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Chen et al.

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- (54) **RECONFIGURABLE OPTICAL ADD-DROP MULTIPLEXERS WITH SERVO CONTROL AND DYNAMIC SPECTRAL POWER MANAGEMENT CAPABILITIES**
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- (73) Assignee: **Capella Photonics, Inc.**, San Jose, CA (US)
- (21) Appl. No.: **12/816,084**
- (22) Filed: **Jun. 15, 2010**

Related U.S. Patent Documents

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- Issued: **Apr. 12, 2005**
- Appl. No.: **10/745,364**
- Filed: **Dec. 22, 2003**

U.S. Applications:

- (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.**
G02B 6/28 (2006.01)
H04J 14/02 (2006.01)
- (52) **U.S. Cl.** **385/24; 385/10; 385/33; 385/37; 398/83**
- (58) **Field of Classification Search** **385/24, 385/11, 10, 37, 34, 33; 398/79, 82, 83, 84, 398/88, 87**

See application file for complete search history.

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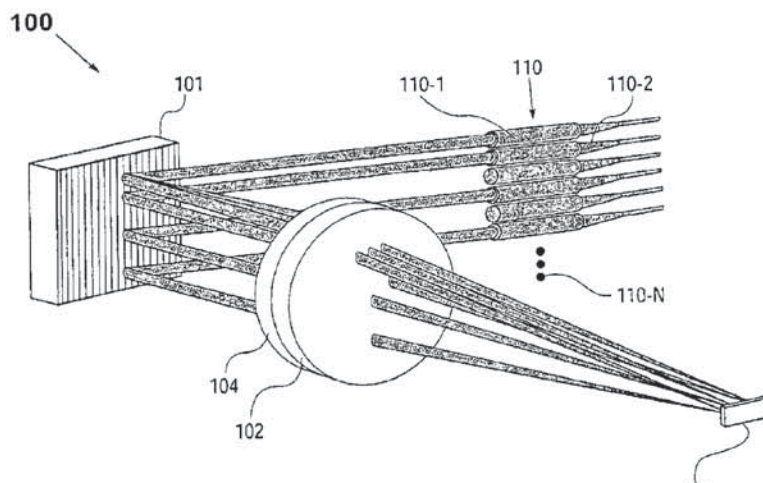
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(57) **ABSTRACT**

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



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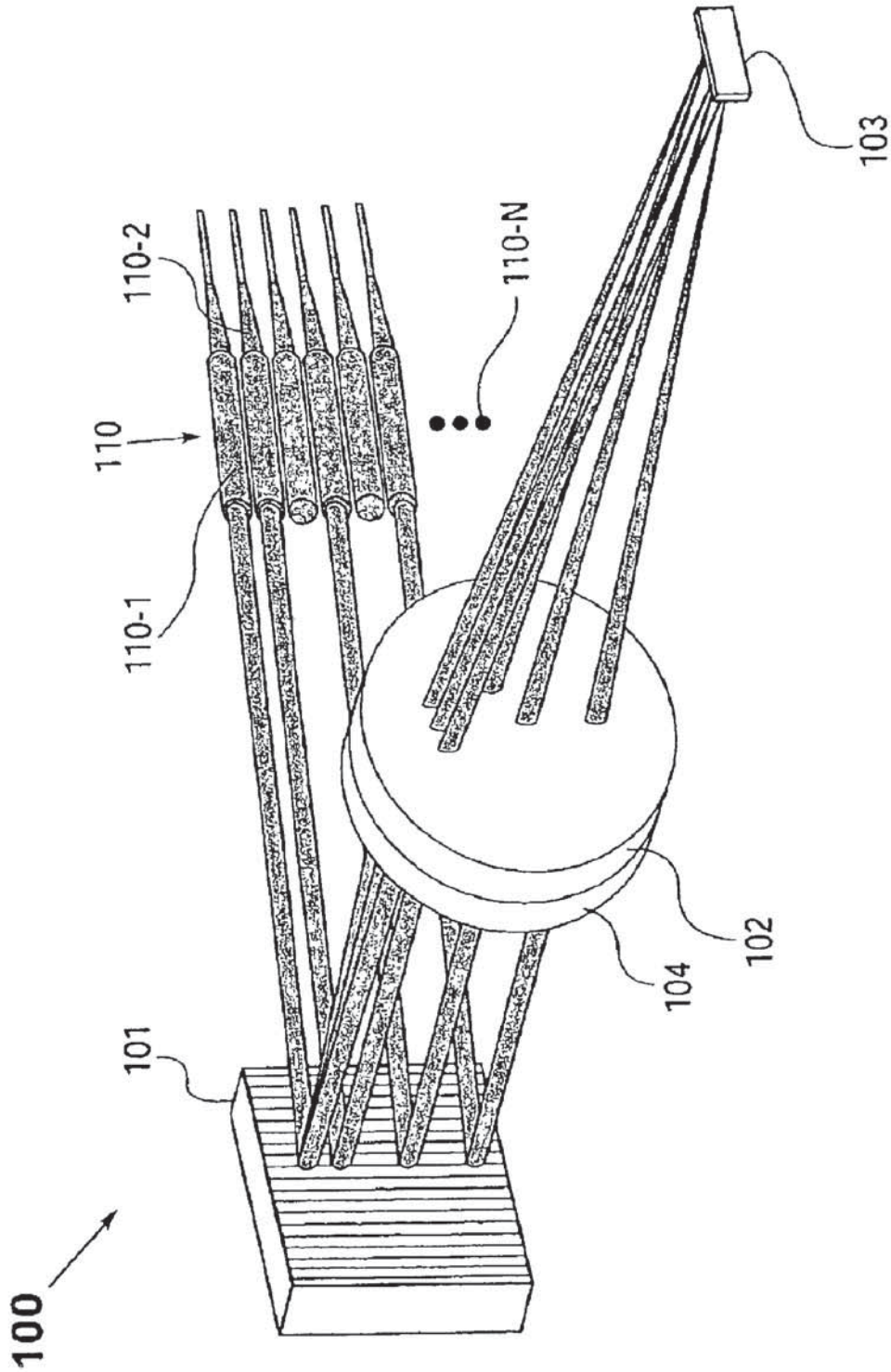


