



US006256430B1

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

(10) **Patent No.:** **US 6,256,430 B1**  
(45) **Date of Patent:** **Jul. 3, 2001**

(54) **OPTICAL CROSSCONNECT SYSTEM  
COMPRISING RECONFIGURABLE LIGHT-  
REFLECTING DEVICES**

(75) Inventors: **Sungho Jin**, Millington; **Neal Henry  
Thorsten**, Lebanon, both of NJ (US)

(73) Assignee: **Agere Systems Inc.**, Miami Lakes, FL  
(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.

(21) Appl. No.: **09/197,800**

(22) Filed: **Nov. 23, 1998**

(51) Int. Cl.<sup>7</sup> ..... **G02B 6/26**

(52) U.S. Cl. .... **385/18; 385/17; 385/37**

(58) Field of Search ..... 385/16, 17, 18,  
385/20, 21, 22, 23, 37

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,042,889	*	8/1991	Benzoni	.....	385/16
5,581,643	*	12/1996	Wu	.....	385/18
5,974,207	*	10/1999	Aksyuk et al.	.....	385/24
5,999,546	*	12/1999	Espindola et al.	.....	385/37
5,999,671	*	12/1999	Jin et al.	.....	385/37

\* cited by examiner

*Primary Examiner*—Frank G. Font

*Assistant Examiner*—Sang H. Nguyen

(74) *Attorney, Agent, or Firm*—Lowenstein Sandler PC

(57) **ABSTRACT**

In accordance with the invention, an optical switching device comprises a light-reflecting mirror containing a magnetic component coupled to a substrate. One or more programmable magnets are provided for moving the mirror by interacting with the magnetic component. The programmable magnets move the mirrors between or among selected positions and then maintain the mirror position without continuous power. Exemplary cross connects and 2x2 switches are described.

