United States Patent [19]

Ruiz

[11] **Patent Number:** 5,617,274

[45] **Date of Patent:** Apr. 1, 1997

[54] **LOW PROFILE INTEGRAL FLEXURE FOR CLOSELY PACKED DISKS IN A DISK DRIVE ASSEMBLY**

[75] Inventor: **Oscar J. Ruiz**, San Jose, Calif.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.

[21] Appl. No.: **585,983**

[22] Filed: **Jan. 12, 1996**

[51] **Int. Cl.⁶** G11B 5/60
[52] **U.S. Cl.** 360/104
[58] **Field of Search** 360/97.01, 98.01, 360/104–106

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,761,699	8/1988	Ainslie et al.	360/103
4,797,763	1/1989	Levy et al.	360/104
4,996,623	2/1991	Erpelding et al.	360/104
5,115,363	5/1992	Khan et al.	360/104
5,138,507	8/1992	Zarouri et al.	360/104
5,187,625	2/1993	Blaeser et al.	360/104
5,198,945	3/1993	Blaeser et al.	360/104
5,225,950	7/1993	Crane	360/104
5,282,102	1/1994	Christianson	360/104
5,282,103	1/1994	Hatch et al.	360/104
5,331,489	7/1994	Johnson et al.	360/104
5,333,085	7/1994	Prentice et al.	360/104
5,377,064	12/1994	Yaginuma et al.	360/104
5,381,288	1/1995	Karam, II	360/104
5,428,489	6/1995	Takamure et al.	360/104
5,428,490	6/1995	Hagen	360/104
5,452,158	9/1995	Harrison et al.	360/104
5,491,597	2/1996	Bennin et al.	360/104
5,504,640	4/1996	Hagen	360/104
5,530,605	6/1996	Hamaguchi et al.	360/104
5,530,606	6/1996	Baasch et al.	360/104

FOREIGN PATENT DOCUMENTS

0487914A2	6/1992	European Pat. Off. .	
59-207065	11/1984	Japan .	
5-36035	2/1993	Japan	360/104
5-314630	11/1993	Japan	360/104
WO94/12974	6/1994	WIPO .	
WO94/16438	7/1994	WIPO .	
WO94/24664	10/1994	WIPO .	

OTHER PUBLICATIONS

"Type 1650 Product Summary", Hutchinson Technology Inc., Sep. 1992, pp. 1–9.

Primary Examiner—Robert S. Tupper
Assistant Examiner—Jefferson Evans
*Attorney, Agent, or Firm*—Baker, Maxham, Jester & Meador

[57] **ABSTRACT**

A load beam having an integral flexure for coupling a transducer head in a disk drive assembly. The integral flexure includes a pair of bending bars connected to the main body of the load beam, a floating pad connected to the bending bars, and a dimple formed on the floating pad. A torsion bar connects the floating pad with a bonding pad. The transducer head is adhesively coupled to the bonding pad, and rests upon the dimple. In operation, the dimple provides preload and allows gimbaling along the pitch and roll axis, but yaw movement is substantially prevented by the geometry of the load beam design. The integral flexure has a low profile and will fit within a very small space between closely-spaced disks in a stacked multiple disk drive system.

