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[54] **MULTI-CHANNEL FIBER OPTIC
ROTATABLE INTERCONNECTION SYSTEM**

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[56] **References Cited**

U.S. PATENT DOCUMENTS

4,050,782 9/1977 Uchida et al. 385/28

4,529,986 7/1985 d'Auria et al. 385/25

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[57] **ABSTRACT**

A multi-channel fiber optic rotatable interconnection system for coupling optical signals from a plurality of

diverse optical signal sources at a source location to a like plurality of optical signal receivers at a destination location rotatable relative to each other. The interconnection system comprises an input fiber and an output fiber both of which are comprised of step-index multi-mode optical fibers. The input fiber includes an input end which receives optical signals from the optical signal sources, the fiber forming a composite optical signal therefrom. The optical signal sources are positioned at diverse polar angles relative to the input end of the input fiber to provide a plurality of optical transmission modes having minimal crosstalk, so that the composite optical signal can be resolved into its component optical signals at the destination. A rotatable coupler is positioned co-axially between the input fiber and the output fiber thereby no allow the input fiber and the output fiber to rotate axially relative to each other. The rotatable coupler couples the composite optical signal from the input fiber to the output fiber. A signal detection arrangement positioned axially at the output end of the output fiber receives optical signals therefrom and separates it into its component optical signals for coupling to the receivers.

9 Claims, 2 Drawing Sheets

