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Erdogan et al.

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(54) **METHOD OF MAKING HIGH PERFORMANCE OPTICAL EDGE AND NOTCH FILTERS AND RESULTING PRODUCTS**

(75) Inventors: **Turan Erdogan**, Spencerport, NY (US); **Joseph T. Foss**, Rochester, NY (US); **Ligang Wang**, Rochester, NY (US)

(73) Assignee: **Semrock, Inc.**, Rochester, NY (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.: **11/248,456**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 10/840,134, filed on May 6, 2004.

(60) Provisional application No. 60/637,697, filed on Dec. 21, 2004, provisional application No. 60/468,245, filed on May 6, 2003.

(51) **Int. Cl.**
G02B 5/28 (2006.01)
G02B 1/10 (2006.01)

(52) **U.S. Cl.** **359/589**; 359/588; 359/580; 359/587

(58) **Field of Classification Search** 359/589, 359/588, 580, 587
See application file for complete search history.

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Primary Examiner—Fayez G. Assaf
(74) *Attorney, Agent, or Firm*—Lowenstein Sandler PC

(57) **ABSTRACT**

High performance optical edge and notch filters and methods of making the same are disclosed. The multi-layer, thin-film optical edge filters have an edge steepness greater than about 0.8% as measured by dividing (a) the edge width from the 50% transmission wavelength to the optical density 6 ("OD6") wavelength by (b) the 50% transmission wavelength. The optical edge filters also have an average transmission above about 95%. The notch filters exhibit a blocking of OD>6, very high transmission (>90%) outside the notch(es), and a narrow notch bandwidth comparable to that of holographic notch filters. The methods for making such filters accurately determine when deposition of each layer of the filter should terminate.