22 Claims, 8 Drawing Sheets

FIG. 1

FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

Compressive Contact Stress at Dimple Interface
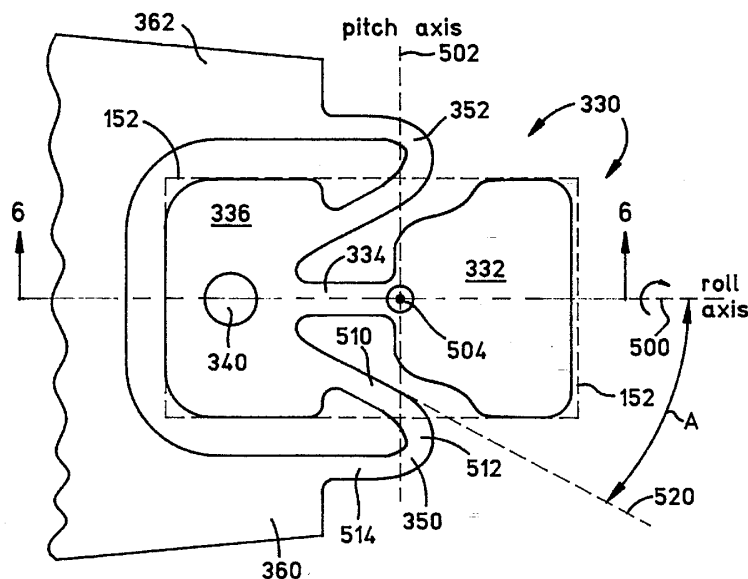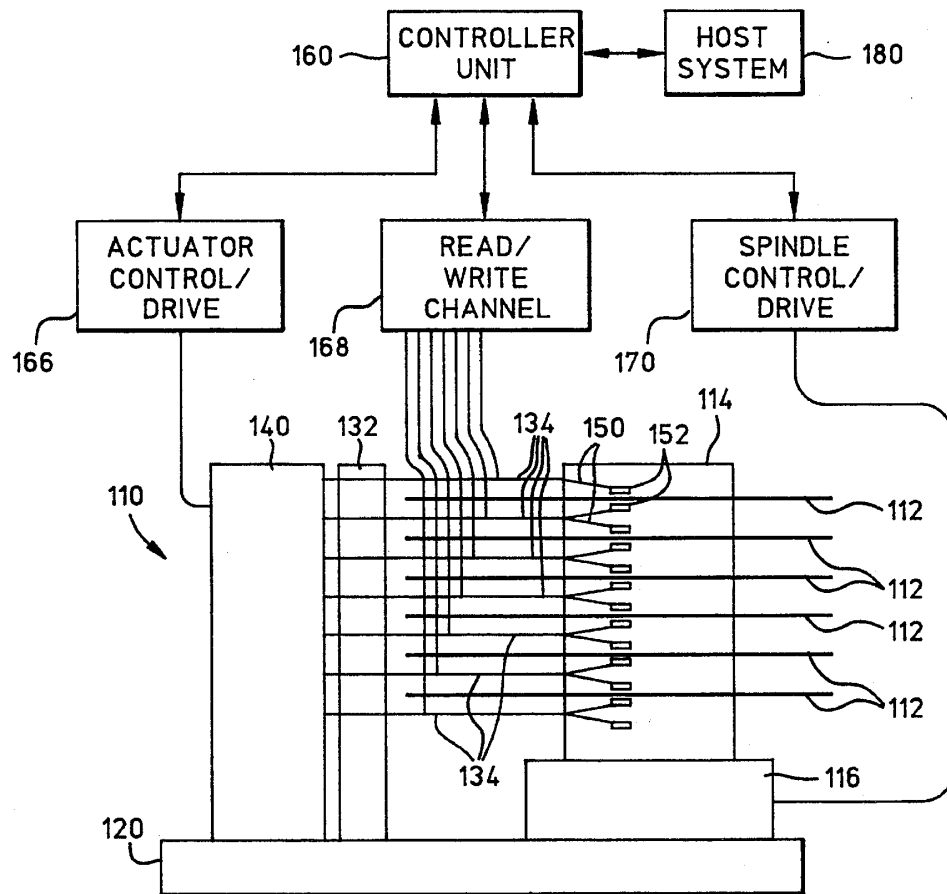