**9 Claims, 6 Drawing Sheets**

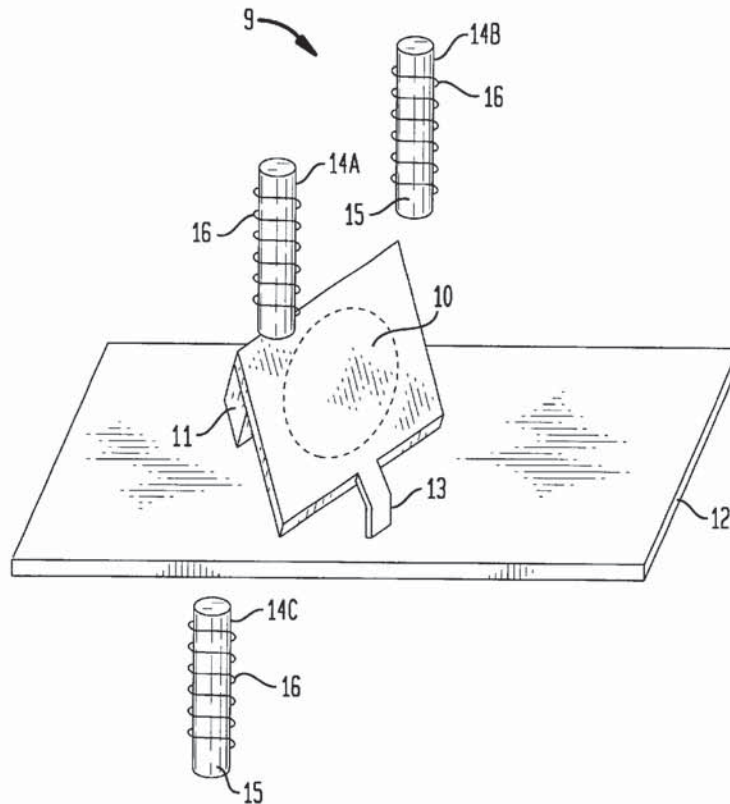


FIG. 1

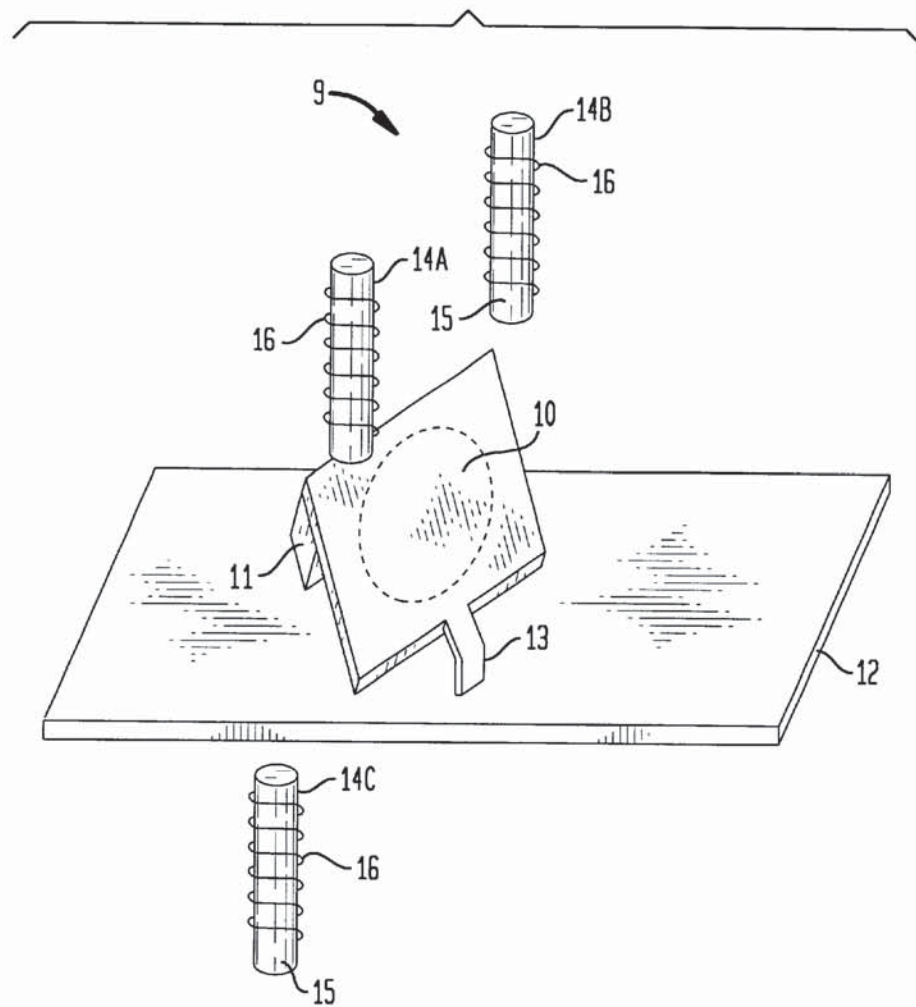


FIG. 2C

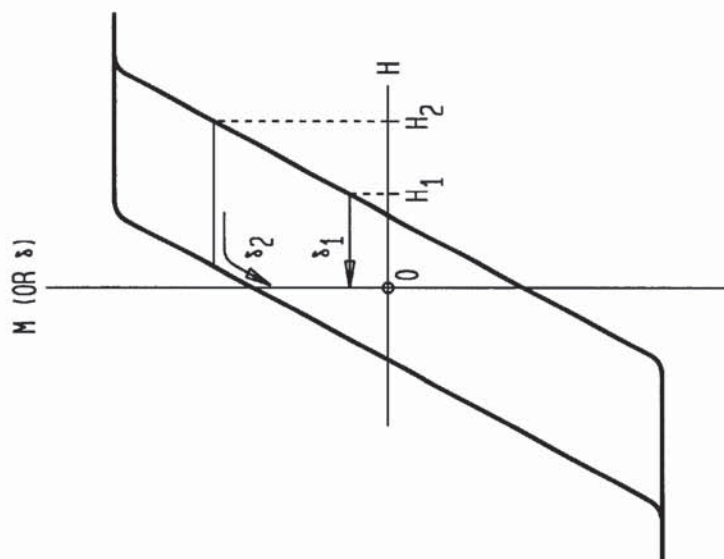