53 Claims, 18 Drawing Sheets

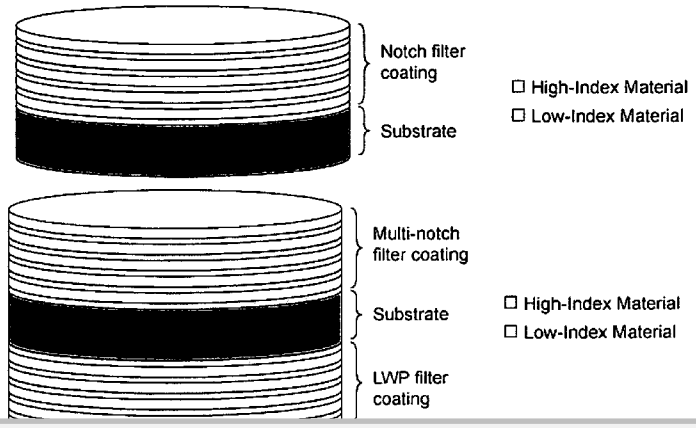

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Fig. 1A

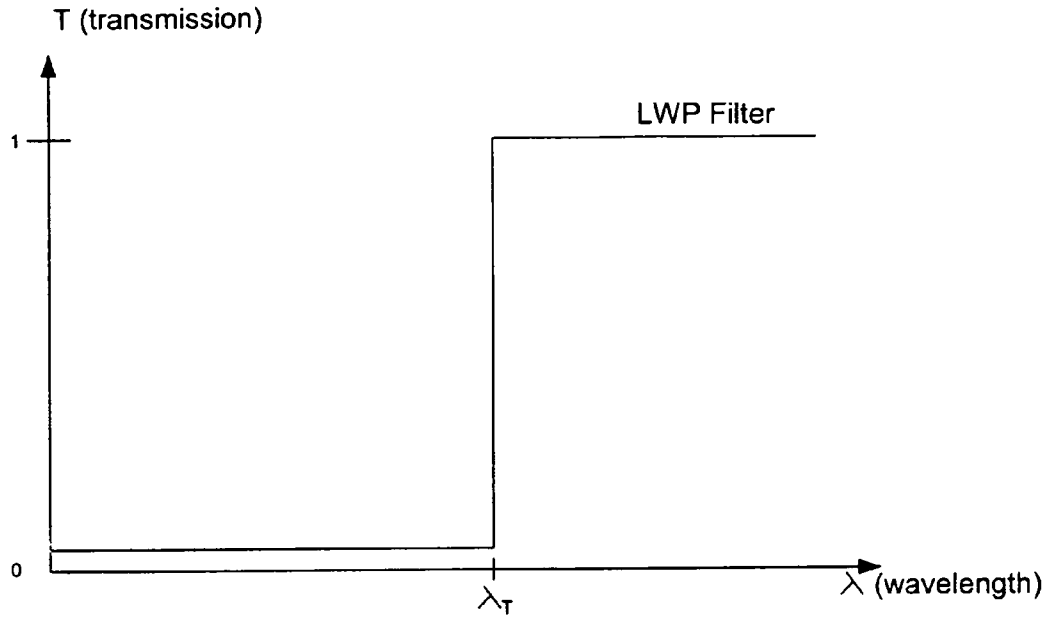


Fig. 1B

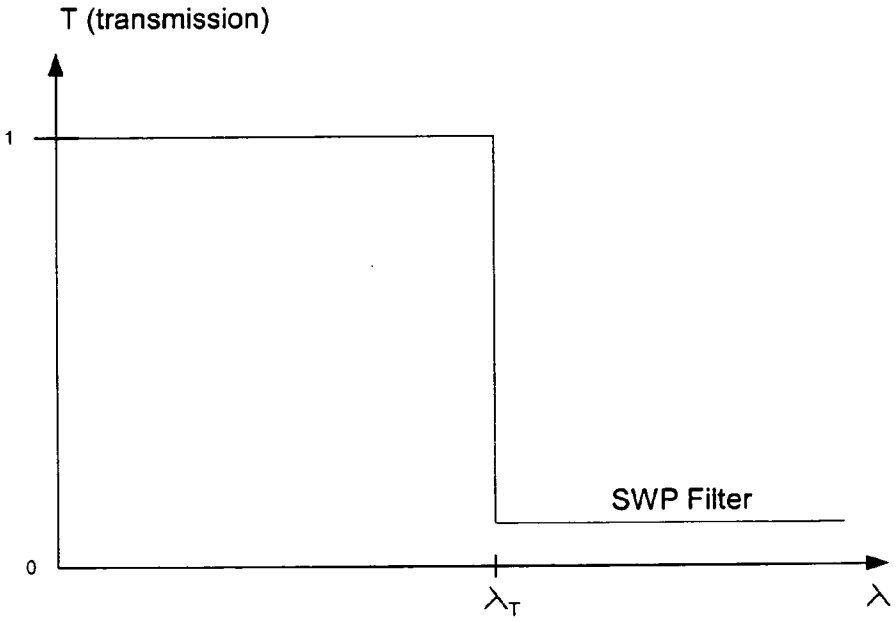


Fig. 1C

