add-Drop Multiplexers with Servo Control and Dynamic Spectral Power Management Capabilities
First Named Inventor/Applicant Name:	Tai Chen
Customer Number:	48789
Filer:	Barry N. Young
Filer Authorized By:	
Attorney Docket Number:	C2393-1106RE1
Receipt Date:	15-JUN-2010
Filing Date:	
Time Stamp:	17:16:19
Application Type:	Reissue (Utility)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$1844
RAM confirmation Number	4021
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Transmittal Reissue Application	SB-50_Re_Trnsmtl.pdf	63609 67fa571957236 4c4cba9a3a6e7c2a97a2596 5214	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	SB-56_Fee_Trnsmtl.pdf	52750 33980b83f0130cc3e208868c7d277ebb0b4 6dde9	no	1
Warnings:					
Information:					
3		6879750.pdf	1260688 de8c15d7196db0c27c6d5a98a04946153c5 7d449	yes	21
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Abstract		1	1	
	Drawings-only black and white line drawings		2	13	
	Specification		14	19	
	Claims		20	21	
Warnings:					
Information:					
4	Reissue dec filed in accordance with MPEP 1414.	SB-52_Declr_PoA.pdf	406652 a880ad9b477bea082970a102d3813014 17ede4b3	no	2
Warnings:					
Information:					
5	Consent of Assignee accompanying the declaration.	SB-53_Consent_Asgnee.pdf	193808 c5a91d53ffb218326ee0ee3b2723499c9764 32a0	no	1
Warnings:					
Information:					
6	Assignee showing of ownership per 37 CFR 3.73(b).	SB-96_Stmt_373b.pdf	213777 42efc196a5e1536b4c3616050437f1a4dede 1c38	no	1
Warnings:					
Information:					
7		1106RE1_PA_Status_Support.pdf	35429 b3fbd7f42e039e34298168a2a50dc739388 e9e7c	yes	9

	Multipart Description/PDF files in .zip description				
	Document Description	Start	End		
	Preliminary Amendment	1	1		
	Claims	2	7		
	Applicant Arguments/Remarks Made in an Amendment	8	9		
Warnings:					
Information:					
8	Information Disclosure Statement (IDS) Filed (SB/08)	SB-08_IDS.pdf	827057 115319899b4668c6584ba8182efeacde08fa1f66	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
9	Fee Worksheet (PTO-875)	fee-info.pdf	37958 fbee7fb38d6da54cce491b7794501520386 2c555	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3091728		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 12/816,084	Filing Date 06/15/2010	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	06/15/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 22	Minus	** 22	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DEBORAH NASH/

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