FIG. 2B

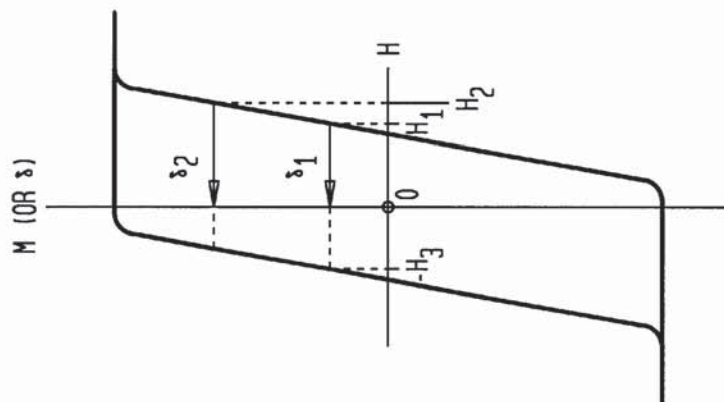


FIG. 2A

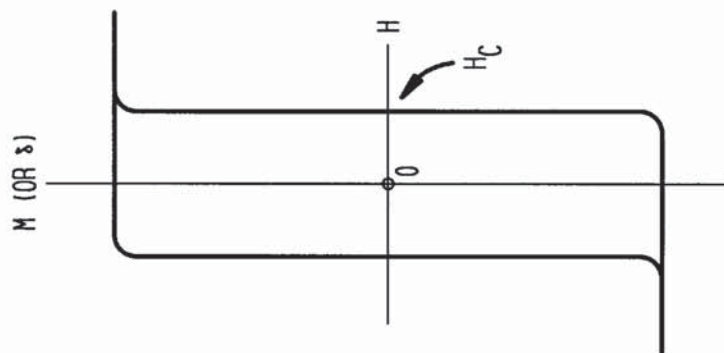


FIG. 3

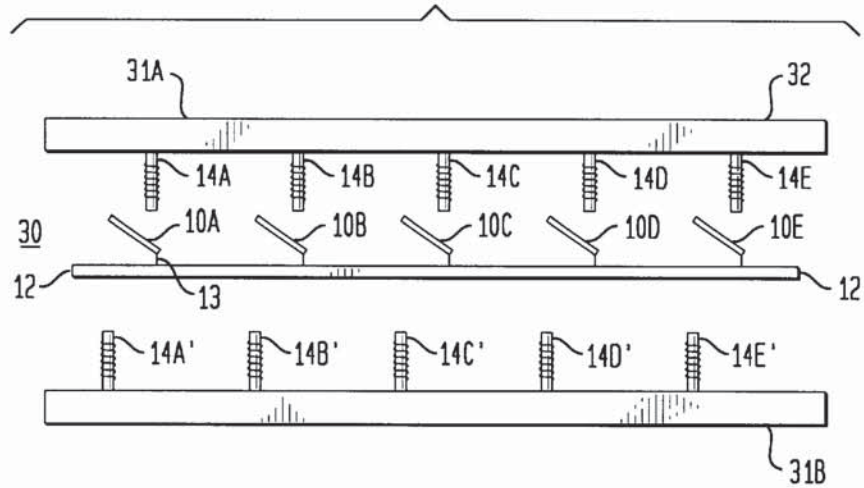


FIG. 4A