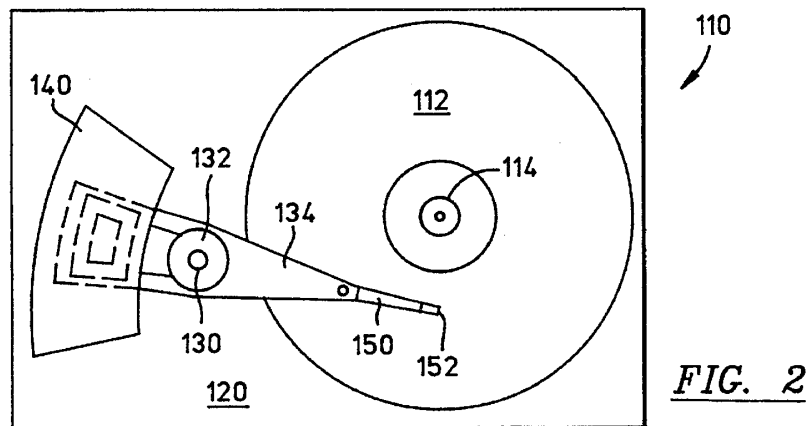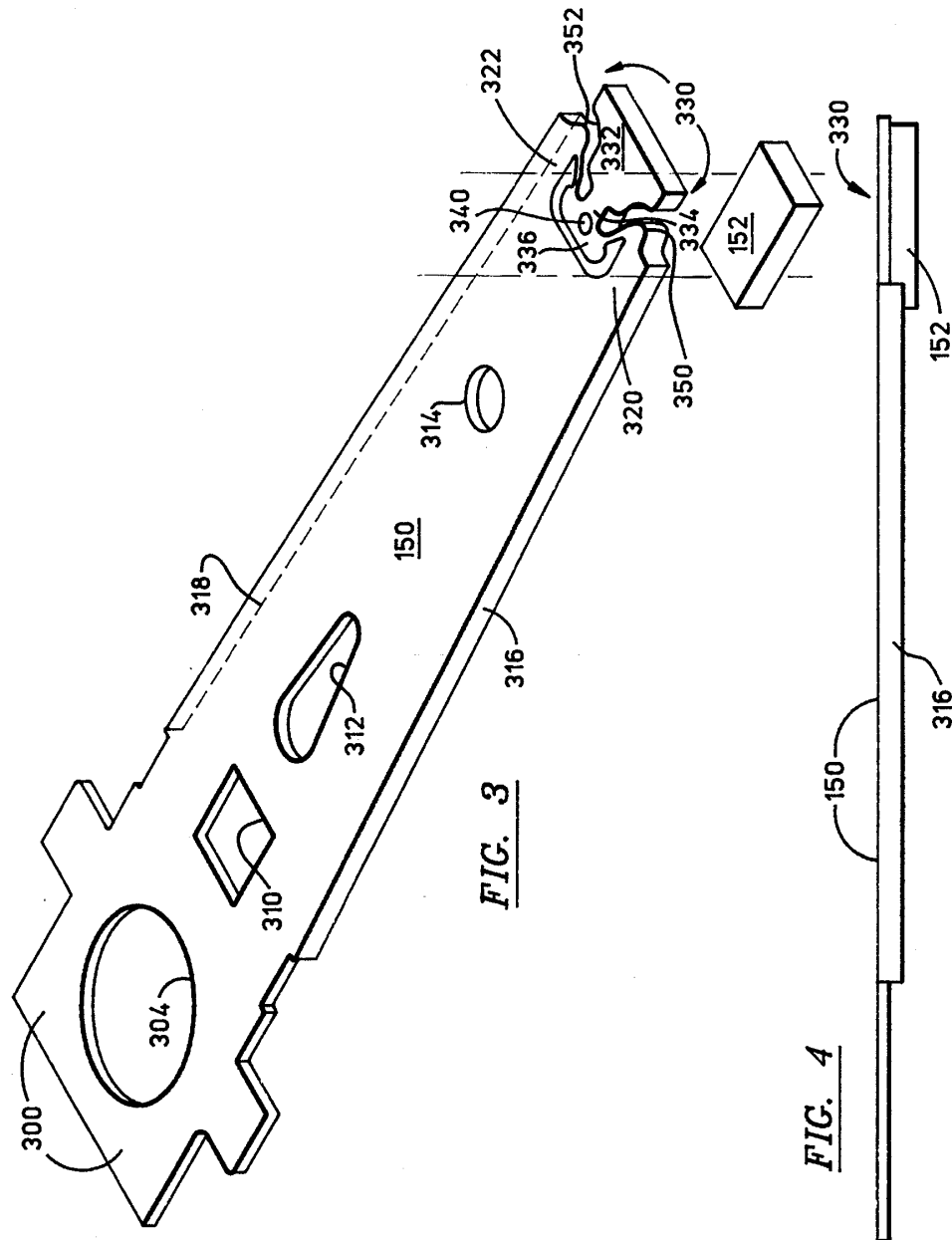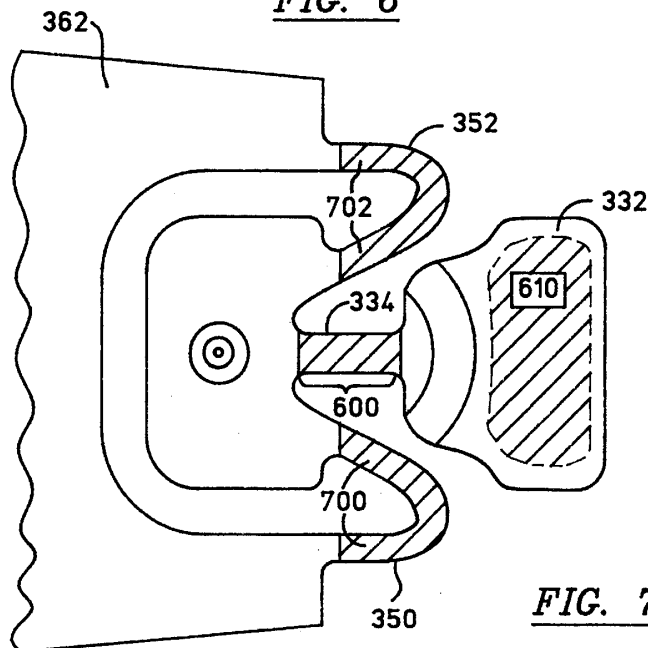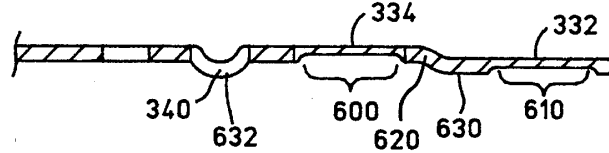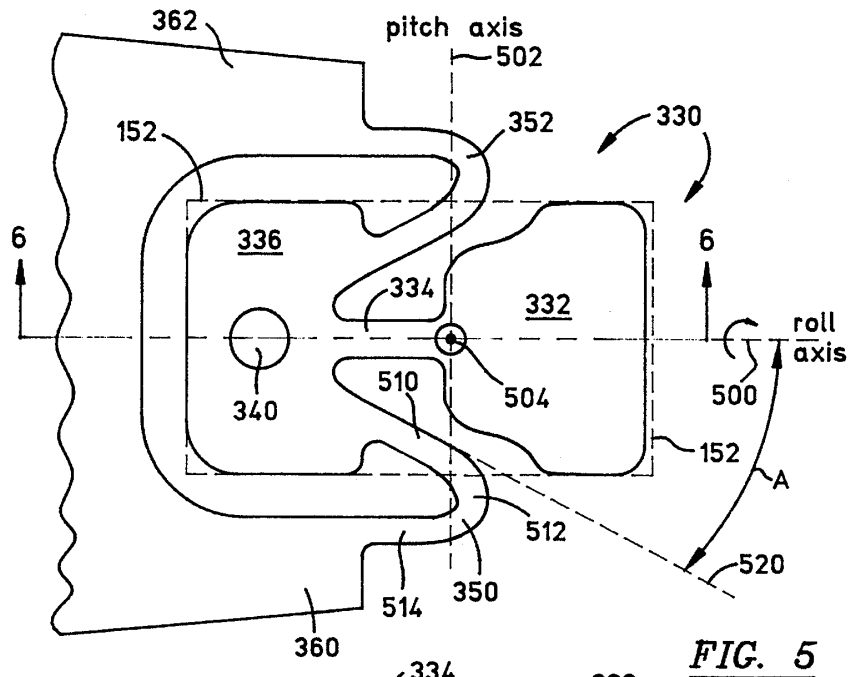
FIG. 8