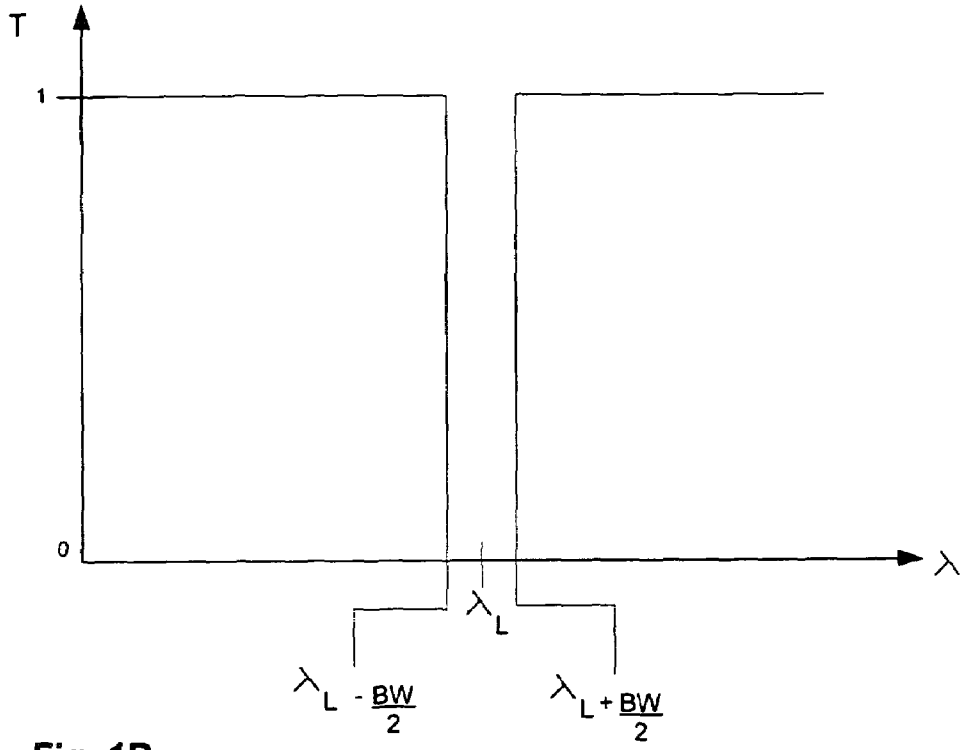


Fig. 1D

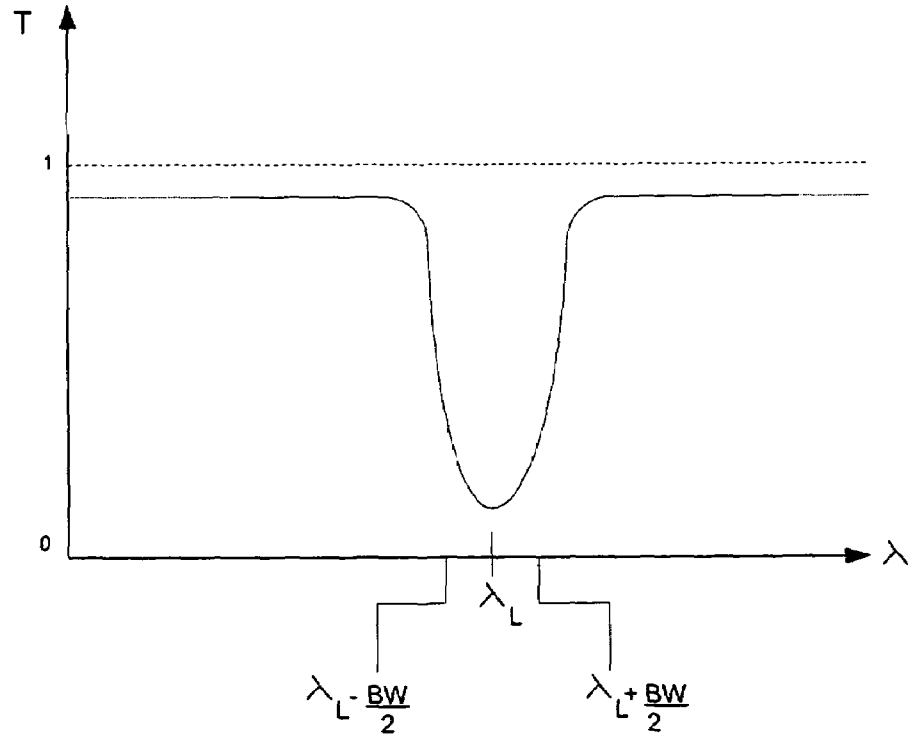


Fig. 2

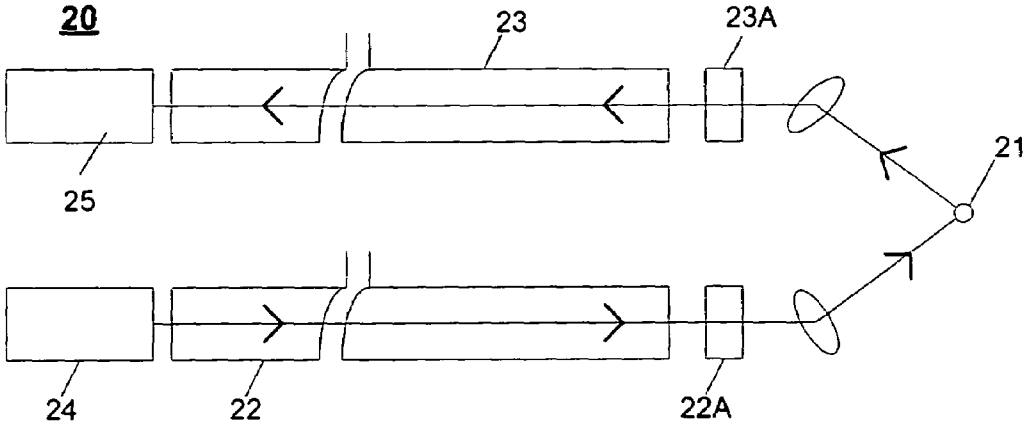
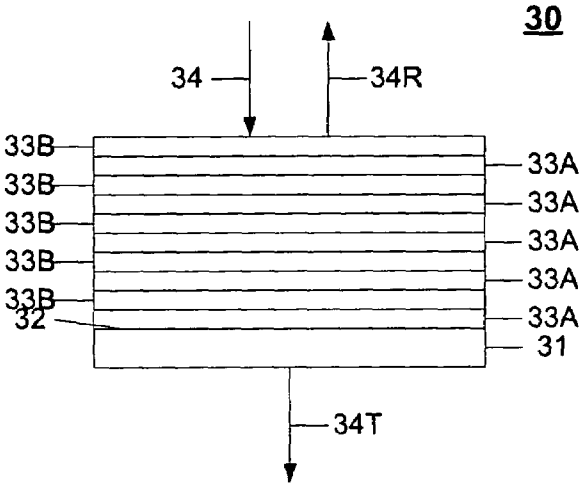


Fig. 3



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