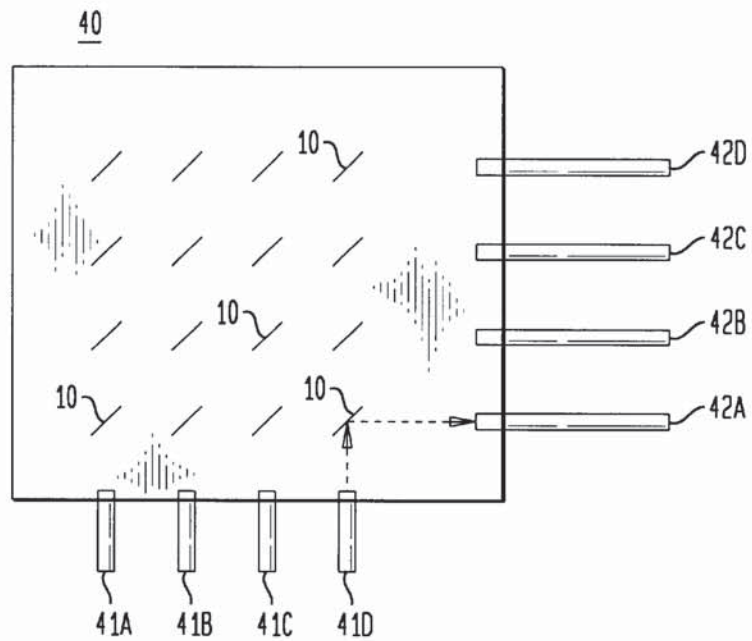


FIG. 4B

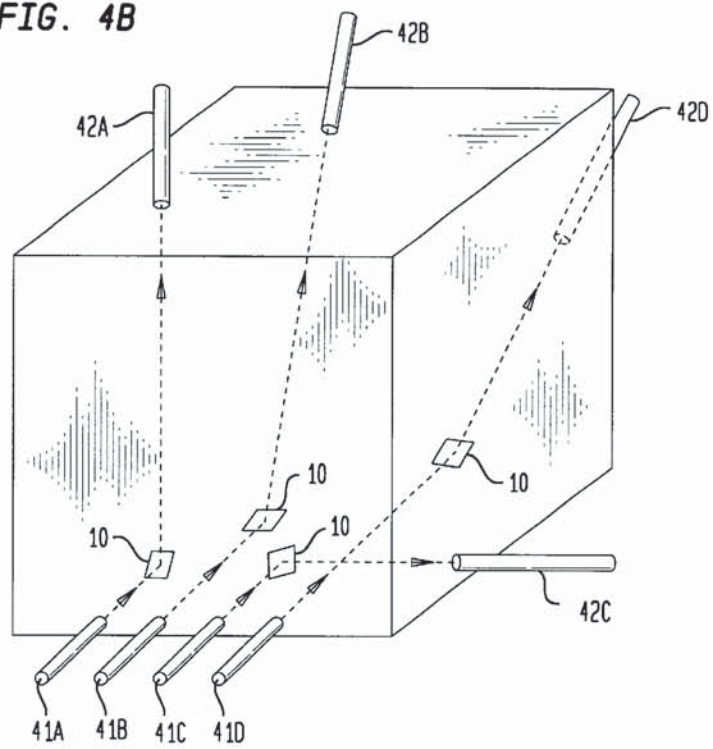
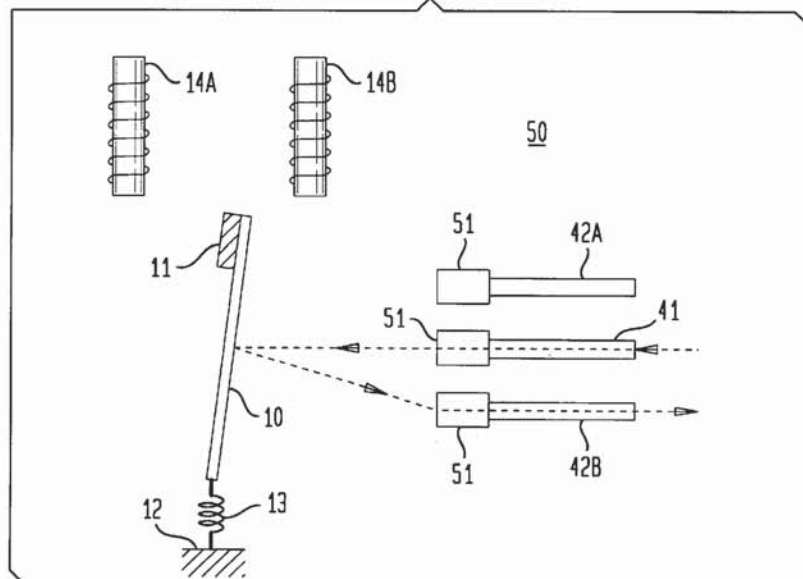


FIG. 5



# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.