DOCKET ALARM
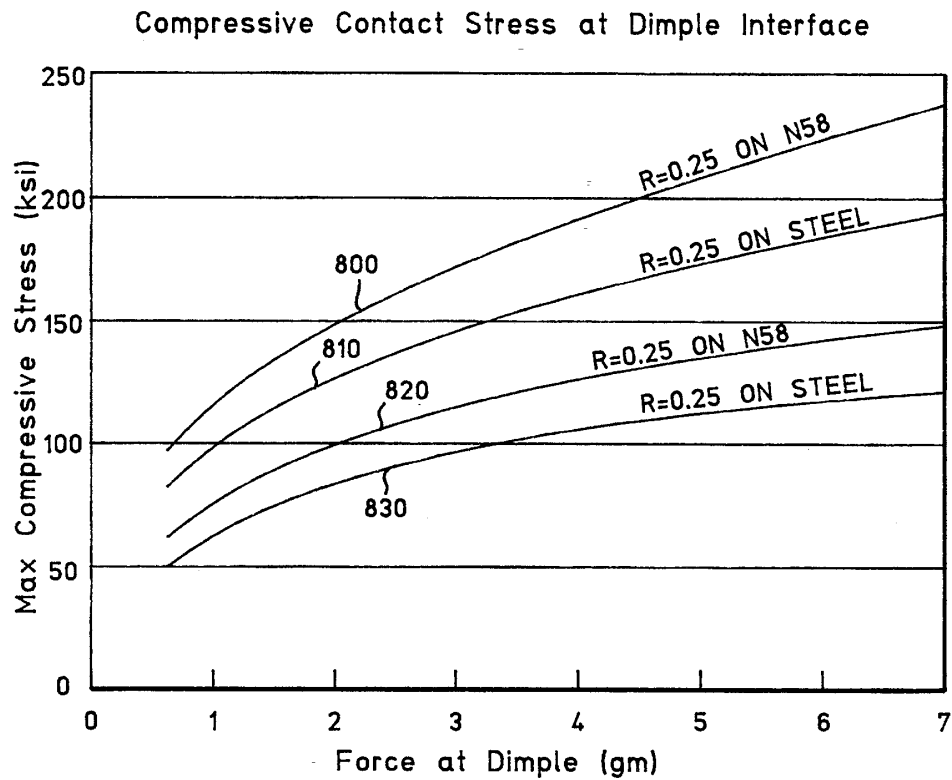
Explore Litigation Insights

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.

fastcase
Smarter legal research.