Fig. 1A

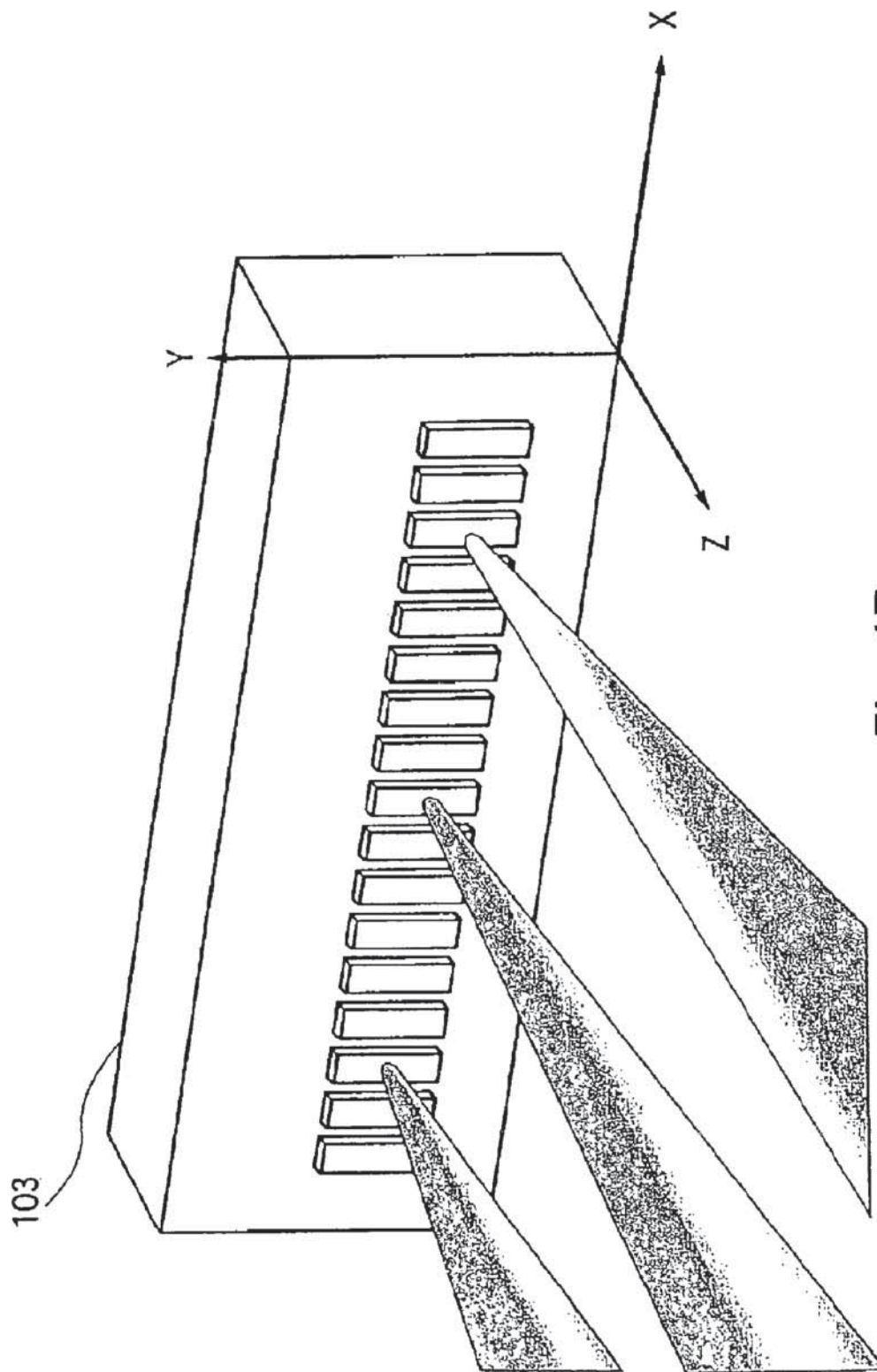


Fig. 1B

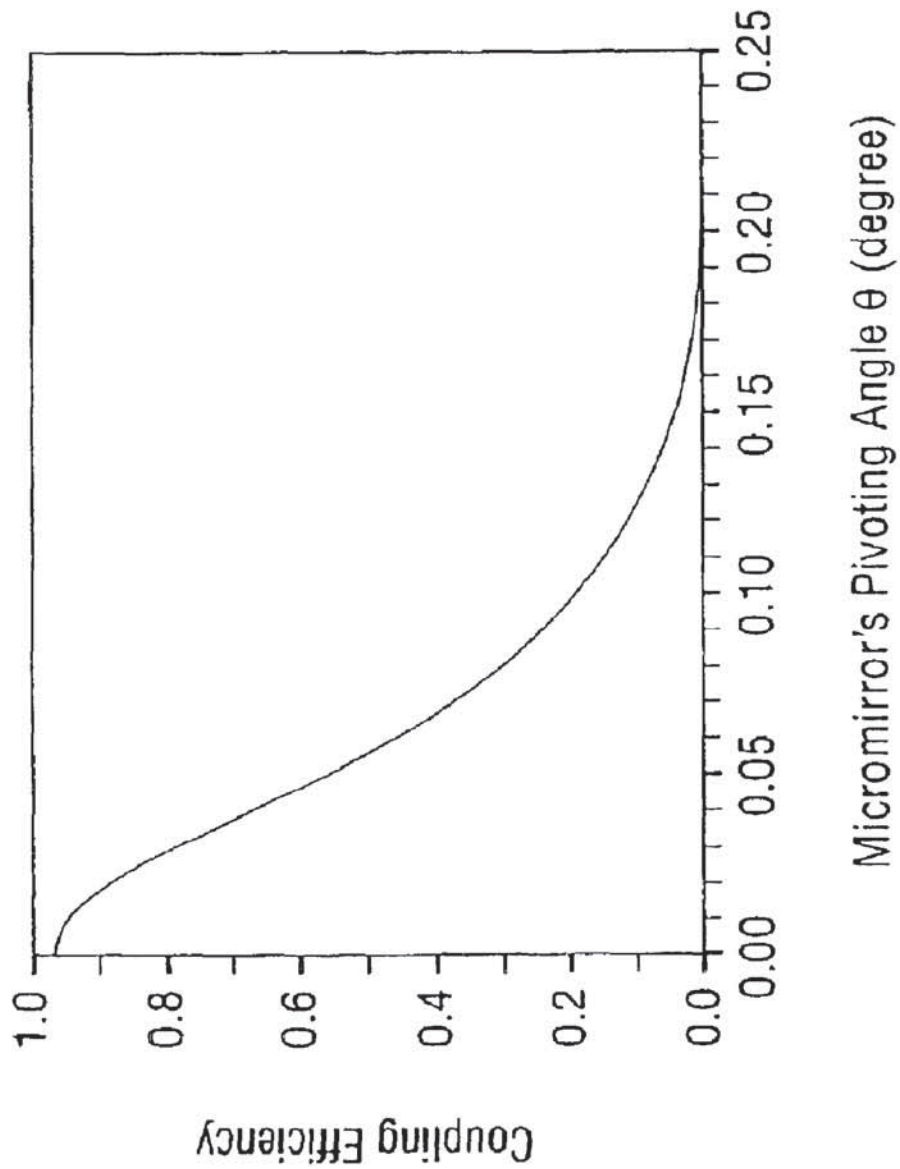


Fig. 1C

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